A Preliminary Assessment of Protected Area Management within the WWF 'Coastal East Africa' Priority Place, Eastern Africa

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A PRELIMINARY ASSESSMENT OF PROTECTED AREA MANAGEMENT WITHIN THE WWF 'COASTAL EAST AFRICA' PRIORITY PLACE, EASTERN AFRICA

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ABSTRACT

We studied the effectiveness of protected area management within a Worldwide Fund for Nature (WWF) priority place for conservation investment, located in the coastal areas of Kenya, Tanzania and Mozambique. At least 473 sites in this region have completed Management Effectiveness Tracking Tool (METT) assessments since 2003, often associated with Global Environment Facility (GEF) funded projects, but also through work funded by other donors and WWF itself. We show that community managed reserves score higher using the METT tool when compared with sites managed by the state forest agencies. We situate this within the context of approaches to reserve management in Tanzania, where state-managed Forest Reserves have received little in terms of funding support and score lowest when compared with all other management types in Tanzania. Further, we show that slightly higher average METT scores for sites where WWF are working across Kenya, Tanzania and Mozambique, when compared with all other sites, are most pronounced in elements of the METT tool relating to inputs, process and planning, and are not seen in outputs or outcomes. We discuss the utility of the METT tool for organisations like WWF to evaluate their impact in protected area management, including the issue of systematic bias in data recording (WWF facilitation of assessments) and that more time may be required to see the outcomes and impacts from any management improvements that have been achieved.

Key words: Management Effectiveness Tracking Tool, coast, Kenya, Tanzania, Mozambique

INTRODUCTION

A number of different tools have been developed to systematically assess protected area management effectiveness. The most widely used is the 'Management Effectiveness Tracking Tool' (METT) (Dudley & Stolton, 2009), which was built upon the World Commission on Protected Areas (WCPA) framework for assessment of protected areas (Hockings et al., 2006). Operational in 2003, it is now applied as a mandatory reporting mechanism for all protected area projects funded by the Global Environment Facility (GEF), the World Bank and the Critical Ecosystem Partnership Fund (CEPF), and is additionally used by other international agencies to track protected area management. WWF has adopted the METT as a tool to measure its conservation outcomes across its programmes, through the monitoring of the delivery of the 'Global Programme Framework' within its 35 priority places for interventions around the world (Burgess et al., 2014). It has also been used for global reporting against the Convention on Biological Diversity (CBD) Aichi Biodiversity Target 11 (Leverington et al., 2010a, 2010b; Coad et al., 2013).

One of the WWF priority places that forms a focus for their conservation efforts is 'Coastal East Africa', which includes the globally important species endemism values

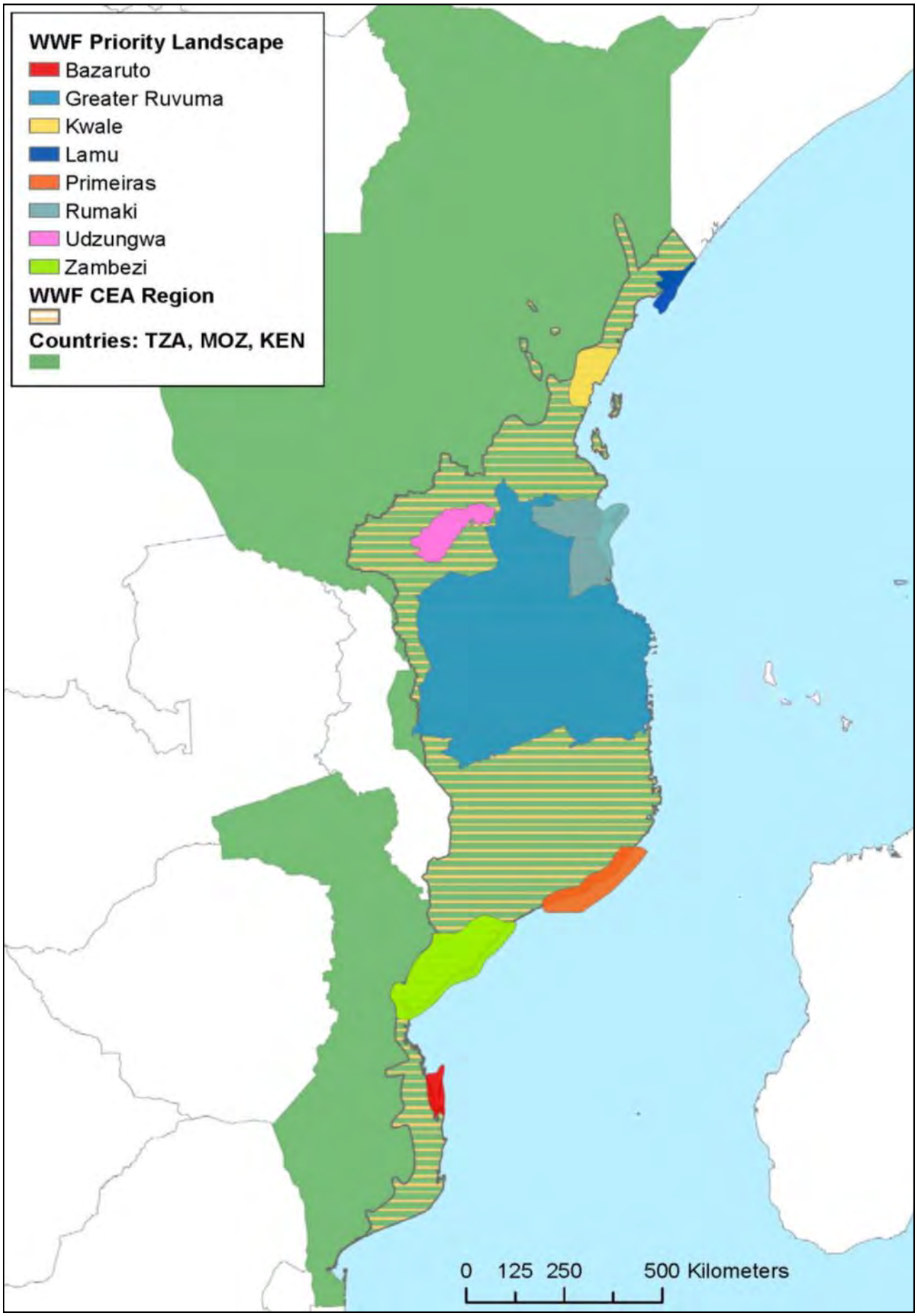

Figure 1: WWF Coastal East Africa Global Initiative (CEA-GI) region and Priority Landscapes within Kenya, Tanzania and Mozambique

Participants at a workshop to introduce the METT in Tsavo East National Park, Kenya © Equilibrium Research

of the Eastern Arc Mountains ecoregion (Burgess et al., 2007), and the eastern African coastal forests ecoregion (Burgess & Clarke, 2000), as well as components of the miombo woodlands ecoregions, with their globally important assemblages of large mammals (Olson et al., 2001; Burgess et al., 2006). The Coastal East Africa region includes marine and terrestrial elements, although there are few marine sites included in the dataset addressed for this paper. WWF has been working in Coastal East Africa for many years, an element of this work since the 1990s has been supporting the development of state managed and community managed conservation areas. There has been a wide application of the METT tool in the region, often through the GEF and WWF funded projects (some GEF funded projects are also implemented by WWF in Kenya and Tanzania), but also through other conservation projects with various combinations of partners including state bodies and other international NGOs. This dataset allows preliminary analyses of the utility of this tool, within the context of a regional conservation programme coordinated through an international conservation NGO, and within the setting of three different nations and a number of different protected area management regimes.

This paper presents an analysis of protected area management in the Coastal East Africa WWF priority places within Eastern Africa, using data from all available METT assessments from the countries of Tanzania, Kenya and Mozambique. Specifically we investigate:

1. To what extent has the METT tool been applied in the region?
2. How does protected area management, as measured by the METT tool, vary with management type, both in broad terms and in more detail for Tanzania?
3. Can we measure the impact of WWF presence or absence in a protected area, as measured by the METT tool, on improvements to protected area management?

METHODS

Study location

The study area comprises a nested set of overlapping regions (Figure 1): a) the country boundaries of Tanzania, Kenya and Mozambique; b) the WWF Coastal East Africa Global Initiative (CEA-GI) region which comprises the coastal regions of these countries and aims to cover the most critical biodiversity values within a coherent region (WWF, 2008); and c) the WWF Priority Landscapes for conservation activity within the broader CEA-GI region (WWF, 2008).

Preparation of datasets

- **METT assessment data**: The METT tool (last updated in 2007[1]) consists of three datasheets: the first contains information on protected area context (e.g. legislation, ownership and governance), protected area management inputs (e.g. budget and staff numbers), and protected area objectives and management activities. The second datasheet focuses on protected area threats, and the third comprises a series of 30 questions scored between 0 and 3 (four ranks) and covers various elements of site

management (Belakurov et al., 2009; Hockings et al., 2006) covering the six components of the WCPA framework: context, planning, inputs, process, outputs and outcomes.

For this study we compiled all METT data from the region from 2003 onwards, as collected by several different agencies; NGOs such as WWF, national governments, GEF and CEPF funded projects etc. The majority of the 473 assessed sites from this region were associated with GEF project investments, with over 150 sites assessed during a GEF project focused on the Eastern Arc Mountains in Tanzania and an additional c. 150 assessed during two different GEF projects focused on coastal forests in Kenya and Tanzania. The remaining sites were assessed by a mixture of agencies and projects, including around 100 by WWF itself. Across the set of sites where WWF is working, their staff have been present together with either government or community members when METT assessments were completed. Across the sites where WWF is not working, but METT assessments are available, there has been no WWF facilitation or involvement when the sheets were completed. In our analysis we compare protected areas where WWF has been working against all other possible options for protected areas combined, including state-only, other national organisations, other international NGO involvement and funding from international organisations. We initially identified assessments for the region already compiled in the January 2014 version of the Global Database on Protected Area Management Effectiveness (GD-PAME). From January to June 2014 we gathered new METT data from WWF country contacts and other protected area managers in the region. These new data were added to the GD-PAME from June to September 2014. The September 2014 version of the METT data from this database was used for all analyses reported here. Where possible, we linked METT assessment data to the World Database on Protected Areas (WDPA) (June 2014 version), assigning a WDPA code to each assessment, using the protected area name given in the METT assessment. Where more than one METT assessment had been completed for a protected area, the most recent assessment was used in the analyses, unless otherwise stated.

- **Spatial protected area data**: We used boundary data for protected areas in Tanzania, Kenya and Mozambique from the June 2014 version of the WDPA. The spatial location of assessed protected areas was determined by linking the boundary data from the WDPA to the METT assessment data, by WDPA code. Assessment data could then be analysed by 1) Country, 2) CEA-GI region, and 3) Priority Landscape, using ArcGIS mapping software to extract the protected areas within each of these three study locations.

  We identified those protected areas where WWF is working through a process of contacting all project managers in the region, and developed a list of their intervention sites (protected areas) that was then checked in terms of names and locations and linked to the WDPA. As a number of sites where WWF is working were not matched to the WDPA (due to the lack of a polygon for the protected area in the WDPA or possibly problems of matching names), the list of WWF intervention sites matched to the WDPA is only around half of the sites where WWF is working in the region. This list of sites where WWF is working was then also used to develop a list of sites where WWF is not working, which comprised all other sites in the WDPA within the regions of interest. There are some sites where WWF is not working that have the involvement of other NGOs, but this number is small compared with the number of sites with WWF involvement.

DATA ANALYSES

Application of the METT tool within the study regions

For each of the three study areas we calculated the percentage of protected areas (by both number of protected areas and area coverage) that had conducted METT assessments.

Analysis of METT scores

For each of the three study areas, we calculated the total METT score as a percentage of the total possible score. We then compared the average percentage METT score by:

1. Country (Tanzania, Kenya and Mozambique);
2. Protected area management type derived from the data given in the METT assessments (central government, local government, local communities, and private/other where the management type was too few in number to warrant a separate category);
3. WWF project presence or absence in a particular protected area where there has been a METT assessment.

We also calculated METT component scores, creating average scores for questions pertaining to the six different WCPA framework elements of management: context, planning, inputs, process, outputs and outcomes. We then compared average component scores for protected areas with and without WWF projects.

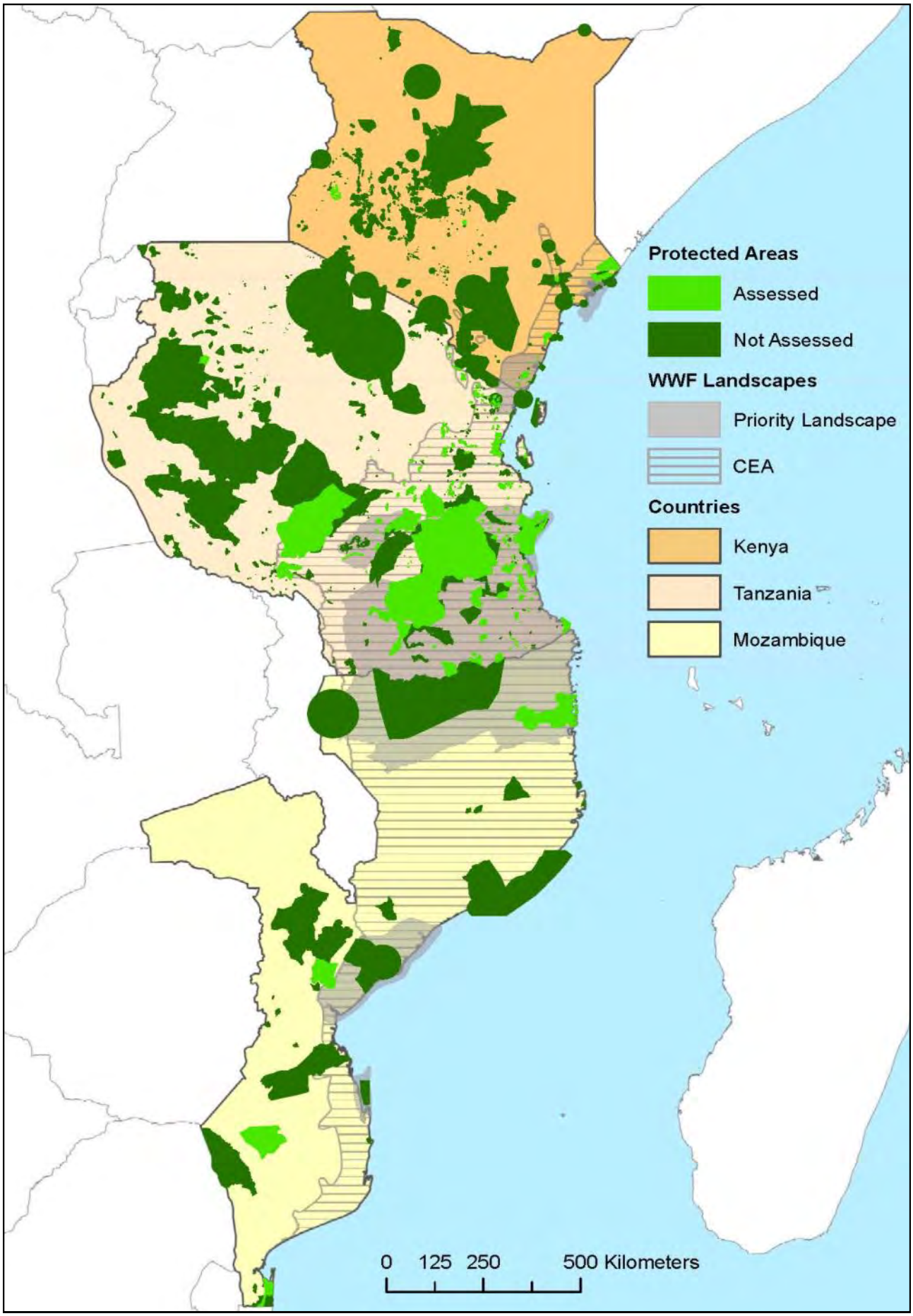

Figure 2: METT assessments by country within the CEA-GI region

Table 1: Numbers of sites included in the spatial analysis of METT scores within the three study areas: Country (Tanzania, Kenya and Mozambique), CEA-GI region and Priority Landscape. For sites not held in the WDPA we have no additional information on their location, so it is not possible to know how many sites fall within the CEA and Priority Landscape boundaries

	Country	CEA	Priority Landscapes
Number of sites in WDPA	1,076	457	216
Number of sites in WDPA that have been assessed using METT (% of total)	222 (21%)	209 (46%)	112 (52%)
Area of sites held in WDPA in km^2	617,527	257,811	191,193
Area covered by METT assessed sites in km^2 (% of total)	119,886 (19%)	112,607 (44%)	83,231 (44%)
Number of sites assessed using METT not in WDPA	251		
Total number of sites with METT assessments	473		

RESULTS

Application of the METT tool

Overall 21 per cent of the protected areas held in the WDPA for Tanzania, Kenya and Mozambique have been assessed using METT, which represents 19 per cent of the total area under protection (Figure 2 and Table 1). Of the total METT assessments for the three countries, only 47 per cent are included in the WDPA. This difference in numbers of sites where METT has been applied and sites in the WDPA is largely due to the numerous community-owned 'Village Land Forest Reserves' assessed in Tanzania, and community managed 'Kaya forest' sites assessed in Kenya. These are sites that: a) may not conform to the IUCN definition of a protected area, and are therefore not added to the WDPA; or b) conform to the IUCN protected area definition but no boundary or attribute data has been provided to UNEP-WCMC by government. The latter is often because clarity on applying the new IUCN protected area definitions has only recently been developed and many governments have previously only been providing data to the WDPA on state-managed protected areas.

Within the smaller area covered by the WWF broad intervention area (CEA-GI), 46 per cent of the protected areas held in the WDPA have been assessed using METT, representing 44 per cent of the total area under protection. For the Priority Landscapes targeted intervention region, the percentage of protected areas held in the WDPA that have been assessed using METT rises to 52 per cent, or 44 per cent of the total area under protection (Table 1).

Management of METT-assessed sites

Half of the total number of assessments for protected areas in the region reported that they were being managed by national government at the time of assessment (Figure 3). Assessments report that local communities were managing the protected area in 16 per cent and 31 per cent of assessments in Kenya and Tanzania respectively. Too few assessments have been collected for Mozambique to provide a breakdown.

Analysis of average METT scores

- **Average scores by country**: The mean percentage METT score for protected areas in the countries of Kenya, Tanzania and Mozambique for which spatial data was available was 41.9 per cent (±SE 1.0, n = 217). Protected areas in Kenya achieved higher scores than those in Tanzania (44.0 ± SE 2.7 and 41.4 ±1.1 respectively; Figure 4). There were not enough protected areas assessed in Mozambique to produce a meaningful mean score. The average METT score for the CEA-GI region was 41.8 per cent (±SE 1.0, n = 206). The average METT score for the Priority Landscapes was 42.9 per cent (±SE 1.6, n = 111).
- **Average scores by management type**: Within all of the three study areas (Country, CEA-GI and Priority Landscapes), METT scores were higher for community-managed sites than for government-managed sites (Figure 5). A Kruskal-Wallis rank-sum test conducted at the spatial level of 'Country', comparing mean percentage scores of central government managed, local government managed and community managed sites indicates that this difference is significant (central government managed sites mean percentage score =40.3 ±SE 1.1 n=168, local government =40.3 ±SE 2.5 n=19, community managed =51.6 ±SE 1.9 n=22; $X^2_{(2)} = 19.1$, $p<0.001$). Tukey's HSD post-hoc test on mean rank differences shows that the difference between community and central government managed sites, and difference between community and local government managed sites, are significant at $p<0.01$.
- **Average scores by Tanzania-specific reserve types**: To elaborate on this analysis, we were able to access more detailed information on protected area types in Tanzania, allowing the comparison of METT

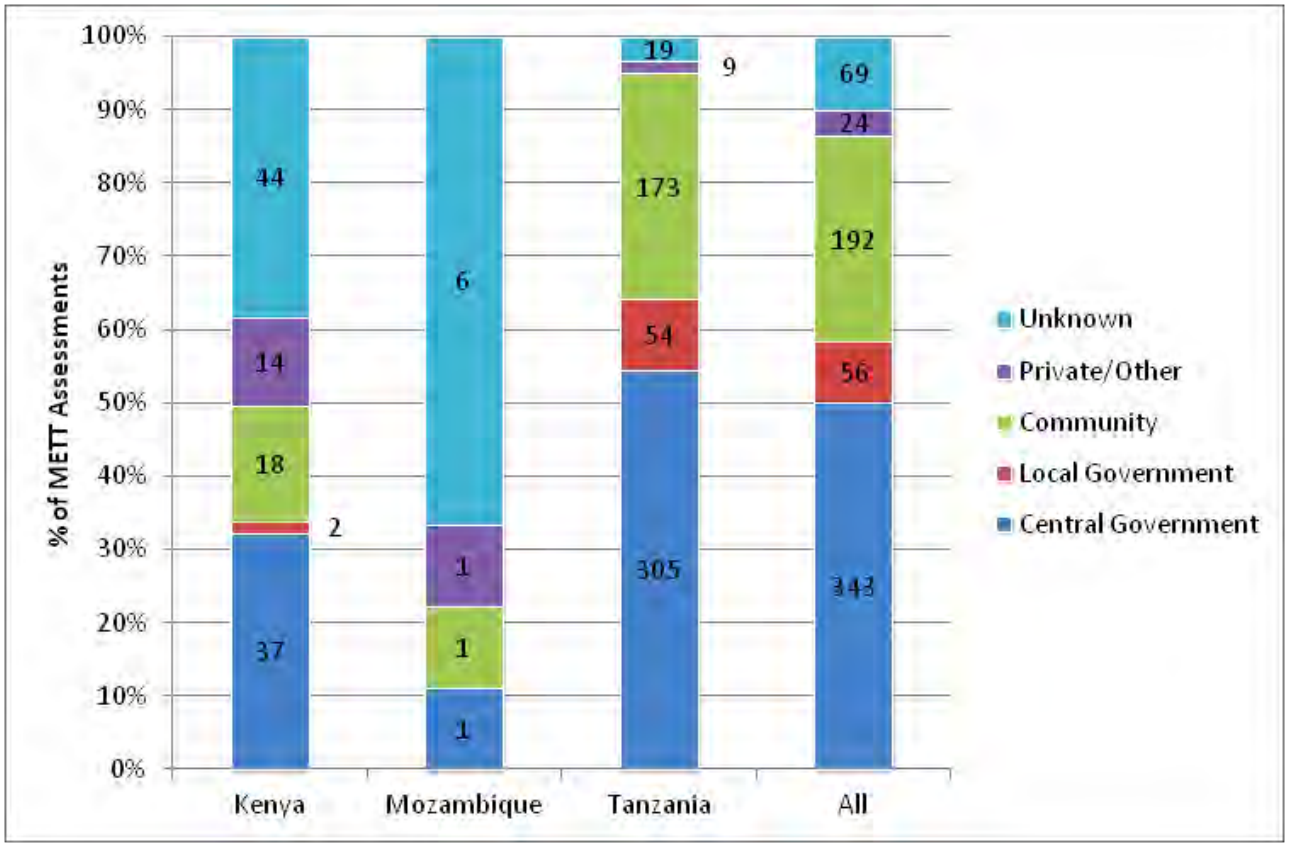

Figure 3: Governance of METT assessed sites, by country (actual numbers of METT assessments are given by numbers in the appropriate bar). Colours represent the various management types

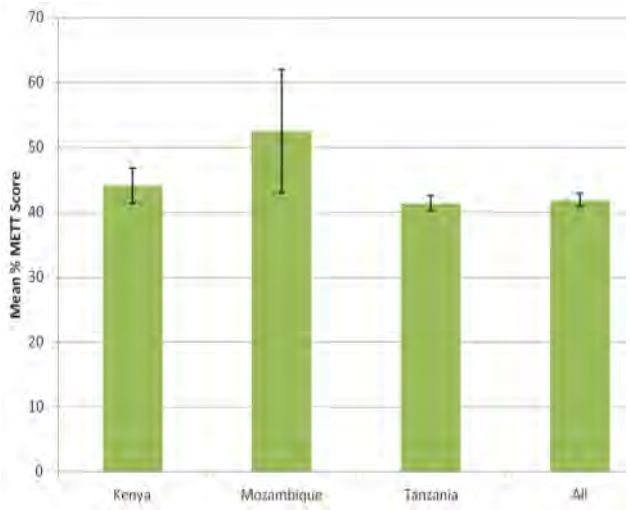

Figure 4: Mean percentage METT scores by Country for sites held in the WDPA. Error bars show standard error of the mean. Sample sizes per country: Kenya n=21; Mozambique n=4; Tanzania n=192

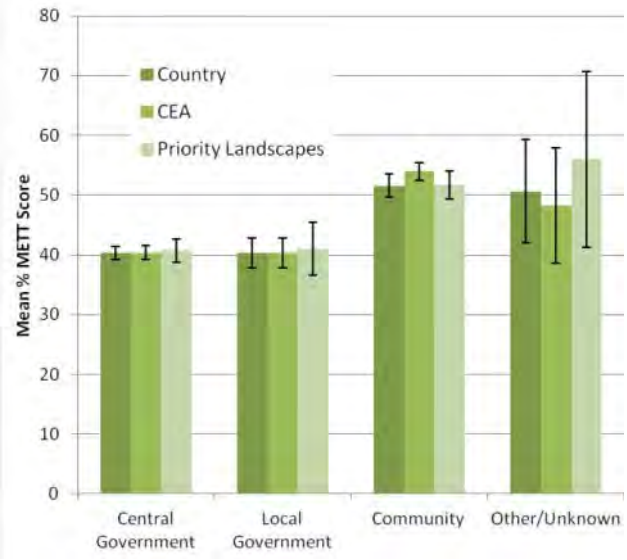

Figure 5: Mean percentage METT scores by management type at Country, CEA-GI Region and Priority Landscape scale. Error bars show standard error of the mean

scores between central government managed sites of different types (Forest Reserves, Game Reserves and National Parks), Local Authority Forest Reserves and community managed sites (Village Land Forest Reserves and Wildlife Management Areas) (Figure 6). All sites with METT assessments for Tanzania were used in this analysis. The central government managed sites show a polarisation of METT scores, with National Parks and Game Reserves scoring highest overall (National Parks n=7, mean percentage score =67.0 ±SE 5.0; Game Reserves n=5, mean percentage score=65.8 ±SE 8.4), and the Forest Reserves scoring the lowest overall (n=192, mean percentage score=37.4 ±SE 0.9). This indicates that the broader grouping of 'central government' managed sites (Figure 5) effectively swamps the

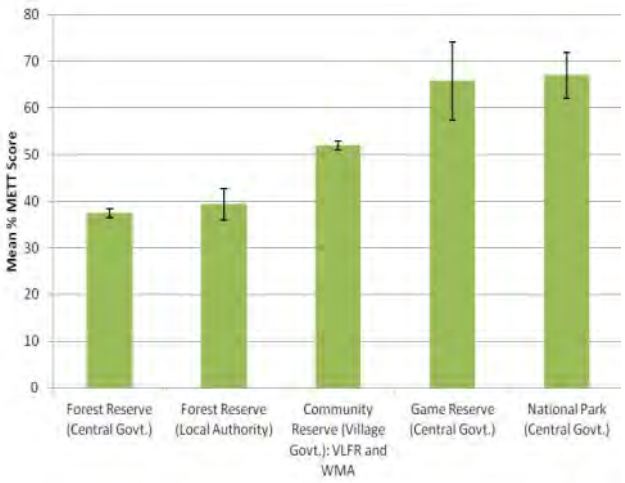

Figure 6: Breakdown of percentage METT scores by reserve type for all sites in Tanzania for which reserve type information was available. Error bars show standard error of the mean. VLFR: Village Land Forest Reserve, and WMA: Wildlife Management Area

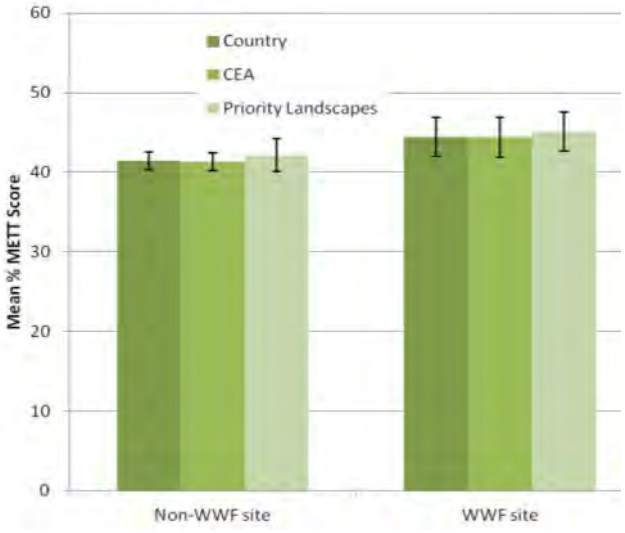

Figure 7: Mean METT scores by WWF presence/absence (at country, CEA-GI Region and Priority Landscape scale). Error bars show standard error of the mean

higher scoring reserve types due to the large number of Forest Reserves. Community-managed sites still score higher when compared with forest reserves managed by central or local government (Village Land Forest Reserves and Wildlife Management Areas n=151, mean % score =51.9 ±SE 1.0; Local Authority Forest Reserves n=14, mean % score=39.4±SE 3.4). Sample size limitations do not allow statistical comparisons between these categories.

- **Average scores by WWF presence or absence**: Of the 95 sites where WWF works within the CEA-GI region, 67 (71 per cent) have been assessed using the METT tool, and 132 assessments have been conducted. Overall, sites with WWF presence score slightly higher than sites without WWF presence

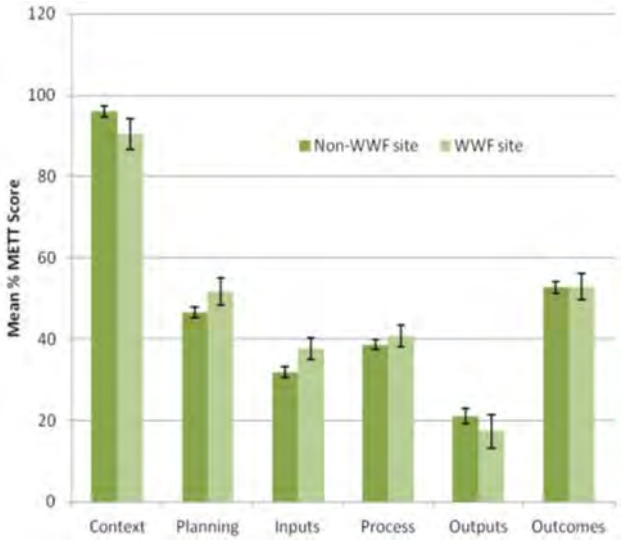

Figure 8: Mean percentage METT scores broken down by WCPA framework components of management effectiveness (Hockings et al., 2006), according to WWF site involvement (using data from Tanzania, Mozambique and Kenya for sites within the WDPA at the spatial level of the WWF CEA-GI region). Error bars show standard error of the mean

(Figure 7), but this difference is not statistically significant (Mann-Whitney U test of mean per cent score ranks; WWF sites (n=31)= 44.4 per cent, non-WWF site (n=175)= 41.3 per cent, W=2352, pns). When METT scores within the CEA-GI spatial dataset – comparing sites with and without WWF presence within the CEA-GI region – are broken down by the six components of management effectiveness, the difference in scores is greater in the 'design, appropriateness and adequacy' components of the METT tool (planning, inputs and process) with the exception of context (Figure 8; mean percentage scores for context, WWF site =90.4 ±SE3.8, non-WWF site = 96.0 ±SE 1.3; planning, WWF site =51.8 ±SE 3.4, non-WWF site = 46.6 ±SE 1.4; inputs, WWF site = 37.7 ±SE 2.7, non-WWF site =31.9 ±SE 1.3; process, WWF site =40.8 ±SE 2.7, non-WWF site = 38.7 ±SE 1.2). Mann-Whitney U tests of difference in mean percentage score ranks, between sites with and without WWF presence, in each of the six components of management effectiveness show a statistically significant difference in the inputs component only (WWF sites n=31, non-WWF sites n=175, W = 2073, p< 0.05). For the 'delivery' components (outputs and outcomes), sites with WWF presence scored either slightly lower than sites where WWF are not working or fractionally higher (Figure 8), but these differences are not statistically significant (mean percentage scores for outputs, WWF site = 17.4 ±SE 4.1, non-WWF site =21.0 ±SE 1.9; outcomes, WWF site =52.9 ±SE 3.3, non-WWF site =52.8 ±SE 1.4).

House of spirits: Mijikenda elders undertaking a sacred ceremony at Chizia Cha Nyere, Kaya forests, Kenya © E. Obel-Lawson / WWF-Canon

DISCUSSION

This study compiled and analysed protected area METT data for Tanzania, Kenya and Mozambique, investigating protected area management by country, WWF CEA-GI region and WWF Priority Landscape. There has been a wide application of the METT in the region, largely through past GEF funded projects working with government, and NGOs working together with government and communities in the region. METT application has been most frequent in the priority landscapes/seascapes for WWF; 52 per cent of protected areas in the CEA-GI Priority Landscapes had been assessed, compared to 46 per cent in the wider CEA-GI Region, and 21 per cent within Tanzania, Kenya and Mozambique overall. There is a marked difference in the application of METT between countries; numerous sites have been assessed in Tanzania, some in Kenya, and very few in Mozambique. Balancing this effort by increasing the number of assessed sites in Mozambique and Kenya would enhance the utility of the available METT data for the region.

Analysis of METT scores show that sites managed by, or in collaboration with, local communities, achieved higher overall METT scores than Forest Reserves managed by national or local government. These findings warrant further analysis to investigate whether community managed reserves are performing better than government managed sites in certain elements of site management (for instance management inputs, process, outputs or outcomes), or over all facets of management. In Tanzania the central and local government state-managed forest reserves have received very little funding support for decades, unless there has been a project providing funding support. The main funder in recent years has been the GEF and different NGOs, with WWF support (often with GEF funding) to community reserves being significant (Burgess et al., 2013).

A more detailed analysis within the Tanzanian coastal forests shows that forest reserves run by local communities (Village Land Forest Reserves) have higher mean METT scores than those managed by the central government Tanzania Forest Service and the forest reserves managed by the local authorities, and that both National Parks and Game Reserves score higher than all types of forest reserves. In the coastal regions of Tanzania, the central government devolved responsibility for the management of all forest reserves to the districts in the 1980s, but provided no funding, which has placed severe restrictions on protected area management planning, process and management actions (Burgess et

Lake Manyara National Park, Tanzania © Equilibrium Research

al., 2013). Similar patterns have also been seen in the Eastern Arc Mountains where village reserves and private reserves score better than local authority or central government managed forest reserves, and proposed reserves score the worst (Madoffe et al., 2005). This may be a general pattern and is worth further exploration and analysis within the region.

Because the METT tool has been widely applied in the CEA-GI region it has the potential to be a useful impact evaluation tool for all protected area managers and their supporters in the region. We found slightly higher METT scores in sites that had WWF presence than those that did not, although these differences were not statistically significant. WWF staff have facilitated the completion of the METT questionnaires in many cases, which may have led to a systematic bias in the data. In addition, the differences in scores may reflect a choice by WWF to work in areas that already had basic management structures in place. There may be a positive impact of WWF support, but to truly understand the impacts of WWF involvement on protected area management, baseline and time series data (repeat METT assessments over a number of years) are required, and the quality and objectivity of the assessment process should be considered (i.e. where possible assessments should be carried out with a range of stakeholders, including PA managers, local government and local community representatives). Time-series analysis and the ability to gather consistent data to track management over time is one of the key functions, and a central original intention, of the METT tool. Currently, time-series analyses are not possible due to the limited number of repeat assessments. The utility of the METT for organisations like WWF to measure their impacts will improve as the size of the dataset increases and more repeat assessments become available.

The slightly higher scores in sites supported by WWF are skewed in favour of the design side of protected area management (planning, inputs and process). On the results side, there are marginally negative results for outputs and almost neutral ones for outcomes. It should be noted that the METT as an evaluation tool is less strong on evaluating the 'delivery' components of management effectiveness, and was not really designed as an outcomes measurement tool. For WWF and other conservation organisations, their interventions and investments in protected areas have been biased towards the design side, with most resources available in the early stages of projects (Burgess, pers obs.). Continuing to assess changes in management over time would allow managers and funders to track how different elements of protected area management change, and investigate how long it takes (if at all) for changes in protected area inputs and planning to result in positive conservation outcomes.

In the future, there is a need to assess the relationship between METT scores and conservation outcomes as measured using independent datasets. Suitable data could come from analysis of forest cover changes over time, or species population trends, within and outside protected areas. The purpose of such analyses would be to assess whether improved management of different reserves has prevented the loss of forest cover and species. Data available for this exercise include the forest change data from the University of Maryland together with the World Resources Institute and Google (Hansen et al., 2013). Similarly, it should be possible to get relevant species data, at least for the larger mammals in some of the savannah parks. We expect further use of METT data with biodiversity data to enhance our understanding of the links between protected area management and conservation impact in East Africa.

ENDNOTE

[1] See: assets.panda.org/downloads/mett2_final_version_july_2007.pdf

ABOUT THE AUTHORS

Kathryn Knights is a consultant with Protected Area Solutions. Her research interests are centred on the effectiveness of protected area management and the sustainable use of wild food resources.

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Isaac Malugu, **Peter Scheren**, **Elizabeth Ngoye** and **P. J. Stephenson** work for WWF in Eastern Africa and Switzerland and are supporting conservation actions on the ground and looking at how to measure impacts at the protected area and regional scales.

Neil D. Burgess runs the UNEP-WCMC Science Programme and has been involved with GEF and WWF projects in the Eastern African region for many years, working together with government agencies and communities.

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RESUMEN

Examinamos la eficacia de la gestión de áreas protegidas en un lugar prioritario del Fondo Mundial para la Naturaleza (WWF) para inversiones de conservación, situado en las zonas costeras de Kenia, Tanzania y Mozambique. Al menos 473 sitios de esta región han completado evaluaciones para monitorear la eficacia de la gestión (Management Effectiveness Tracking Tool-METT) desde 2003, a menudo relacionadas con proyectos financiados por el Fondo para el Medio Ambiente Mundial (FMAM), aunque también mediando proyectos financiados por otros donantes y por el propio WWF. Demostramos que las reservas forestales gestionadas por la comunidad obtuvieron una puntuación más alta con la herramienta METT en comparación con los sitios gestionados por los organismos forestales estatales. Situamos esto dentro del contexto de enfoques basados en la gestión de las reservas forestales en Tanzania, donde las reservas administradas por el Estado han recibido poco en términos de apoyo financiero y obtuvieron la puntuación más baja con respecto a todos los demás tipos de gestión en Tanzania. Demostramos, asimismo, que los puntajes de METT, ligeramente más altos en promedio para los sitios donde WWF está trabajando en Kenia, Tanzania y Mozambique, en comparación con todos los demás sitios, son más acusados en los elementos de la herramienta METT en términos de insumos, procesos y planificación, y no así en términos de productos o resultados. Debatimos la utilidad de la herramienta METT para organizaciones como WWF para evaluar su impacto en la gestión de áreas protegidas, incluido el sesgo sistemático en el registro de datos (evaluaciones facilitadas por WWF) y la posibilidad de que se necesite más tiempo para determinar los resultados e impactos de las mejoras logradas en materia de gestión.

RESUME

Nous avons étudié l'efficacité de la gestion des aires protégées au sein d'une zone d'investissement prioritaire pour le Fonds mondial pour la nature (WWF), située dans les régions côtières du Kenya, de la Tanzanie et du Mozambique. Depuis 2003, au moins 473 sites dans cette région ont complété des évaluations d'efficacité, grâce à un outil de surveillance de l'efficacité de la gestion (Management Effectiveness Tracking Tool - METT), souvent associées aux projets financés par le Fonds pour l'environnement mondial (FEM) ainsi qu'aux travaux financés par d'autres bailleurs de fonds ou par le WWF. Nous montrons que selon les mesures de l'outil METT, les réserves gérées par les communautés obtiennent de meilleurs résultats que les sites gérés par les organismes forestiers de l'Etat. On doit tenir compte ici de la politique de gestion des réserves en Tanzanie, où des réserves forestières gérées par l'Etat reçoivent très peu de soutien financier et obtiennent les résultats les moins élevés parmi toutes les modes de gestion en Tanzanie. En outre, nous montrons que les scores METT légèrement plus élevés que la moyenne obtenus par les sites où travaille le WWF au Kenya, en Tanzanie et au Mozambique, sont les plus prononcés pour les indicateurs liées aux intrants, à la gestion des processus et à la planification, que pour celles relatives aux sorties ou aux résultats. Nous examinons l'utilité de l'outil METT pour des organisations telle le WWF dans l'évaluation de leur impact sur la gestion des aires protégées, en tenant compte de la question du biais systématique dans l'enregistrement des données (les évaluations étant menées par le WWF) et du fait qu'il faudrait plus de temps pour voir les résultats et les impacts des améliorations obtenues.

CONSERVATION TRUST FUNDS, PROTECTED AREA MANAGEMENT EFFECTIVENESS AND CONSERVATION OUTCOMES: LESSONS FROM THE GLOBAL CONSERVATION FUND

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ABSTRACT

The Global Conservation Fund (GCF) is a global programme intended to address the problems associated with protected areas that lack sufficient resources to function effectively. In operation since 2001, GCF has built a global portfolio of over 65 protected area investments linked to a comprehensive integrated data set on protected area management effectiveness and conservation outcomes. With data collected over the last six years (2008-2013), this paper attempts to answer two questions: 1) What is the relationship between conservation investments and the enabling conditions needed to achieve conservation outcomes? 2) Does stable funding correlate with a stable or improving deforestation rate? Results from analysis of this data suggest that regular, sustained investment in protected area management resulted in a statistically significant decline in deforestation rates in and around these protected areas. Additionally, we find that higher scores on management effectiveness were associated with lower deforestation rates. This suggests that monitoring the enabling conditions for effective protected area management provides a reasonable proxy for conservation outcomes as measured by changes in deforestation rates. These results make a compelling argument that Conservation Trust Funds are valuable tools to help protected areas deliver on their objectives and contribute to global conservation targets.

Key words: Global Conservation Fund, protected area investments, conservation outcomes, deforestation

INTRODUCTION

The lack of long-term investment in conservation has historically been a key limitation to the effective management of protected areas and the success of conservation interventions (CFA, 2003). Due to the nature of the conservation process, which is a long-term endeavour that often requires social change, improvements to civil society, and capacity building, conservation goals often cannot be fully achieved by short-term grants alone (Ferraro, 2001) in the typical grant-making cycle of 2-5 years. This inherent limitation of traditional grant financing mechanisms has led to the emergence of Conservation Trust Funds (CTFs).

At their core, Conservation Trust Funds are long-term financing mechanisms which provide grants to conservation projects. These institutions are structured in a variety of ways, from sinking funds to endowments; and directly invest in protected areas, indigenous- and community-conserved areas, and other conservation programmes. Despite this variability, their goal is usually the same: to provide sustainable financing for the conservation of nature.

Since the 1990s, when the first CTFs were established, the number has grown to encompass over 70 world-wide (Mathias & Victurine, 2012). In a review of 36 CTFs, Mathias and Victurine (2012) reported that US$672 million were under management. However, despite the growth in CTFs, donors and governments remain sceptical of the appropriateness and impact of CTFs (Bladon et al., 2014; CFA, 2013; GEF, 1998).

One of the concerns of donors and governments is the degree to which investments from CTFs have resulted in tangible impacts on biodiversity. Adams and Victurine

In Madagascar, remnant forests provide the last refuge for threatened endemic species and protect the headwaters of watersheds important for the production of subsistence crops. However protected areas alone cannot ensure healthy ecosystems © Conservation International/photo by Curan Bonham

(2011) have noted that, in addition to the primary benefits of CTFs (namely, a regular and reliable source of funding to cover recurrent protected area management costs), a number of important secondary benefits become apparent over time. These include increased continuity in project management and community engagement, sustained investment in rural communities that can lead to increased employment and human development benefits, and the building of civil society institutions that can develop strategic partnerships, attract new sources of investment, and expand their financial and project management expertise to have impacts in other areas of importance to local communities.

Nevertheless, CTFs have historically put less emphasis on measuring impact and evaluating their contribution to maintaining biodiversity (Spergel & Taieb, 2008) or other potential outcomes. Without proper verification of the impacts resulting from CTF investments, further financial support may be at risk. Recently, there has been an increasing interest in biodiversity monitoring by CTFs, but substantial evidence of their effectiveness is still largely anecdotal in the absence of detailed studies of their effectiveness (Spergel & Mikitin, 2013; RedLAC, 2012; Adams & Victurine, 2011).

Despite the nascent data collection efforts by CTFs, one global portfolio of CTFs in particular provides a case in which substantial impact data already exist. The Global Conservation Fund (GCF) was established in 2001 by a 10-year US$ 100 million grant from the Gordon and Betty Moore Foundation (GBMF) to Conservation International (CI) to support the establishment and sustainable financing of protected areas. The GBMF grant to GCF has enabled GCF to become a leading global source of technical expertise for designing CTFs. It has also allowed it to compile one of the most comprehensive integrated global data sets on protected area management effectiveness and conservation outcomes.

Most GCF protected area investments target the establishment of a sustainable financing mechanism as their ultimate outcome, and, because GCF frequently supported the recurrent management costs of these protected areas at a level similar to that provided by the investment returns of the CTFs that are eventually established, GCF's data set on management effectiveness and conservation outcomes can serve as a proxy of CTF effectiveness. Additionally, GCF continues to collect monitoring data on conservation outcomes after CTFs are established, and some of this data is incorporated

Figure 1. GCF impact pathway

into the analysis below while additional data will be used in a forthcoming publication.

With data collected over the last six years (2008-2013), this paper attempts to answer two key questions: 1) What is the relationship between conservation investments and the enabling conditions needed to achieve conservation outcomes? 2) Does stable funding (i.e. regular GCF contributions or CTF support) correlate with a stable or improving deforestation rate?

THE CASE OF GCF

GCF is a global programme intended to address the problems associated with protected areas (both newly-created and long-established) that lack sufficient funding to function effectively. GCF invests in projects developed by other international and national NGOs in addition to projects developed or implemented by CI, while also providing technical assistance and leading the design and establishment of CTFs for each protected area project in the portfolio. GCF allocated most long-term financing (LTF) funds to be used as capital for endowments to finance the long-term management of protected areas in GCF's portfolio, but GCF has also allocated LTF funds for strategic land purchases, contributions to debt for nature swaps, and payments for environmental services (PES). GCF has established 18 protected area endowments in 16 countries supporting at least 34 protected areas, and co-financed five US Government debt-for-nature swaps. By early 2014, GCF had 10 LTF transactions remaining in its original pipeline to be concluded before the end of 2015, while also developing new projects in additional geographic regions.

GCF was created with a focus on the creation and expansion of protected areas in the biodiversity hotspots, high-biodiversity wilderness areas, and key marine areas. Project selection favoured proposals seeking deep engagement with communities living in and around protected areas and with the potential to generate multiple benefits for biodiversity, ecosystem services and human wellbeing. The resulting portfolio includes diverse intervention styles ranging from government-sponsored protected areas to indigenous peoples' and community conserved territories and areas (ICCAs) and from privately-managed nature reserves to areas protected with voluntary conservation agreements. Ultimately, GCF investments were approximately evenly split by area between forest and marine ecosystems. Generally, GCF support began with a scoping/planning exercise to determine the potential for the establishment of a new or expanded protected area, continued to protected area establishment, implementation, and improved management phase, and concluded with the development of a sustainable financing mechanism to support the continuation of these efforts in perpetuity.

As of 30 June 2013, GCF had awarded grants with GBMF funding totalling US$ 30 million for preparatory and start-up ('implementation') grants, and US$ 35 million for 26 LTF grants (mostly contributions to capitalise the endowments of conservation trust funds). GCF's overall investments (both implementation and LTF funds) include US$ 11 million for Africa and Madagascar, US$ 20 million for Asia and the Pacific, and US$ 35 million for the Americas (including Seascapes). Out of GCF's combined total of US$ 65 million in grants for implementation and LTF (as of 30 June 2013), US$ 35 million were invested in CI biodiversity hotspots, US$ 17 million were invested in high-biodiversity wilderness areas, and US$ 13 million was invested in Important Marine Regions (Wells & Spergel, 2014). GCF's grants have financed the protection of over 80 million hectares of new protected areas[1].

Although a simplification of more complex and context-specific processes, a logic model for GCF's impacts is illustrated in Figure 1. Effectively managed long-term financing mechanisms (CTFs) with appropriate levels of capitalisation provide the enabling conditions for the

Aerial view of Sovi Basin, 20,700 hectare of pristine forest and river habitat © Conservation International/photo by Haroldo Castro

generation of regular financial resources (whether through investment returns or other means) to support protected areas. Once generated these financial resources enable the maintenance and continuity of the institutional and physical structures needed for effective management of protected areas (including staff, infrastructure, community benefits programmes, etc.). Effective management of the protected area in turn supports the delivery of conservation outcomes.

Funding can be provided to the management of a site, but if there is no effective management of these funds they are at risk of not having an impact (Bruner et al., 2004). Until the time at which a CTF is established and operational, GCF functions as a de facto CTF for each protected area in its portfolio, providing regular funding to support core management costs at approximately the same level as the CTFs to be established at a later time. However, effective management of funds is not by itself sufficient to improve site management, if funds are not deployed appropriately. Effective management requires sufficient resources to enable, inter alia, development of the management team, on-the-ground patrols, engagement plans with local communities who may affect the site, and the possible direct payment or other incentives to encourage stewardship by local communities. Providing sufficient, stable, and targeted funding to a protected area creates the conditions needed for effective management of the protected area, which in turn facilitates the achievement of identified conservation outcomes.

METHODS

In order to effectively assess the performance of GCF-supported protected areas, CTFs and the relationship between them, GCF established a monitoring and evaluation framework that all projects participate in. The GCF monitoring framework is built upon two core principles: generation of sufficient financing and maintenance/improvement of biological status at site-level. For each of these core principles, GCF measures outcome metrics and the enabling conditions that underlie the achievement of those outcomes. The overall metric of success for GCF's portfolio of protected area investments is a combination of two types of outcomes: financial and biological; and two types of enabling conditions: site level (protected area management effectiveness) and fund level (fund management effectiveness). These four pillars are core to the GCF model of support to protected areas and accordingly our monitoring structure is built around them.

OUTCOMES

Financial outcomes are measured annually through investment performance. The annualised investment return of each established CTF was tracked quarterly and summarised annually from 2008-2013 via investment reports provided by each fund's investment manager. These data were verified through GCF's monitoring and reporting requirements for long-term financing mechanisms, which include regular submission of investment reports, a narrative report on the state of the

fund's financial management, and other information related to disbursement of grants. To enhance our understanding of the flow of financial support to protected areas, we have also collected estimates of financial support from non-GCF sources.

The primary indicator of the biological status of sites is the rate of loss of natural habitats, and among those forested sites, specifically deforestation. Using the extent and rate of loss of natural habitat as an indicator for biodiversity, is a product of three assumptions related to species:

1. that many globally threatened species are primarily threatened by habitat loss (deforestation);
2. that the globally threatened species GCF is concerned with at a site are forest obligates (are restricted to forest habitat);
3. that globally threatened species need viable habitat in order to persist, and measuring the area of primary habitat remaining provides a proxy for the potential area of occupancy for a given species.

Two-date change detection analyses over three time periods were conducted for all terrestrial sites using Conservation International's standard deforestation mapping methodology (Conservation International, 2014). Time periods of analysis were chosen to represent three distinct periods that approximately track the course of a GCF investment: 1990-2005 (baseline, pre-GCF investment), 2000-2005 (transition, initial GCF investment), and 2005-2010 (post-GCF investment). These time periods allow us to track forest cover change and assess the effect of GCF investment on forest change trends. Additionally, a 20-km buffer zone surrounding each site was assessed for deforestation. Any neighbouring protected areas in bordering countries were excluded from the buffer zones. This allows a contextual comparison of the set of sites as well as of the entire portfolio.

Deforestation estimates were based on Landsat image analysis, the image source chosen for its no-cost availability and high quality for monitoring deforestation. The spatial resolution of the imagery is 30 m, and final products are filtered to a minimum-mapping unit of one hectare. When interpreting the spectral data in the images, only areas believed to be mature, natural forest were included in the forest class. Secondary forest fallows and plantations were considered non-forest. Secondary forests older than approximately 15 years can appear similar to mature forest, and thus any such areas may be included in the forest class. Selectively logged forest that leaves a mostly closed-canopy remains in the forest class, and thus deforestation in this study refers to clear-cutting events of primary forest and secondary forest (15 years or older) greater than one hectare in size.

Images were co-registered to an error of less than one pixel to minimise the potential for erroneous changes estimated caused by image shifts over time period. Supervised classification was done using maximum-likelihood or decision-tree algorithms, both of which produce similar results when carefully applied, with the latter being more efficient. Two dates of images were classified in a single process in order to directly estimate change, rather than comparing classification results of individual dates. This was first done for the 1990 to 2000 period, then the 2000 to 2005 and finally the 2005 to 2010 periods, with the final results combined in a GIS. Each time period actually may vary by plus or minus two years, as cloud-free images in many sites are scarce. For some sites with images that were especially cloud-contaminated, multiple images of each date were used and the results merged. The average cloud cover among all sites and dates is less than 10 per cent. While validation was not done for these particular classifications, it has been done for several national-level assessments, with accuracies for the estimation of forest cover being consistently over 92 per cent (Conservation International, 2014).

ENABLING CONDITIONS

While outcomes indicators such as deforestation and investment performance, as discussed above, apply to the impact of GCF investment, management effectiveness indicators assess the conditions on site which should be met in order to achieve those positive outcomes. Management effectiveness indicators were collected annually from 2008-2013 for each site in the GCF portfolio with the assistance of project managers, protected area managers, and others who were knowledgeable about each site. These indicators are based on a modified form of the Management Effectiveness Tracking Tool (METT) developed by the World Bank/WWF Alliance (Stolton et al., 2007). The data for these indicators are periodically verified through site visits by GCF staff. The protected areas management effectiveness indicators describe the current state of management at the sites in the GCF portfolio and can be compared across six years. These 24 indicators are organised around five themes: Legal Recognition, Governance, Management Plans, Minimum Resources, and Research and Knowledge. Specific indicators include questions related to the following topics: gazettement, land tenure, staff capacity, reporting, local input, stakeholder engagement, management plan implementation, species action plans, education and

Table 1. Sample descriptives of mean annual deforestation rate inside protected areas and buffer zones using t-tests for equality of means

	Mean	Standard Deviation	t	df	P
Paired t-tests					
In Site					
1990-2000	0.58%	1.20%	-2.12	52	0.04**
2005-2010	0.22%	0.52%			
20-km buffer zone					
1990-2000	1.30%	1.53%	-0.49	51	0.00**
2005-2010	0.42%	0.52%			

*significant at p<.05
**significant at p<.01

awareness, monitoring and evaluation, financial plans, business plans, periodic review, biodiversity targets, adequate staff, appropriate budget, minimum infrastructure, boundary demarcation, biodiversity research, and socioeconomic research (Conservation International, 2008).

At the time when GCF was created, widely-accepted monitoring tools to measure the management effectiveness of CTFs were not available. Using a definition of CTFs as an efficient, effective and durable long-term financing mechanism, GCF developed indicators to assess CTF management effectiveness. Based on accepted 'best practices' for CTFs, these indicators measure credible and transparent operational procedures, effective checks and balances within decision -making processes, appropriate asset management, and a governance structure representing a variety of sectors (government, NGOs, business, academia, community). Fund management effectiveness data were collected annually from 2008-2013 through a self-reported survey instrument designed by the GCF and completed by CTF managers. The data provided through this assessment are verified by GCF staff through meetings to discuss any year-to-year inconsistencies. The fund management effectiveness indicators describe the performance of funds based on two themes: Governance and Financial Management. These 19 indicators include questions concerning the following topics: operational procedures, stakeholder participation, composition of board, government support, fund leadership/management, flow of funds, communication, reporting, fund learning, external audits, administrative costs, strategic planning, investment policy, financial management, financial capacity, financial returns, sufficient finances, and financial plan implementation (Conservation International, 2008).

RESULTS

This report presents six years (2008-2013) of management effectiveness data for 65 actively monitored sites in the GCF portfolio. Additionally, data are provided about the biological status of these sites (vis-à-vis analysis of deforestation rates). The report also examines data on enabling conditions (fund effectiveness) for 15 of the funds to which GCF has disbursed long-term financing and funding rates (annual budget allocations) to all 65 sites actively monitored.

Biological outcomes

A paired samples t-test was conducted to examine whether there was a significant difference between deforestation rates both inside GCF supported sites and within a 20-km buffer area surrounding the site during the baseline period pre-GCF investment (1990-2000) and during the period after GCF investment (2005-2010). The test presented in table 1 revealed a statistically significant difference in deforestation rates before and after investment, both inside sites (t^2=-2.12, df^3= 52, p^4 <.05) and within the 20-km buffer zone around the sites (t= -0.49, df= 51, p <.000). Deforestation rates inside sites during the period from 1990-2000 (M^5=0.58 per cent, SD^6=1.20 per cent) were lower than deforestation rates in the buffer during the same period (M= 1.30 per cent, SD= 1.53 per cent) and decreased significantly after GCF investment, (in site, M=0.22 per cent, SD= 0.52 per cent vs. in buffer, M=0.42 per cent, SD= 0.52 per cent). These results suggest that GCF investment had a measurable effect on reducing deforestation rates in protected areas as well as their buffer zones. Specifically, our results suggest that when GCF investment is present, not only does the annual rate of deforestation within protected areas decrease, but also the annual deforestation rate within the 20-km buffer zone decreases.

Table 2. GCF Summary Financial Outcomes as of 30 June 2013

Total GCF Contribution to CTFs*	Total Funds Leveraged from Non-GCF sources*	Total Fund Capitalisation of GCF supported CTFs*	Average Annual Return on Investment	Estimated Future Average Annual Disbursement**
US$ 31.1M	**US$ 115.1M**	**US$ 146.2M**	**5.30%**	**US$ 7.3M**

* includes CTFs only and no other GCF deals such as debt for nature swaps
** assumes an annual spend down of no more than 5 per cent of principal

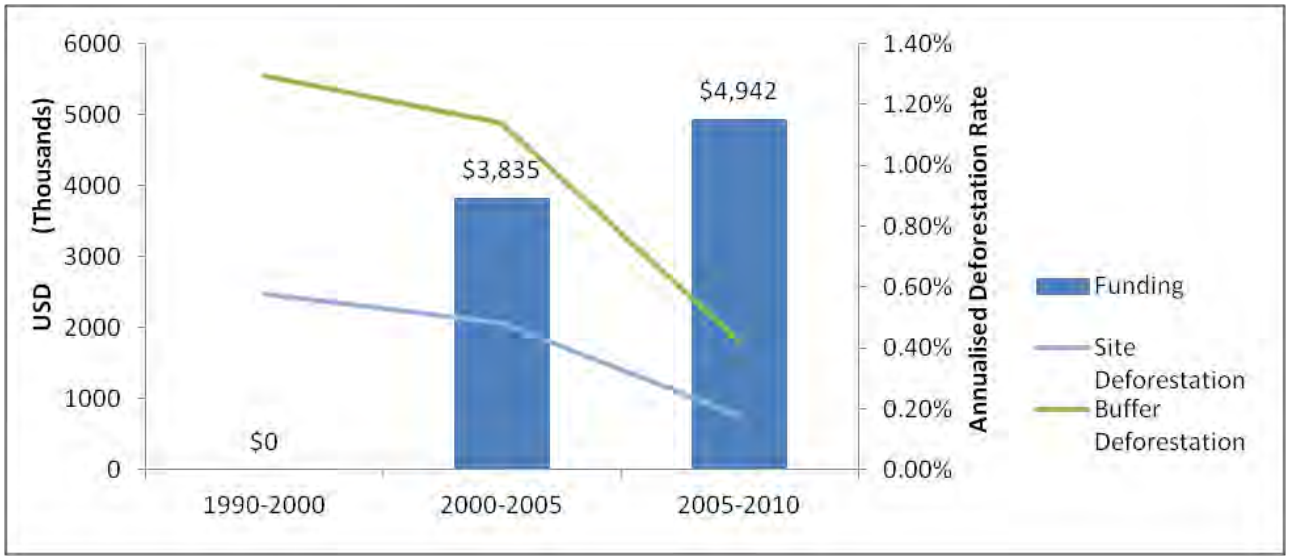

Figure 2 Funding levels and annualised deforestation rates for 65 GCF supported sites over three time periods

Financial outcomes

The average size of GCF's LTF grants is just under US$ 2 million dollars, and the average size of the resulting endowments (including contributions from other sources) is around US$ 7 million. GCF's LTF grants range in size from around US$ 750,000 for each of two endowments that benefit very small private or community managed PAs in Peru and Colombia and that were matched roughly 1:1 by other donors (meaning that the total capital of these endowments is around US$ 1.5 million)[7], to the largest five GCF LTF grants which were for around US$ 3 million each and leveraged contributions from other donors of between 1.5 and 50 times the amount of GCF's LTF contribution (meaning that the size of those endowments ranges from US$ 5 million to more than US$ 50 million).[8]

GCF has calculated that its CTF investments alone have leveraged a total of US$ 115.1 million in funding for protected areas from other donors through June 2013 (Wells & Spergel, 2014).

By contrast, GCF's implementation grants (i.e. project preparation and start-up grants) had a greater range in size, from US$ 25,000 to US$ 2 million, including seven such grants for over US$ 1 million each, although leverage funding for these implementation grants was not recorded. The first of these grants were disbursed in 2002 and average annual outlays between 2002 and 2013 were approximately US$ 700,000. Figure 2 shows the relationship between total funding levels and annualised deforestation rates in the portfolio during three five-year periods. This figure indicates that at a portfolio level, increased financial support to protected areas corresponds with a subsequent decrease in annualised deforestation rates. The relationship between funding and deforestation rate inside the site was evaluated using a linear regression model. A regression was performed between total funding and deforestation rate, as continuous variables. This regression had a negative slope (i.e. higher levels of funding, lower deforestation rate), although it was not significant at the 0.05 level. Although this data set does not demonstrate a causal relationship between funding levels and deforestation rates, a time-series analysis (Figure 2) provides preliminary evidence that increased financial support follows a similar trend in decreasing deforestation in site and in the 20-km buffer zone surrounding sites.

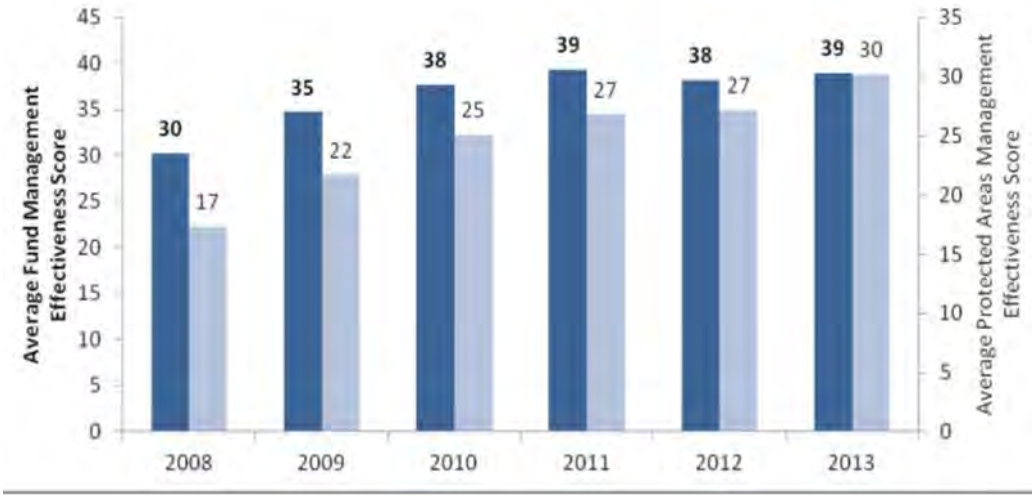

Figure 3. Evolution of management effectiveness scores from 2008-2013
Note: Dark blue bars on left correspond to mean annual fund management effectiveness scores averaged across all funds, light blue bars on right refer to mean annual protected area management effectiveness scores averaged across all sites. The maximum score possible for both the Fund Management Effectiveness and the Protected Area Management Effectiveness Survey is 50.

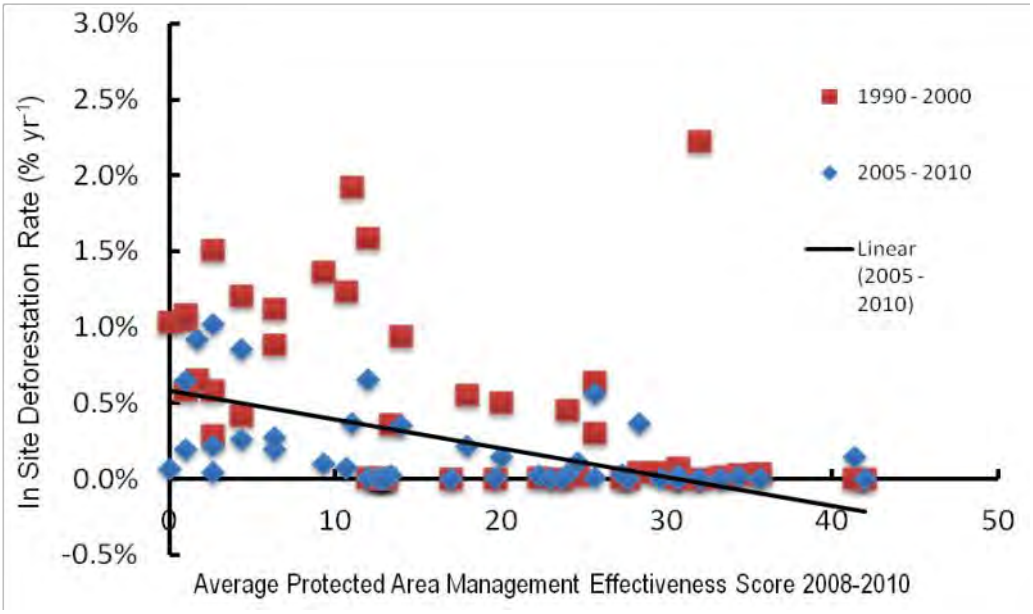

Figure 4. Relationship between Post Investment Deforestation (2005-2010) and Post Investment Management Effectiveness (2008-2010) in GCF sites.
Note: Regression for the 2005 to 2010 period is: y = a + bx, df = X, r2 = y, p<Z.

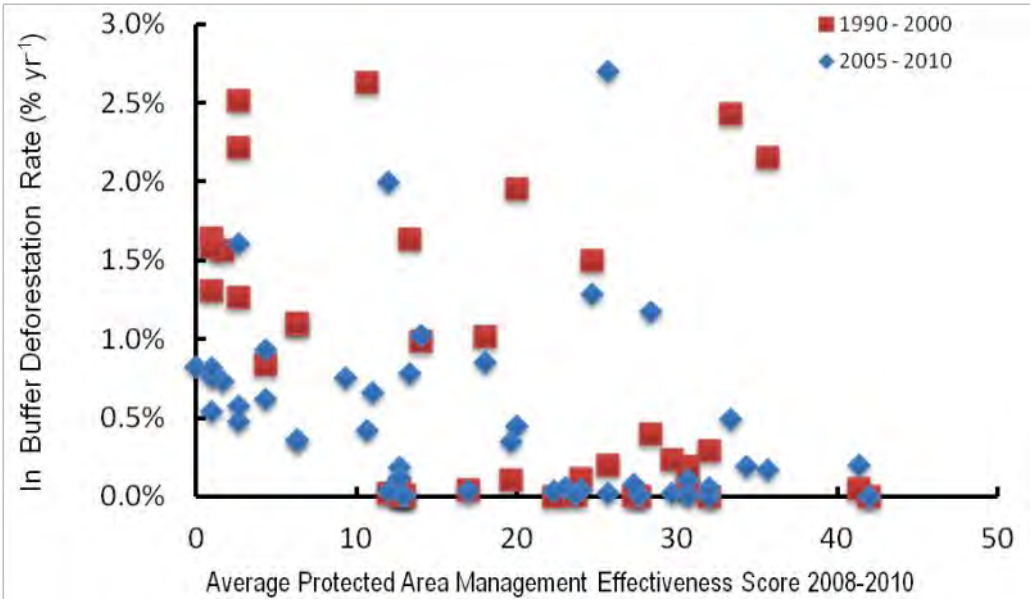

Figure 5. Relationship between Post Investment Deforestation (2005-2010) and Post Investment Management Effectiveness (2008-2010) in 20-km buffer around GCF sites.

Management effectiveness

In order to further explore the relationship between the elements of GCF's conceptual model, Figure 3 shows the change in management effectiveness both at the fund and the protected area level over six years. Since the inception of management effectiveness monitoring in 2008 average management effectiveness scores have steadily increased, as might be expected with a regular stream of funding for management costs. As protected area management effectiveness scores increase, deforestation rates correspondingly decrease showing an inverse relationship (Figure 4).

Prior to GCF investment, in the 1990 to 2000 monitoring period, deforestation inside all sites in the portfolio averaged 0.58 per cent per year (Figure 2). This slowed to 0.48 per cent per year during the transition period, 2000 to 2005, and to 0.22 per cent per year during the post-investment period, 2005 to 2010. For the set of 20-km buffer zones around each site, a similar declining trend is found, although with overall higher rates that declined from 1.30 per cent per year to 1.10 per cent per year to 0.42 per cent per year.

Deforestation rates among project sites in the pre-investment period varied substantially, from 0 per cent per year to over 2.5 per cent per year (Figure 4). Seventeen sites had deforestation rates over 0.5 per cent per year, a rate close to estimates of the global average for tropical forests (Hansen et al., 2013). Among the set of buffer zones around each site, rates varied within the same range, although were skewed higher (Figure 5). While 17 buffer zones also had rates of over 0.5 per cent per year, most of these were over 1.5 per cent per year in the post-investment period, 2005 to 2010.

Deforestation tended to be higher both before and after investment for protected areas that had effectiveness scores of less than 25. This is less apparent in the buffer-zone rates. Within the protected areas, during the post-investment period, deforestation rates were significantly correlated to effectiveness score (Figure 4; $y = a + bx$, df = X, r2 = y, $p<Z$).

DISCUSSION

The urgent need for increased conservation of biodiversity and ecosystem services in the context of global climate change is well understood. International commitments reflect these global priorities, as can be seen in the Aichi targets under the UN Convention on Biological Diversity: scaling up global protected area coverage is identified as an essential strategy for protecting biodiversity and ecosystem services, ultimately benefitting humanity.

However, it is also well understood that not all protected areas are equally effective in achieving their purported outcomes. Ineffective management, lack of financial resources, and other deficiencies can undermine the ability of protected area strategies to achieve their desired outcomes and fulfil global commitments. Better understanding of the factors that lead to effective protected area management for biodiversity, ecosystem service and even human development outcomes is therefore of critical importance as governments, NGOs and communities seek to secure the many benefits that natural ecosystems provide.

As noted above, the onset of regular investment in GCF-supported protected areas resulted in a statistically significant decline in deforestation rates. This investment had benefits beyond the borders of individual protected areas, as significant declines were also seen in the buffer zones. Among the many possible explanations for these are 1) the sites are in areas that would have experienced a regional declining trend regardless of investments, and 2) the GCF activities, which in many cases feature conservation strategies that favour positive engagement with local communities, who have traditionally used the land inside and outside the sites, had an effect on rates in the surrounding areas, not just inside the sites. On the latter point the data suggest that at least the site-level investments did not cause leakage of deforestation to the surrounding areas. We intend to disaggregate this data by intervention style, regional context, and other factors in future analysis.

The results of the basic time-series analysis described above also provides evidence that deforestation declined as funding levels increased both within protected areas and in their buffer zones. However, a statistically significant causal relationship was not supported by the data. This suggests that many global challenges relating to deforestation and habitat loss can be effectively addressed when sufficient funding is paired with effective management. The particular land-use dynamics and impacts of investments are actually site-specific, despite some portfolio-wide trends being apparent. This and similar studies could be furthered by both additional statistical analyses of sets of sites of conservation investments and case studies to explain the particular dynamics in sites, especially those with particularly high rates or changes in rates. For example, the dates of both when deforestation occurred and conservation investments occurred varied within the three five-year time periods of this study, and in both cases were gradual. We expect a more detailed analysis of this trend using annual data on deforestation and total funding (both from conservation trust funds and other sources)

would reveal differences by intervention style, ecosystem type, and perhaps thresholds below which or above which effects are less prominent.

Additionally, we find that management effectiveness of the protected areas in the GCF portfolio, as measured by relevant indicators, steadily increased over time. While there could be other factors at work in creating this effect, this suggests the importance of funding continuity and predictability (as well as the availability of technical assistance) in efforts to improve protected area management.

Finally, the results indicate that higher scores on management effectiveness were associated with lower deforestation rates. This suggests that measuring and monitoring these enabling conditions for protected area management effectiveness provide a reasonable proxy for conservation outcomes in the 65 protected areas assessed by this study and may have more broad implications on protected areas as a whole. Despite evidence contrary to these findings (Nolte et al., 2013), this study contributes to the growing body of evidence that associates management effectiveness scores with conservation outcomes such as have been found using the Management Effectiveness Tracking Tool (METT) developed by the WWF/World Bank partnership (Dudley et. al., 2007). The low costs associated with collecting annual survey data make it an attractive option to otherwise more expensive remote sensing analysis to evaluate deforestation rates.

The example of GCF, taken as both a proxy for CTFs and as a key factor in creating many of these funding mechanisms, indicates that steady investment in protected areas can stimulate improvement in management effectiveness and lead to concomitant reductions in deforestation. Importantly, improvements in management effectiveness can accumulate over time with regular financial support, which is also associated with parallel improvements in deforestation rates. Taken together, we believe these results make a compelling argument that CTFs (or other regular long-term funding sources) are a valuable tool to complement existing protected area strategies and for achieving global conservation commitments.

ENDNOTES

[1] However, it should be noted that approximately one half of the total number of hectares just cited represents a single large uninhabited marine protected area in the South Pacific which has become a no-take zone: the Phoenix Islands Protected Area in the Republic of Kiribati.
[2] T statistic
[3] Degrees of freedom
[4] P value
[5] Mean
[6] Standard deviation
[7] These were the endowments for an indigenous community managed protected area near Cusco in Peru which is known as the Vilcanota Polylepis project, and the AZE trust fund (also called Serrania de las Quinchas) for six small private protected areas totaling around 7,000 hectares that are managed by the Colombian bird conservation NGO, Pro Aves.
[8] These five funds are the legally independent and national-level Guyana Conservation Trust; the Kayapo indigenous protected area trust fund sub-account managed by the Brazilian national-level environmental trust fund FUNBIO; the Malpelo marine protected area (MPA) trust fund established as a sub-account of Colombia's national level environmental fund, Fondo Acción; the Harapan Rainforest Endowment established as a sub-account of a new UK charity to finance an NGO-managed conservation concession in Indonesia; and the legally independent Caucasus Protected Areas Fund to support government-managed protected areas in Armenia, Azerbaijan and Georgia.

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RESUMEN

El Fondo Mundial para la Conservación (GCF) es un programa destinado a abordar los problemas relacionados con las áreas protegidas que carecen de recursos suficientes para funcionar eficazmente. En funcionamiento desde 2001, el GCF ha construido una cartera global de más de 65 inversiones en áreas protegidas vinculadas con extensos conjuntos integrados de datos sobre la eficacia y los resultados de conservación de la gestión de áreas protegidas. Con base en los datos recogidos durante los últimos seis años (2008-2013), este trabajo trata de responder a dos preguntas: 1) ¿Cuál es la relación entre las inversiones en conservación y las condiciones necesarias para lograr resultados de conservación? 2) ¿Se correlaciona la financiación estable con un índice de deforestación estable o que mejora? Los resultados de los análisis de estos datos sugieren que la inversión periódica y sostenida en la gestión de áreas protegidas produjo una disminución estadísticamente significativa en las tasas de deforestación en y en los alrededores de estas áreas protegidas. Constatamos, asimismo, que a mayor puntuación en eficacia de la gestión, menor tasa de deforestación. Esto sugiere que el monitoreo de las condiciones necesarias para la gestión eficaz de las áreas protegidas proporciona un indicador aproximado razonable acerca de los resultados de conservación, medidos en términos de los cambios en las tasas de deforestación. Estos resultados apoyan de manera convincente el argumento de que los fondos fiduciarios para fines de conservación son herramientas valiosas para ayudar a las áreas protegidas a cumplir los objetivos perseguidos y contribuir a las metas mundiales de conservación.

RESUME

Le Fonds pour la Conservation Globale (GCF) est un programme destiné à répondre aux problèmes liés aux aires protégées qui manquent de ressources suffisantes pour un fonctionnement efficace. En activité depuis 2001, le GCF a mis en place un portefeuille mondial de plus de 65 investissements dans des aires protégées liés à des objectifs de gestion efficace et aux résultats de la conservation. En rassemblant les données recueillies au cours des six dernières années (2008-2013), ce document tente de répondre à deux questions : 1) Quelle est la relation entre les investissements et les conditions favorables à l'obtention de résultats positifs de conservation? 2) Est-ce qu'un financement stable correspond à un déboisement stable ou en réduction? Les résultats de l'analyse indiquent qu'un investissement régulier et soutenu dans la gestion des aires protégées a provoqué une réduction du déboisement statistiquement significative dans ces aires protégées et dans leur proximité. En outre, nous constatons qu'un degré plus élevé d'efficacité dans la gestion des parcs correspond à un taux de déboisement plus bas. Ainsi, en se fondant sur la mesure du taux de déboisement, on peut déduire que le fait d'assurer des conditions favorables de gestion aboutit à des résultats positifs de conservation. Ces conclusions constituent un argumentaire de poids permettant d'affirmer que les fonds de conservation sont des outils efficaces pour aider les aires protégées à obtenir les résultats attendus et pour contribuer aux objectifs globaux de la conservation.