STATUS AND THREATS TO THE GUINEAN FORESTS OF WEST AFRICA BIODIVERSITY HOTSPOT

Endline assessment of management effectiveness, forest cover change and threats in CEPF investment areas

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Contents

List of Acronyms

CEPF	Critical Ecosystem Partnership Fund
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GFWA	Guinean Forests of West Africa
GLCF	Global Land Cover Facility
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
METT	Management Effectiveness Tracking Tool
PAME	Protected area management effectiveness
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SMART	Spatial Monitoring and Reporting Tool
UNEP-WCMC	UN Environment Programme World Conservation Monitoring Centre
WCPA	World Commission on Protected Areas
WDPA	World Database on Protected Areas
WWF	World Wildlife Fund

1 Introduction

1.1 Context, aims and structure of report

The UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) was contracted to provide a baseline and endline assessment of management effectiveness, forest cover, and threat change in the Critical Ecosystem Partnership Fund (CEPF) Guinean Forests of West Africa (GFWA) Biodiversity Hotspot and CEPF investment areas. This final report draws on the initial baseline assessment conducted in 2016, supplemented with additional data obtained between 2016-2020.

The report focuses on the following three analyses:

Management Effectiveness: An assessment of change over time in the management effectiveness of CEPF investment sites, based on available Management Effectiveness Tracking Tool (METT) data.

Forest cover area change: An analysis of changes in forest cover for Key Biodiversity Areas (KBA) in the CEPF hotspot, with specific focus on sites that have received financial support from CEPF over the past 5 years. Based on remote sensing data produced by Global Forest Watch.

Threat Analysis*:* An assessment of changes in threats to protected areas, with a focus on sites that have received CEPF investment of the past five years. Based on available METT data.

The concluding chapter of this report provides a synthesis of results of these three analyses and key recommendations to inform the future selection of proposals for funding by CEPF.

An overview of data sources and data layers used for these analyses and a summary of which analyses were conducted is provided in the methodology section of this report. All raw data files, maps and tables have been made available to the contractor, in the appropriate format, as supplemental material.

2 Methodology

The analysis focused on the CEPF Guinean Forests of West Africa biodiversity hotspot which covers 621,705 km^2 and can be divided into two subregions: The Upper and Lower Guinean Forests. The hotspot covers lowland and montane forests and a wide range of habitats such as freshwater swamps, coastal habitats and wetland areas in West Africa, spanning nine countries: Benin, Cameroon, Côte d'Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone, and Togo. It also includes four islands in the Gulf of Guinea: Bioko and Annobon, which are part of Equatorial Guinea, and São Tomé and Príncipe (CEPF 2017).

2.1 Data sources

The CEPF hotspot boundary (version 2016.1; Noss et al 2015) served as the primary reference source within which all further analyses were conducted using the following four datasets:

- Key Biodiversity Areas database which includes the CEPF priority sites (BirdLife International, 2019). Funding information was provided directly by CEPF for this analysis.
- The World Database on Protected Areas (WDPA) September 2020 version (UNEP-WCMC and IUCN, 2020a)
- The Management Effectiveness Tracking Tool (METT) database (UNEP-WCMC and IUCN 2020b) which was supplemented by assessments provided by the *Office Ivoirien des Parcs et Réserves*, and by BirdLife International.
- The Global Land Cover Facility (GLCF) dataset (Hansen et al. 2013) was used to show global forest cover and change in the hotspot. For this analysis we use the 2000 tree cover and the 2000-2014 and 2000-2019 forest change datasets to map tree cover in the hotspot sites and sub-regions at a 30m resolution.

2.2 Management effectiveness evaluation

Management Effectiveness evaluations are undertaken at the protected area level. Therefore, in order to assess the effectiveness of the CEPF sites in the region, we first associated each KBA (which includes the CEPF priority and investment sites) with the overlapping protected areas in the WDPA. We then conducted a spatial overlap analysis to match these datasets using a threshold of 90% overlap to ensure the link between a KBA and a protected area, and thus the METT score, is representative. Figure 1 shows the overlap of KBAs and protected areas within the GFWA hotspot.

The METT database does not contain all assessments that have been undertaken, and some protected areas do not use the METT tool. For these reasons, only a small number of METT assessments were available for this analysis and even fewer sites had a baseline (before 2016) and end-line (since 2016) assessment available. A total of 99 assessments that were conducted within the GFWA hotspot between 2002 and 2020 were accessed, however after removing assessments with incomplete information (i.e. missing total score value or date of assessment) and those not located within a KBA, 81 assessments from 38 protected areas remained (full table in Supplementary Materials *METT_Overview_Table*). Table 1 presents the 48 assessments from CEPF funded sites for which a METT assessment was available.

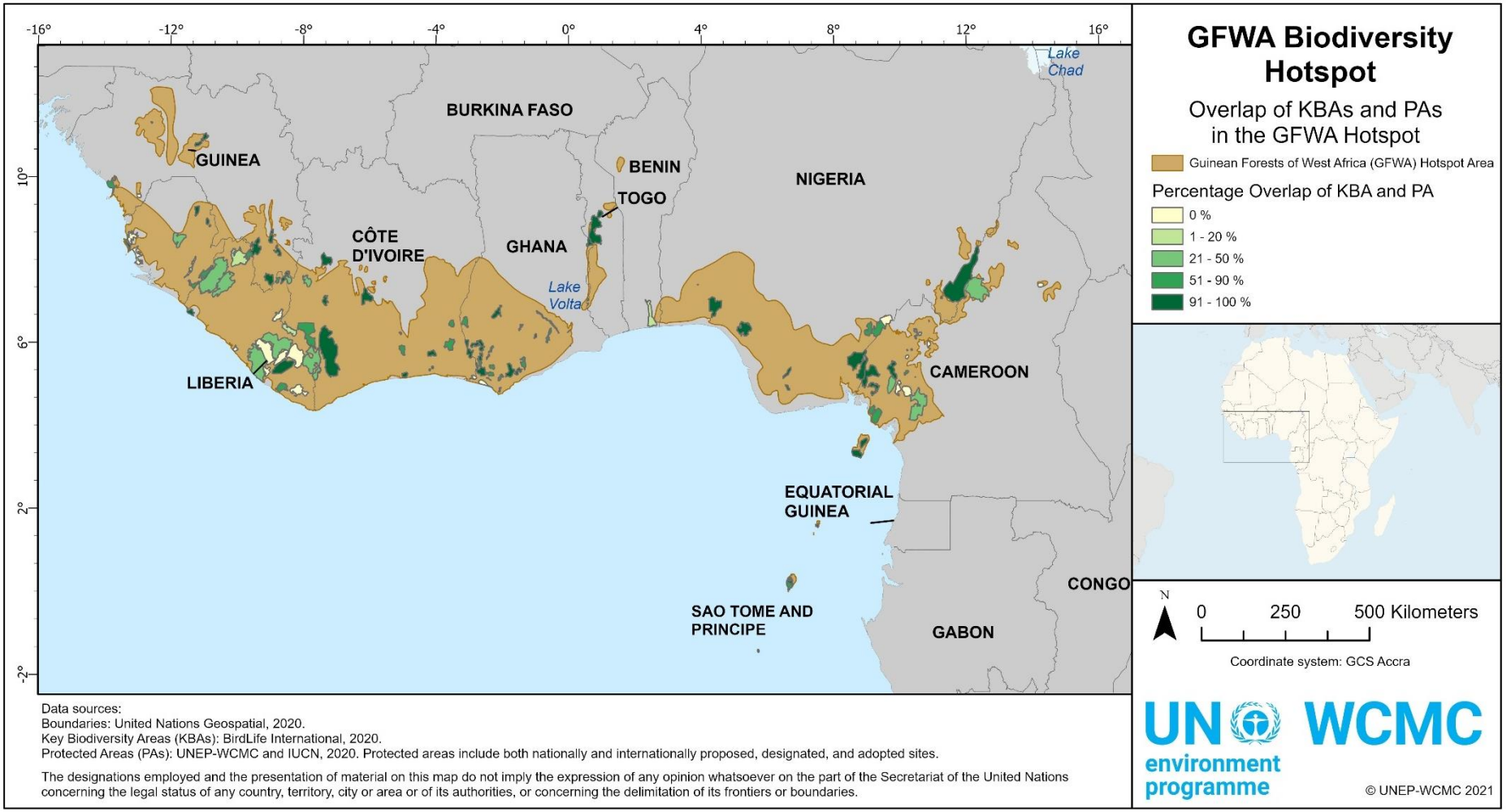

Figure 1 Overlap of Key Biodiversity Areas and protected areas in the Guinean Forests of West Africa Hotspot.

The METT questions were each assigned to one of the corresponding elements of the IUCN World Commission on Protected Areas (WCPA) framework for assessing protected area management effectiveness: context, planning, inputs, process, outputs or outcomes (Hockings et al., 2006). We aggregated scores based on these elements and calculated a percentage of effectiveness for each (if a question wasn't answered in the assessment it was not considered in the analysis).

It is important to note that METT scores should be treated with caution as the scoring system is not weighted and some questions are more crucial to effectiveness than others. It is advised not to compare scores between protected areas (see section 3.1 for more details).

The application of the METT is not evenly spread across protected areas and there is a bias in the type of protected areas currently being assessed: National Parks were much more likely to have been assessed than those with any other designations (Coad et al. 2013).

2.3 Threat analysis

We analysed threat data for all available METT assessments for CEPF funded sites. We provide a count of how often a threat was featured within METT assessments for an overview of the main threats facing the Guinean Forests of West Africa Hotspot. We also highlight some CEPF funded sites that have had changes in their threats over time.

It is important to note that METT threat assessments do not consider spatial impact (e.g. does the threat impact the whole area or just a small part) or temporal impact (e.g. is the impact continuous or only during certain parts of the year). Further limitations of the threat assessment within METT are outlined in section 5.2.

The full METT results for CEPF funded sites, including threat data, are provided in the Supplementary Materials *METT_Overview_Table*.

2.4 Forest cover area change

Maps of forest cover, forest change over time and forest loss help to further inform the habitat protection needs of the hotspot, and we used the GLCF global forest cover and change datasets for this analysis. UNEP-WCMC and the BirdLife Regional Implementation Team agreed in 2016 that a 60% tree cover threshold provides the closest correspondence with forests in the region, and thus elected to classify as forest those areas with minimum tree cover of 60% and minimum tree canopy height of 5m. This is consistent with other forest cover analyses undertaken by global organizations such as the Food and Agriculture Organization (FAO) and REDD+ (GFOI 2016).

The most recent forest cover map available from the Hansen et al. (2013) remotely sensed global dataset is for the year 2000. To present a more recent baseline of forest cover, we conducted a GIS analysis using the forest loss dataset – which captures pixels of loss of tree cover between selected years – to extract forest loss and present 2014 (baseline) and 2019 (endline) forest cover maps.

3 Management Effectiveness

3.1 The Management Effectiveness Tracking Tool

First published in 2002, the METT was one of the first tools developed to align with the IUCN WCPA Framework for protected area management effectiveness (PAME). The METT was originally developed by the World Bank/World Wildlife Fund (WWF) Alliance for Forest Conservation and Sustainable Use. Several versions of the METT and many adaptations have been produced, reflecting lessons learned from implementation. The METT assessments obtained as part of this report are METT Versions 2 and 3.

The METT is now applied as a mandatory part of all protected area projects funded by the Global Environment Facility (GEF), the World Bank and CEPF, and is used by a number of countries and other NGOs, for example, WWF, Conservation International and The Nature Conservancy. The METT has become the world's most widely and frequently used protected area management effectiveness evaluation tool.

The METT consists of two main sections:

1. **Datasheets** that collect key information on the protected area, its characteristics, threats and management objectives and details of who carried out the assessment.
2. **An assessment form** that provides a composite measurement across 38 parameters integrating all six components of the WCPA Framework. The form is designed around a questionnaire with four alternative responses, each with an associated score ranging between 0 (poor) to 3 (excellent). Each question also has data fields to include notes about the answers (with justification if possible), steps to be taken to improve management if necessary and details of information sources.

Interpretation of METT Scores

As noted in the METT handbook (Stolton & Dudley, 2016), METT scores should be treated with caution as the scoring system is not weighted and some questions are more crucial to effectiveness than others. It is advised not to compare scores between protected areas when reporting is done by different people due to varying perceptions of the baseline of success and failure (Stolton & Dudley, 2016). Comparisons between protected areas with different management and governance types should also be avoided. The METT tool is designed to serve as a practical management tool and cannot be reliably used to infer conservation outcomes, particularly as most METT questions focus on management input and processes.

3.2 CEPF funded sites with METT assessments

Table 1 lists KBAs that have received CEPF funding within the last 5 years for which METT assessments are available. The full table of KBA sites with METT assessments, including those that have not received funding in the past five years, are included in the Supplementary Materials *METT_Overview_Table*.

Table 1 Key Biodiversity Areas (KBAs) that have received CEPF funding in the past 5 years with available METT assessments in the Guinean Forests of West Africa Hotspot.

Country	Name of protected area	KBA name	CEPF priority site?	METT version	Year of assessment	Detailed assessment results accessible	Year & amount of funding	Total Score
Cameroon	Korup	Korup National Park	No	METT 2	2004	Yes	2018-2019; $10,579	39
Cameroon	Korup	Korup National Park	No	METT 2	2006	Yes	2018-2019; $10,579	43
Cameroon	Korup	Korup National Park	No	METT 2	2008	Yes	2018-2019; $10,579	56
Cameroon	Korup	Korup National Park	No	METT 2	2010	Yes	2018-2019; $10,579	54
Cameroon	Korup	Korup National Park	No	METT 3	2018	Yes	2018-2019; $10,579	65
Cameroon	Korup	Korup National Park	No	METT 3	Unknown	Yes	2018-2019; $10,579	55
Cameroon	Mont Cameroun	Mount Cameroon & Mokoko-Onge	Yes	METT 3	2012	Yes	2018-2019; $10,894	44
Côte d'Ivoire	Mount Nimba Integral Reserve	Mount Nimba Strict Nature Reserve	No	METT 2	2003	Yes	2019-2020; $244,458	42
Côte d'Ivoire	Mount Nimba Integral Reserve	Mount Nimba Strict Nature Reserve	No	METT 3	2017	No	2019-2020; $244,458	53
Côte d'Ivoire	Mount Nimba Integral Reserve	Mount Nimba Strict Nature Reserve	No	METT 3	2018	Yes	2019-2020; $244,458	61
Equatorial Guinea	Pico de Basilé	Basilé Peak National Park	Yes	METT 3	2019	Yes	2018-2020; $40,000	38
Ghana	Atewa Range	Atewa Range Forest Reserve	Yes	METT 3	2017	Yes	2017-2019; $93,664 & 2021-2022; $179,984 & 2017-2018; $44,259	50
Ghana	Atewa Range	Atewa Range Forest Reserve	Yes	METT 3	2018	Yes	2017-2019; $93,664 & 2021-2022; $179,984 & 2017-2018; $44,259	34
Ghana	Cape Three Points	Cape Three Points Forest Reserve	Yes	METT 3	2017	Yes	2018-2020; $34,975 & 2017-2019; $93,664 & 2018-2020; $39,977 & 2017-2018; $44,259	53

Ghana	Cape Three Points	Cape Three Points Forest Reserve	Yes	METT 3	2018	Yes	2018-2020; $34,975 & 2017-2019; $93,664 & 2018-2020; $39,977 & 2017-2018; $44,259	34
Ghana	Cape Three Points	Cape Three Points Forest Reserve	Yes	METT 3	2019	Yes	2018-2020; $34,975 & 2017-2019; $93,664 & 2018-2020; $39,977 & 2017-2018; $44,259	31
Ghana	Tano Ofin	Tano-Offin Forest Reserve	Yes	METT 3	2017	Yes	2017-2019; $93,664 & 2017-2018; $44,259	50
Ghana	Tano Ofin	Tano-Offin Forest Reserve	Yes	METT 3	2018	Yes	2017-2019; $93,664 & 2017-2018; $44,259	33
Guinea	APAC de Touguissoury	Konkouré	Yes	METT 3	2017	Yes	2017-2018; $41,800 & 2018-2021; $219,702 & 2018-2019; $20,000	45
Guinea	APAC de Touguissoury	Konkouré	Yes	METT 3	2018	Yes	2017-2018; $41,800 & 2018-2021; $219,702 & 2018-2019; $20,000	45
Guinea	Mount Nimba	Monts Nimba (part of Mount Nimba transboundary AZE)	No	METT 2	2004	Yes	2017-2018; $24,968 & 2019-2021; $244,458	37
Guinea	Mount Nimba	Monts Nimba (part of Mount Nimba transboundary AZE)	No	METT 2	2010	Yes	2017-2018; $24,968 & 2019-2021; $244,458	41
Liberia	East Nimba Nature Reserve	Nimba mountains	Yes	METT 3	2018	No	2019-2021; $244,458	50
Liberia	Gola Forest National Park	Lofa-Gola-Mano Complex	Yes	METT 3	2016	No	2019-2020; $244,458	48
Liberia	Gola Forest National Park	Lofa-Gola-Mano Complex	Yes	METT 3	2018	No	2019-2020; $244,458	50
Liberia	Grebo National Forest Park	Grebo	Yes	METT 2	2009	Yes	2017-2020; $259,907	12
Liberia	Grebo National Forest Park	Grebo	Yes	METT 3	2018	No	2017-2020; $259,907	58

Liberia	Krahn-Bassa	Cestos - Senkwen	Yes	METT 3	2019	Yes	2019-2021; $270,001	33
Liberia	Lake Piso Multiple Sustainable Use Reserve	Lake Piso (Cape Mount)	No	METT 3	2013	Yes	2019-2020; $244,458	49
Liberia	Lake Piso Multiple Sustainable Use Reserve	Lake Piso (Cape Mount)	No	METT 3	2015	Yes	2019-2020; $244,458	28
Liberia	Lake Piso Multiple Sustainable Use Reserve	Lake Piso (Cape Mount)	No	METT 3	2016	No	2019-2020; $244,458	49
Liberia	Lake Piso Multiple Sustainable Use Reserve	Lake Piso (Cape Mount)	No	METT 3	2018	No	2019-2020; $244,458	48
Liberia	Sapo National Park	Sapo National Park	Yes	METT 2	2002	Yes	2017-2020; US$259,907	33
Liberia	Sapo National Park	Sapo National Park	Yes	METT 3	2011	Yes	2017-2020; US$259,907	32
Liberia	Sapo National Park	Sapo National Park	Yes	METT 3	2016	No	2017-2020; US$259,907	55
Liberia	Sapo National Park	Sapo National Park	Yes	METT 3	2018	No	2017-2020; US$259,907	44
Liberia	Wonegizi Nature Reserve	Wonegizi mountains	Yes	METT 3	2016	No	2017-2021; $259,907 & 2019-2021; $244,458	39
Liberia	Wonegizi Nature Reserve	Wonegizi mountains	Yes	METT 3	2018	No	2017-2021; $259,907 & 2019-2021; $244,458	41

Nigeria	Cross River (Oban Division)	Cross River National Park: Oban Division	Yes	METT 2	2003	Yes	2018-2019; $49,995	62
Nigeria	Cross River (Okwango)	Mbe Mountains and Cross River National Park Okwangwo Division	Yes	METT 2	2003	Yes	2018-2020; $18,945 & 2017-2021 $349,997	57
Nigeria	Cross River (Okwango)	Mbe Mountains and Cross River National Park Okwangwo Division	Yes	METT 3	2018	Yes	2018-2020; $18,945 & 2017-2021 $349,997	67
Nigeria	Cross River (Okwango)	Mbe Mountains and Cross River National Park Okwangwo Division	Yes	METT 3	2019	Yes	2018-2020; $18,945 & 2017-2021 $349,997	72
Nigeria	Mbe Mountains	Mbe Mountains and Cross River National Park Okwangwo Division	Yes	METT 3	2018	Yes	2018-2020; $18,945 & 2017-2021 $349,997	65
Nigeria	Okomu	Okomu National Park	No	METT 2	2003	Yes	2018-2020; $18,945	57
Nigeria	Okomu	Okomu National Park	No	METT 3	2020	Yes	2018-2020; $18,945	68
São Tomé e Príncipe	Parque Natural Obô de São Tomé	Obô de São Tomé National Park and buffer zone	Yes	METT 3	2018	Yes	2018-2021; $24,840 & 2019-2021; $227,643 & 2018-2021; $296,000 & 2018-2021 $219,702	40
Sierra Leone	Gola Rainforest National Park	Gola Rainforest National Park	No	METT 3	2009	Yes	2019-2021; $244,458	46

3.3 Changes in management effectiveness over time

For this analysis we had access to 17 baseline assessments (before 2016) and 18 endline assessments (after 2016) for 11 KBAs that have received CEPF funding in the last five years in the GFWA Hotspot. **Interestingly, the average scores for the endline assessments were lower than the baselines for the context, inputs, outputs and outcomes of assessed protected areas in these KBAs and only an average increase was noted for the planning and process aspects of management in these sites (Figure 2).** The scores for individual funded sites for each of the Framework elements are shown in Table 2.

With the data available for KBAs in the GFWA Hotspot that had not received funding in the past five years, we observed an increase in the average scores for each of the Framework elements (Figure 2). This data came from 13 endline assessments from 4 KBAs and 22 baseline assessments from 14 KBAs. The scores for individual funded sites for each of the Framework elements are shown in Annex 8.1.

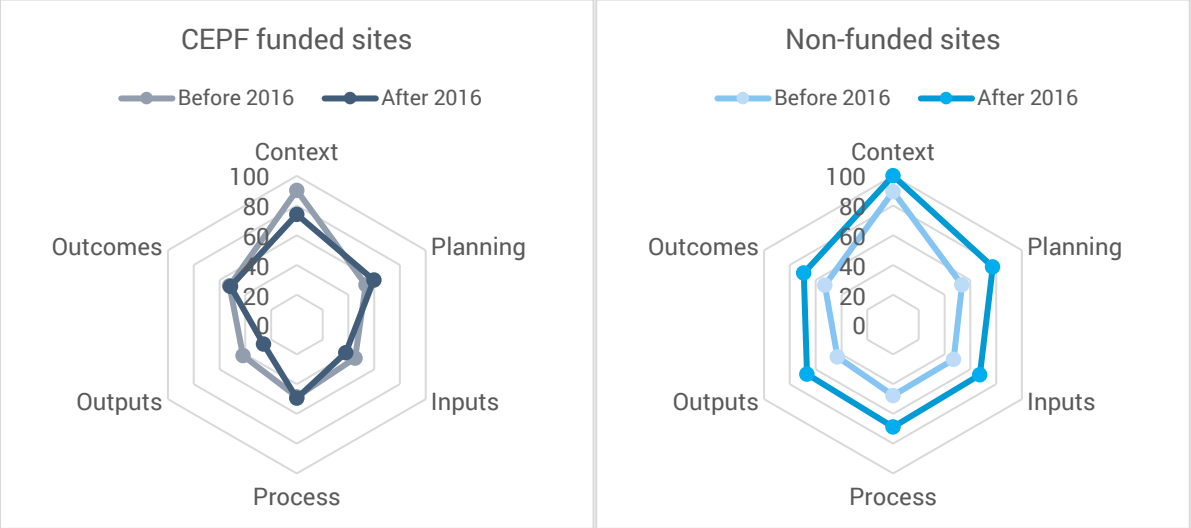

Figure 2 Average scores of each Framework element for baseline (before 2016) and endline (after 2016) assessments for CEPF funded sites (left). Average scores of each Framework element for baseline (before 2016) and endline (after 2016) assessments for non-CEPF funded sites in the Guinean Forests of West Africa Hotspot (right).

Two METT assessments were available for the Mount Nimba Strict Nature Reserve, one from 2003 and one from 2018. Since the funding for this site started in 2019, this doesn't act as a true endline, however it is the only site with an assessment from after 2016. The scores increased for five of the six Framework elements with the outcome score decreasing from 50 to 33 (Figure 3). The planning and input scores for this site increased the most, both by about 30%. However, **the annual change in score for each element was negligible (under 2.2% per year for each framework element).**

Although we can't make any direct comparisons, we provide the Sangbe Mountain National Park, also in Côte d'Ivoire, as an example of change in a non-funded KBA. Scores from five METT assessments that were conducted in the protected area since 2014 were available for this analysis. The scores for all six framework elements improved with each assessment, except for a small decrease in the planning score between 2018 and 2019 of 7% (Figure 3). **The scores changed at a very small rate per year for each framework element, with outputs changing the most with an increase of 6.7%** (Annex 8.1).

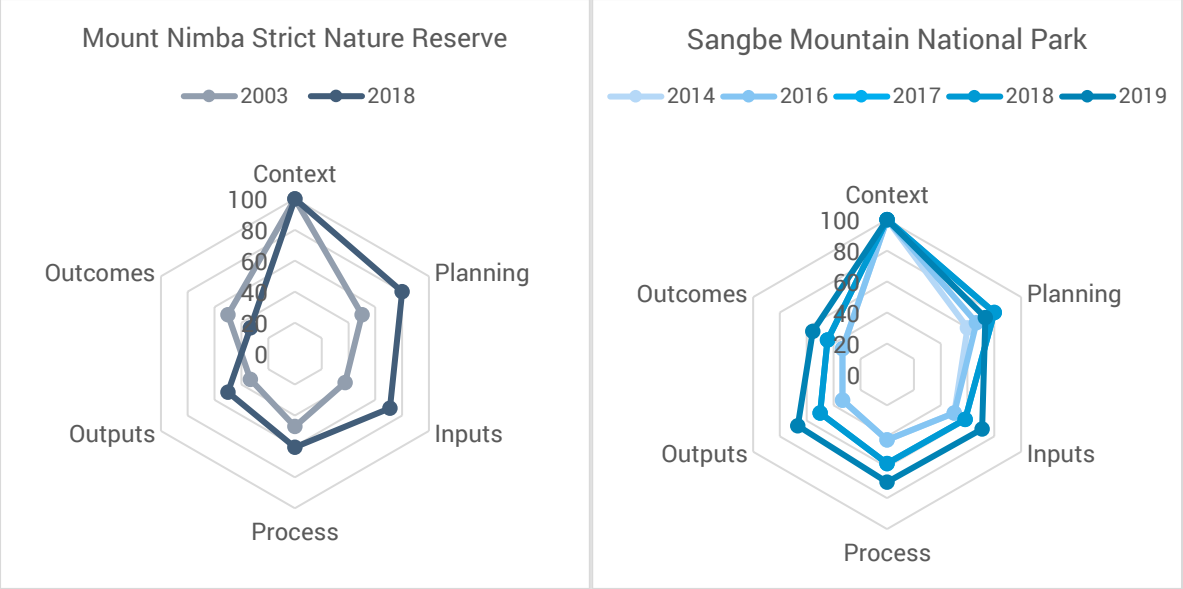

Figure 3 Mount Nimba Strict Nature Reserve is an example of a CEPF funded site with baseline and endline assessments available (left). Sangbe Mountain National Park is an example of a non-CEPF funded site with baseline and endline assessments available (right).

Table 2 KBAs that have received CEPF funding in the past 5 years with the percentage of effectiveness of each of the six key IUCN WCPA Framework elements based on METT scores. For non-funded sites see Annex 8.1.

Country	KBA name	Year	Context	Planning	Inputs	Process	Outputs	Outcomes
Cameroon	Korup National Park	2004	100	50	46	38	33	56
		2006	100	50	50	44	50	56
		2008	100	67	63	65	50	67
		2010	100	58	58	61	50	78
		2018	100	76	58	61	33	67
	Mount Cameroon & Mokoko-Onge	2012	100	60	38	45	50	56
Côte d'Ivoire	Mount Nimba Strict Nature Reserve	2003	100	50	38	47	33	50
		2018	100	80	71	61	50	33
Equatorial Guinea	Basilé Peak National Park	2019	100	48	38	33	0	33
Ghana	Atewa Range Forest Reserve	2017	67	52	33	56	17	67
		2018	33	71	21	28	17	17
	Cape Three Points Forest Reserve	2017	67	52	33	64	17	67
		2018	33	71	21	28	17	17
		2019	100	29	33	31	17	25
	Tano-Offin Forest Reserve	2017	67	52	33	56	17	67
		2018	33	71	17	28	17	17
Guinea	Konkouré	2017	67	52	29	47	17	58
		2018	67	52	29	47	17	58
	Monts Nimba (part of Mount Nimba transboundary AZE)	2004	67	75	38	36	50	20
		2010	33	50	46	51	33	40
Liberia	Cestos - Senkwen	2019	33	33	21	44	0	33
	Grebo	2009	33	17	13	8	0	33
	Lake Piso (Cape Mount)	2013	100	47	46	62	50	56
		2015	100	40	29	41	N/A*	100
	Sapo National Park	2002	100	58	29	31	33	30
		2011	100	50	29	42	33	22
Nigeria	Cross River National Park: Oban Division	2003	100	67	71	69	67	50
	Mbe Mountains & Cross River National Park Okwangwo Division	2003	100	58	67	64	50	50
		2018	67	62	58	61	67	83
		2018	100	76	50	69	33	75
		2019	100	81	50	78	50	75
	Okomu National Park	2003	100	50	58	69	67	50
		2020	100	67	54	69	50	83
São Tomé and Príncipe	Obô de São Tomé National Park & buffer zone	2018	100	48	33	31	33	50
Sierra Leone	Gola Rainforest National Park	2009	100	63	50	50	17	75

* None of the questions related to this element were answered in the assessment.

4 Forest Cover

4.1 Overview of forest cover change in the hotspot

We used the GLCF global forest cover and change datasets to create maps of forest cover, forest change over time and forest loss help to inform habitat protection needs of the hotspot. It is important to note the two main limitations with this analysis. Firstly, the Hansen et al. (2013) data does not distinguish between natural and planted vegetation. Secondly, the forest loss layers assume a pixel which is classed as 'loss' is equal to complete loss of cover within that pixel. The dataset defines loss as a stand-replacement disturbance, or a change from forest to non-forest cover.

This report is focused on CEPF funding received in the region since 2016 and based on the available data layers we used forest cover data from 2014 to act as our baseline and data from 2019 for the end-line. The Guinean Forests of West Africa biodiversity hotspot can be divided into two subregions: Upper Guinean Forests where CEPF has invested in the long term and Lower Guinean Forests where CEPF had never invested before 2014.

Forest cover has decreased throughout the hotspot since 2000 with a higher rate of loss in the Upper Guinean Forests as compared to the Lower Guinean Forests (Figure 4). The Upper Guinean Forests lost 14% of its forest cover since 2000 with an average loss of 0.4% per year from 2000 to 2014, and 1.6% per year since 2014. The deforestation rate in the Lower Guinean Forests was much lower, with only 4% loss in cover since 2000 with an average of 0.1% lost annually from 2000 to 2014, and 0.4% annually since 2014. Although the percentage of loss is much lower in the Lower Guinean Forests, both regions experienced a 4-fold increase in the rate of deforestation between the two time periods (2000-2014 and 2014-2019).

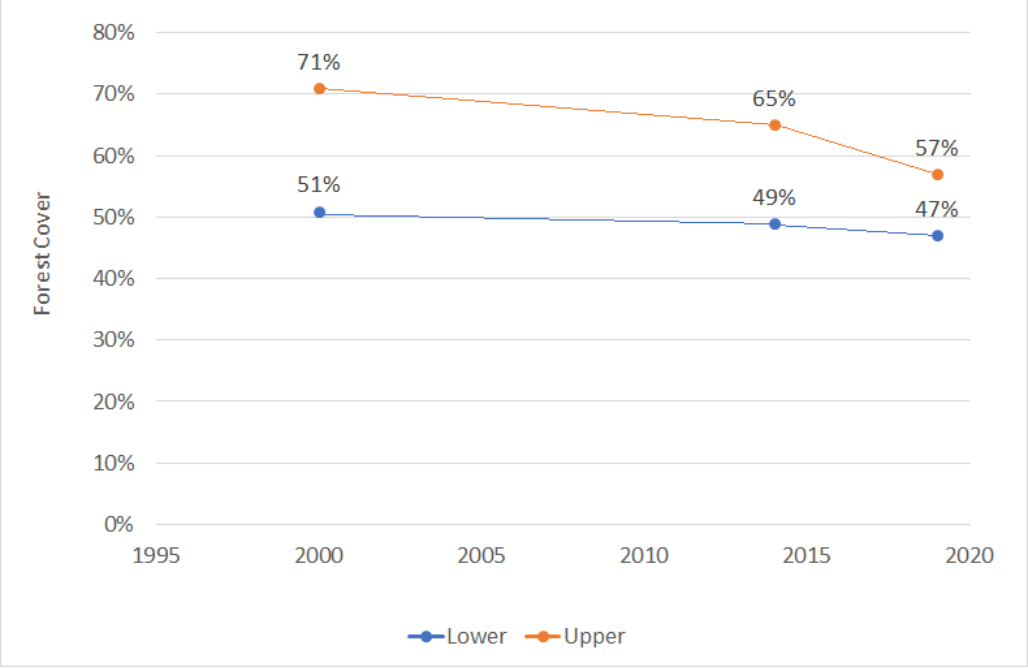

Figure 4 The percentage of the Upper (orange) and Lower (blue) Guinean Forests of West Africa Hotspot with forest cover relating to areas where there is a minimum tree cover of 60% and minimum tree canopy height of 5m. (data source: GLCF global forest cover and change datasets).

4.2 The impact of funding on forest cover

The rate of deforestation varied across all of the KBAs in the hotspot, but no substantial difference in forest loss was found when comparing sites that have received CEPF funding in the last 5 years with non-funded sites where both categories had a mean net loss of 2.6% (Figure 5). However, the KBA with the largest net loss of forest cover (21.6% loss) since 2014 was the Kangari Hills Non-hunting Forest Reserve in Sierra Leone which did not receive CEPF funding.

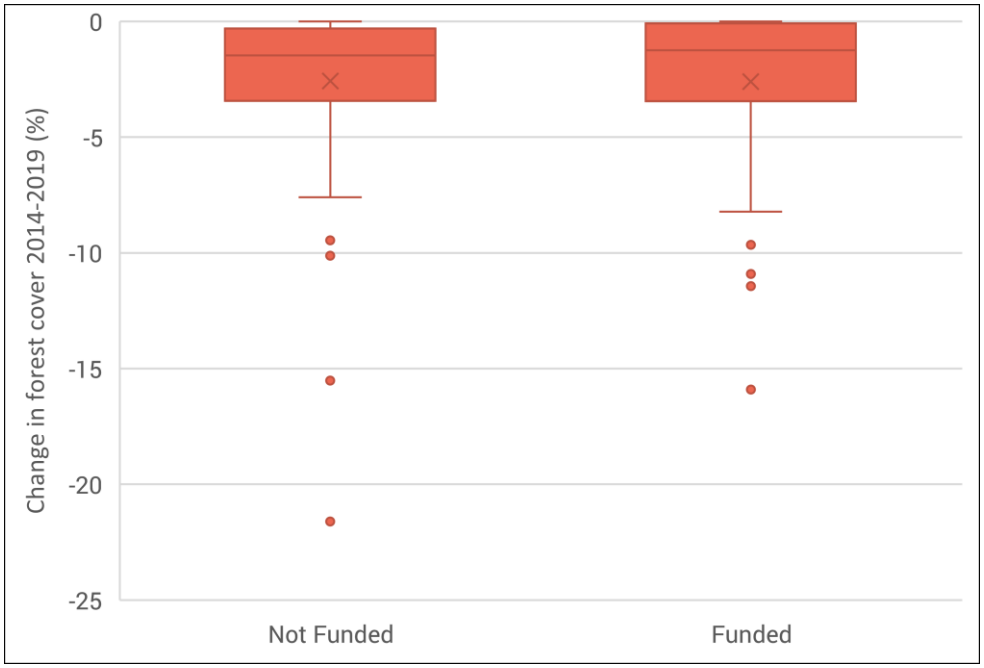

Figure 5 The percentage of forest cover loss between the baseline (2014) and endline (2019) analyses for all funded and non-funded Key Biodiversity Areas (KBAs) in the Guinean Forests of West Africa Hotspot (median is shown with central line, and mean is shown with X).

Six KBAs lost more than 10% of their forest cover since 2014, half of which were funded, and half were not (Table 3). A study from 2017 found that in West Africa, Sierra Leone, Liberia, and Côte d'Ivoire were most at risk of deforestation in terms of exposure, vulnerability and pressures from agricultural expansion into tropical forests (Ordway et al 2017). These same countries were identified in our analysis as having the KBAs with the highest deforestation rate, however we also identified Ghana as having two KBAs with more than 10% forest loss.

These six most vulnerable KBAs continue to have a substantial forest cover that can still be a priority for protection. The Weeni creek and associated hydrobasin in Liberia has the lowest remaining forest cover of these six KBAs with 60.0% remaining, and the Subri River Forest Reserve in Ghana has the highest with 86.6% remaining. The forest cover results for all KBAs in the hotspot are available in the Supplementary Materials *Forest_Cover_Change_Table*.

Overall, the forest cover within the KBAs of the GFWA Hotspot are higher than outside of the KBAs and the largest deforestation hotspots since 2014 have been outside of KBAs (Figures 6, 7, 8).

Table 3 The Key Biodiversity Areas (KBAs) in the Guinean Forests of West Africa Hotspot that have lost more than 10% forest cover between the baseline (2014) and endline (2019) analyses.

Country	KBA site name	CEPF funded in the past 5 years?	Forest cover in 2014 (%)	Forest cover in 2019 (%)	Change (%)
Sierra Leone	Kangari Hills Non-hunting Forest Reserve	No	84.8	63.2	-21.6
Ghana	Tano-Offin Forest Reserve	Funded	95.1	79.2	-15.9
Côte d'Ivoire	Cavally and Goin - Debe Forest Reserves	No	80.3	64.8	-15.5
Liberia	Weeni creek and associated hydrobasin	Funded	71.4	60.0	-11.4
Cote d'Ivoire	Mount Nimba Strict Nature Reserve	Funded	91.6	80.7	-10.9
Ghana	Subri River Forest Reserve	No	96.7	86.6	-10.1

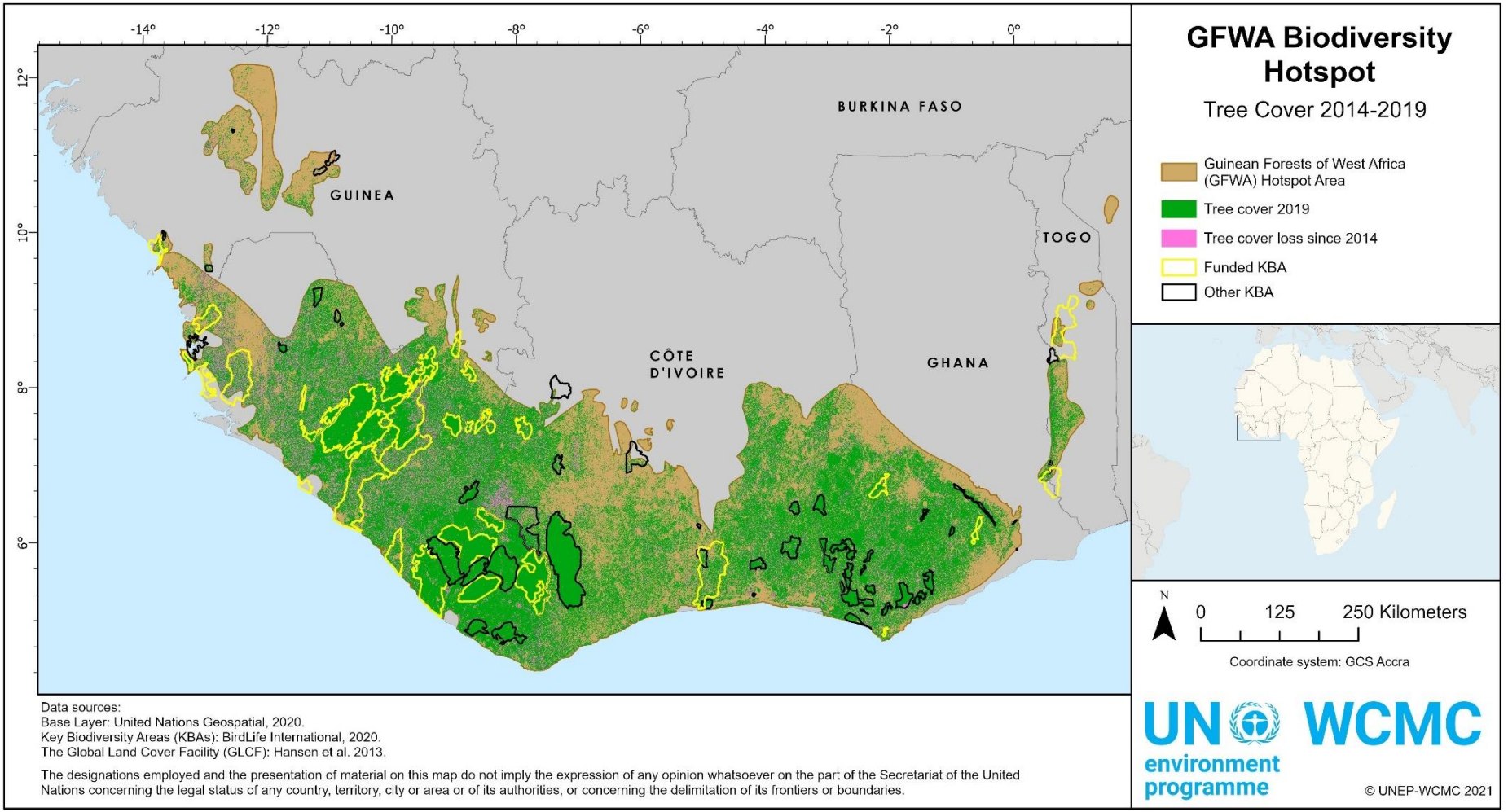

Figure 6 Forest cover in the Upper Guinean Forests in 2019 (green) and forest loss since 2014 (pink) with KBAs that have received CEPF funding in the past 5 years (yellow outline) and un-funded (black outline) KBAs.

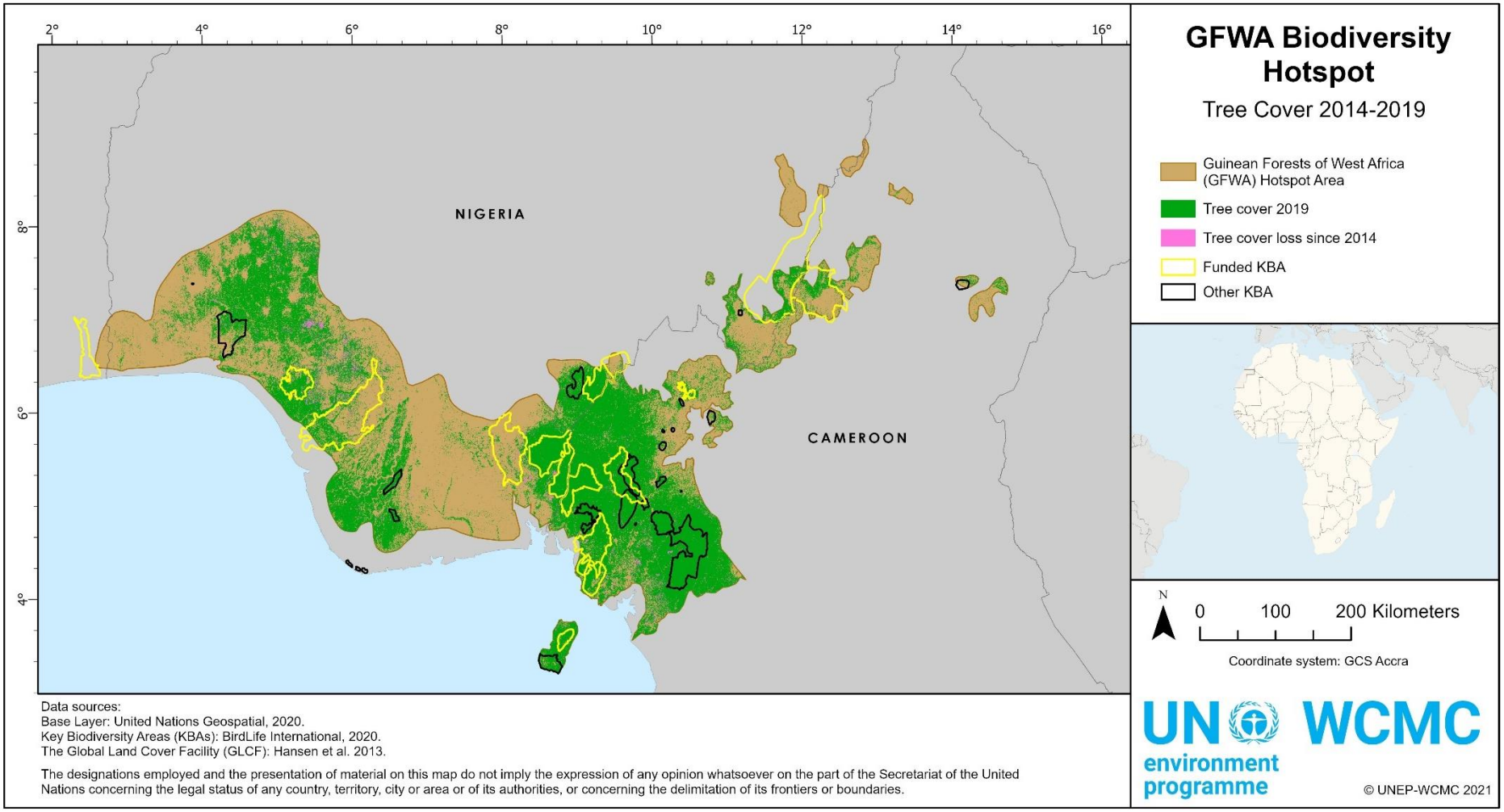

Figure 7 Forest cover in the Lower Guinean Forests in 2019 (green) and forest loss since 2014 (pink) with KBAs that have received CEPF funding in the past 5 years (yellow outline) and un-funded (black outline) KBAs.

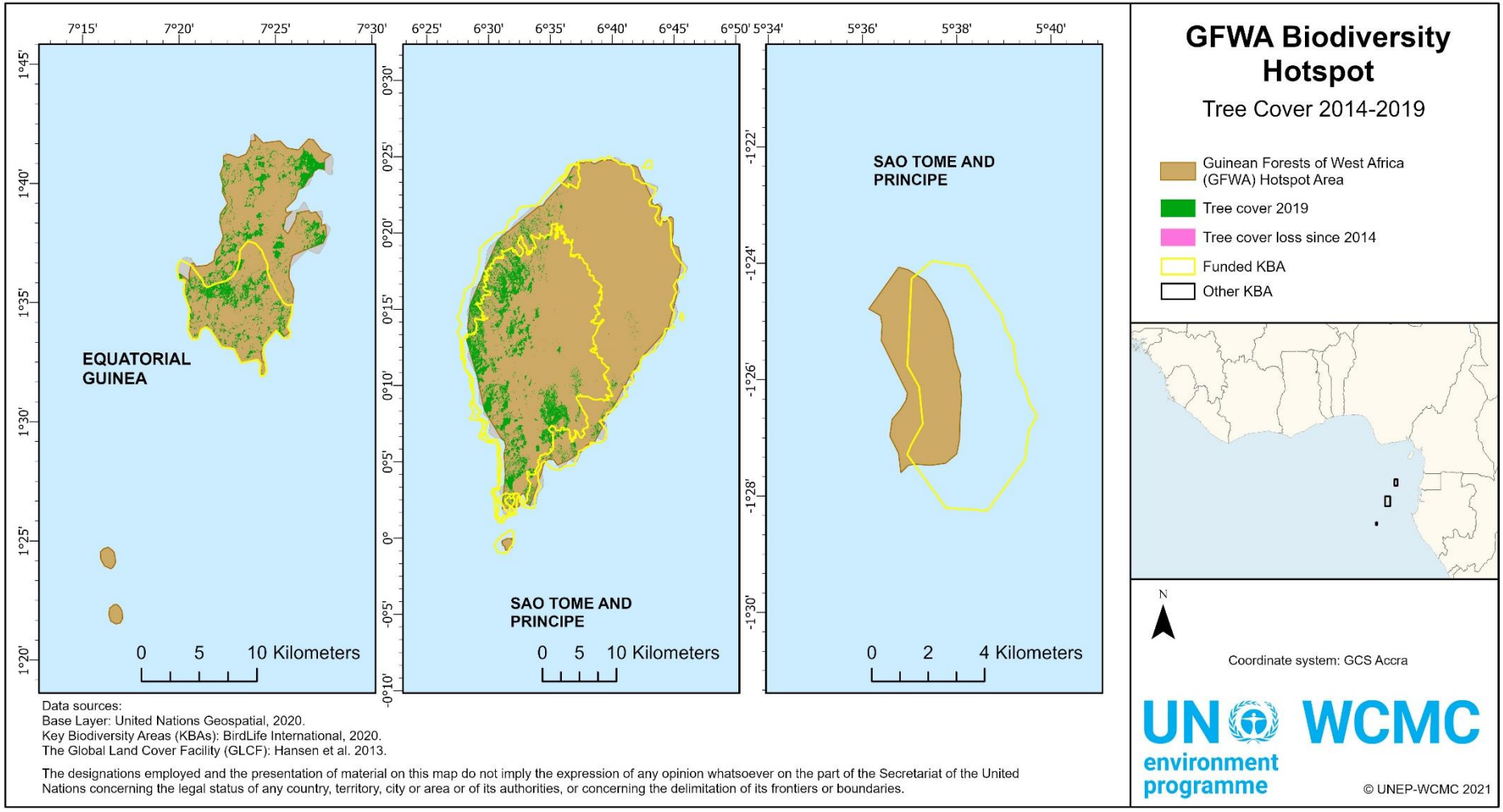

Figure 8 Forest cover in Sao Tome and Principe and southernmost island is part of Equatorial Guinea of the GFWA Hotspot with funded (yellow) and un-funded (black) KBAs. The islands from left to right are shown North to South.

5 Threat Analysis

5.1 Overview of METT threat assessment method

In the METT context, threats are defined as "human activities or processes that have caused, are causing, or may cause the destruction, degradation, and/or impairment of biodiversity targets (e.g., unsustainable fishing or logging). Threats can be past (historical), ongoing, and/or likely to occur in the future." (Stolton et al. 2020). Threats usually refer to activities taking place within protected areas, however they can also refer to activities taking place beside or near the protected area (Stolton & Dudley, 2016).

Threats are assessed within Data Sheet 2 of the METT, though the approach varies between different versions of assessment tool.

In METT 2, respondents are asked to list the top two most important threats to the protected area values and indicate why they were chosen. Although only asked to provide two, data providers often list more than two threats in their response. See Annex 8.2 for the METT 2 threat assessment sheet outlining threat categories.

In METT 3 (published in 2007) data providers tick all relevant existing threats as either high, medium or low significance. Threats ranked as **high** significance are those which are seriously degrading values; **medium** are those threats having some negative impact and those characterised as **low** are threats which are present but not seriously impacting values. Where the threat is not present or not applicable in the protected area a value of N/A is recorded. See Annex 8.3 for the METT 3 threat assessment sheet outlining threat categories.

Limitations of METT threat assessments

As noted in the METT handbook (Stolton & Dudley, 2016), METT threat assessments are limited as they do not consider spatial impact (e.g. does the threat impact the whole area or just a small part) or temporal impact (e.g. is the impact all the time or only during certain parts of the year). The assessment also does not include consideration of possible management actions. The purpose of the METT threat assessment is simply to record already known data, and this should ideally be complemented by a more detailed threat assessment or monitoring system.

5.2 Threat assessment results

METT 2

A total of 15 METT 2 assessments were available for protected areas within KBAs which have received CEPF funding over the past 5 years. Threats were not reported for five of these assessments. **The two most common threats recorded across these assessments were consumptive biological resource use though hunting and habitat conversion for farms** (Figure 9).

The specific threats that fell under the "9a Other" category were:

- Return of indigenous population to their ancestral lands and inefficient resettlement attempts
- Exploitation of protected area resources
- Waning community cooperation, understanding and collaboration
- Poisoning of the protected areas streams and rivers for fish, likely to affect the protected area's wildlife

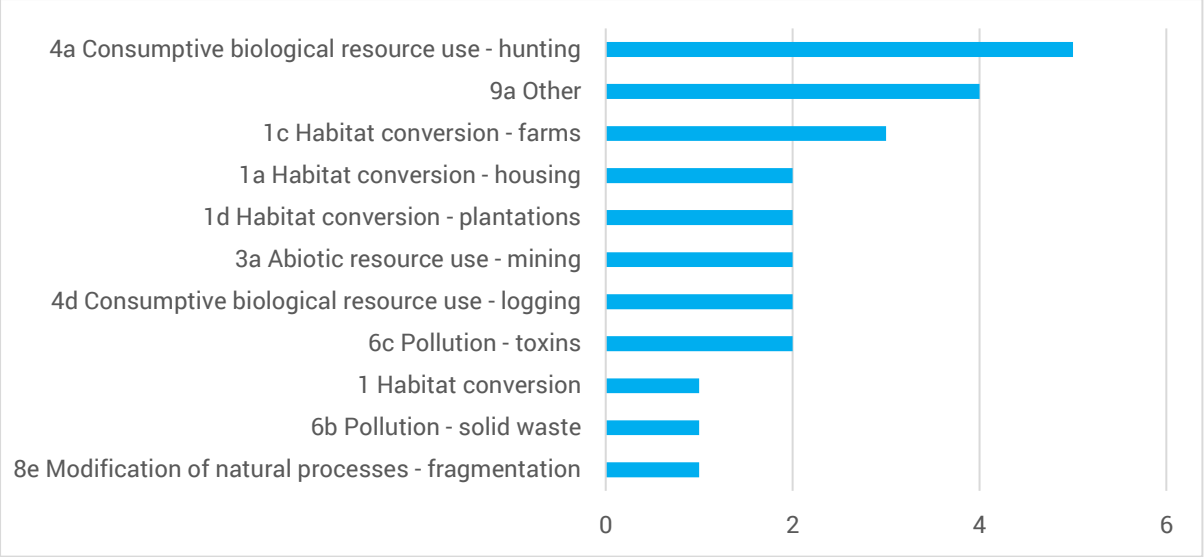

Figure 9 The frequency of each threat recorded in METT 2 assessments for KBAs which have received CEPF funding in the past 5 years. Note: some assessments listed more than two threats.

METT 3

A total of 25 METT 3 assessments were available with threat data for KBAs which have received funding over the past 5 years. **The most common high threat across these sites was hunting, killing and collecting terrestrial animals (including killing of animals as a result of human/wildlife conflict).** When medium and high threats were combined the most common threat was again hunting, but this was closely followed by annual and perennial non-timber crop cultivation and logging and wood harvesting (Figure 10).

Two KBAs stand out as having a very large number of high threats recorded in their assessments. Obô de São Tomé National Park and buffer zone in São Tomé and Príncipe had at least one question under each of the 12 threat categories listed as high. Tano-Offin Forest Reserve in Ghana had high threats in all 12 categories except for *6 - human intrusions and disturbance within a protected area* and *10 - geological events* (see Annex 8.3 for full list of threat categories and questions).

Common threats and changes over time

Looking across METT 2 and METT 3 results, the most frequent medium and high threats are:

1. Biological resource use and harm within a protected area
2. Agriculture and aquaculture within a protected area
3. Natural system modifications

Based on the threat assessments, it is not possible to ascertain the reasons for a change in threats over time i.e. whether the change was a result of management measures which helped to address and reduce the threats listed in the first assessment. However, below we highlight some changes in threats for KBAs that have received funding from CEPF and have a baseline and endline assessment available. Full threat assessment results can be found in the Supplementary Materials *METT_Overview_Table*.

The Tano-Offin Forest Reserve in Ghana received funding for two CEPF projects in 2017 when the first METT assessment was undertaken. One of the projects ended in 2018 and the other ended in 2019, however we only have an endline assessment from 2018. The change between the 2017 and 2018 assessments shows that **two threats have decreased in their significance with mining and quarrying**

changing from a high threat in 2017 to a low threat in 2018, and erosion and siltation/deposition (e.g. shoreline or riverbed changes) changing from a medium to a low threat. However, 16 threats increased from N/A or medium to high significance between the two assessments, and 11 threats remained high.

The Atewa Range Forest Reserve in Ghana received funding for two CEPF projects in 2017 when the first METT assessment was undertaken. One of the projects ended in 2018 and the other ended in 2019, however we only have an endline assessment from 2018. **The change between the 2017 and 2018 assessments had no threats improve and six threats worsen** from low or medium to high (wood and pulp plantations; mining and quarrying; hunting, killing and collecting terrestrial animals; logging and wood harvesting; research, education and other work-related activities in protected areas; loss of keystone species).

Cape Three Points Forest Reserve in Ghana has received funding for four CEPF projects since 2017 with two of these projects having baseline (2017) and endline (2018/2019) assessments. **Six threats have worsened from low or medium to high significance** (commercial and industrial areas; hunting, killing and collecting terrestrial animals; logging and wood harvesting; isolation from other natural habitat; other 'edge effects' on park values; agricultural and forestry effluents). **One threat, gathering terrestrial plants or plant products (non-timber), improved from high to low significance between 2017 and 2019.**

Konkouré in Guinea received funding for a CEPF project from 2017-2018, however the baseline and endline assessments from these two years **had no change in threats**. There are three high threats in the KBA: (i) logging and wood harvesting (ii) deliberate vandalism, destructive activities or threats to protected area staff, and (iii) storms and flooding.

Okomu National Park in Nigeria has received funding for a project that runs from 2018 to 2020, and we have a baseline assessment from 2003 (METT 2) and an endline from 2020 (METT 3). In 2003 the main threats were habitat conversion from cocoa farming close to the protected area as well as consumptive biological resource use through logging around the protected area. **In 2020, no threats were listed as high significance**, however hunting, logging and tourism infrastructure were identified as medium threats.

Mount Nimba Strict Nature Reserve in Côte d'Ivoire had a METT 2 assessment carried out in 2003 and a METT 3 in 2018, however it received funding from CEPF in 2019. In 2003, habitat conversion (farms) and consumptive biological resource use (hunting) were recorded as the two main threats. In 2018, *Other* was recorded as the main threat, with additional text referring to illegal occupation and exploitation of land and natural resources and inefficient resettlement attempts by the government of the indigenous population.

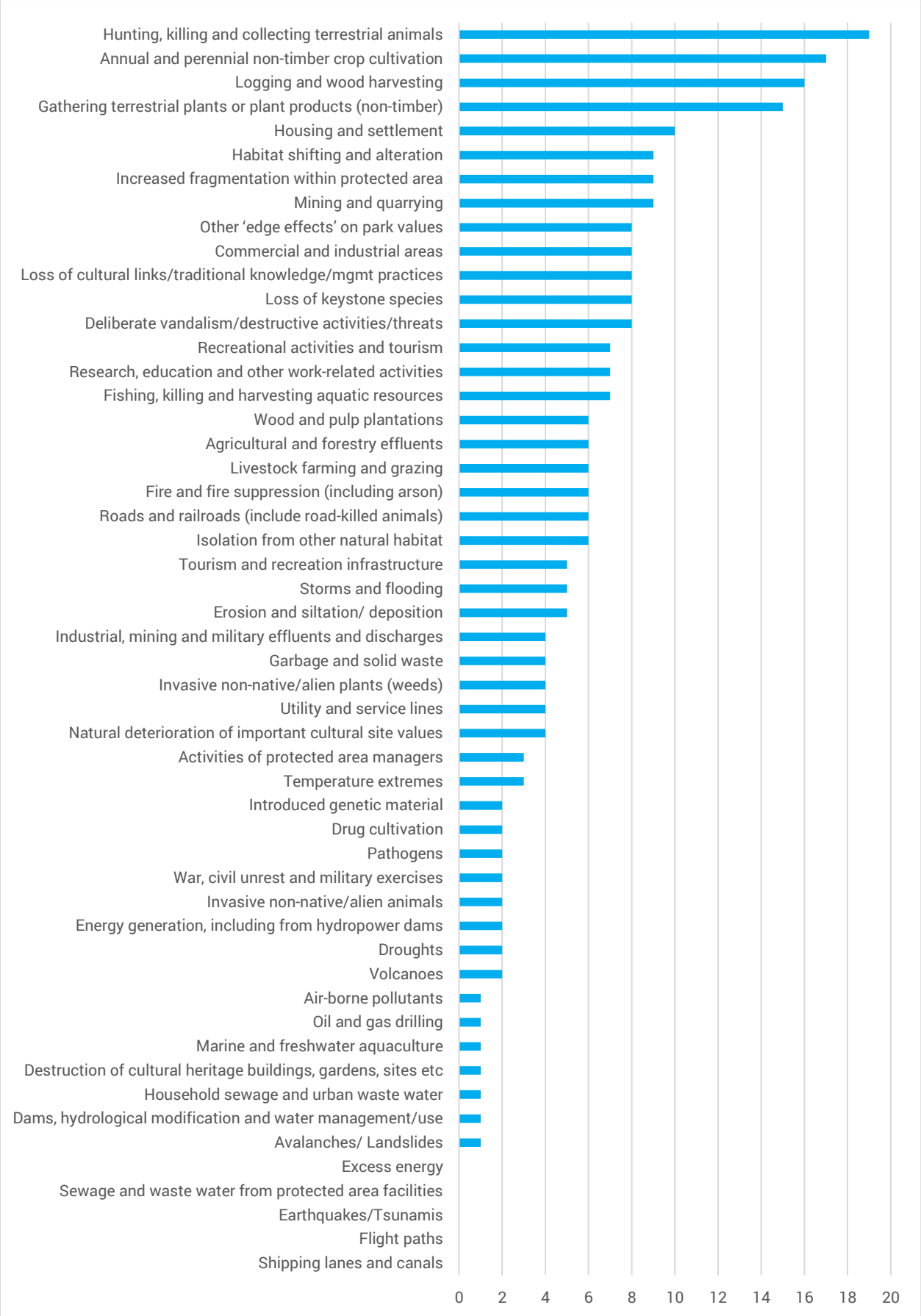

Figure 10 Frequency of medium and high threats indicated in the 25 available METT 3 assessments for CEPF funded KBAs.

6 Conclusion

6.1 Summary of findings for CEPF funded sites

Management effectiveness

When comparing the results from the available METT assessments for CEPF funded and non-funded KBAs in the GFWA Hotspot, we found that there was more improvement in METT scores in sites that had not received funding in the past 5 years. In KBAs that had received funding, the average scores for the endline assessments were lower than the baselines for the context, inputs, outputs and outcomes and only an average increase was noted for the planning and process elements of the IUCN WCPA framework for assessing protected area management effectiveness. A decline in these elements, especially in outputs and outcomes could suggest that more focus is needed on improving the delivery of conservation objectives in the protected areas. However, this conclusion can only be drawn tentatively, as there is a range of other factors that might influence a change in METT scores over time. For example, the assessment may have been conducted by a different person or group of people who had a different understanding of the current and baseline situation (see section 5.1).

Forest cover

The forest cover has decreased throughout the hotspot since 2000 with a higher rate of loss in the Upper Guinean Forests as compared to the Lower Guinean Forests. Although the percentage of loss is much lower in the Lower Guinean Forests, both regions experienced a 4-fold increase in the rate of deforestation between the two time periods (2000-2014 and 2014-2019). The rate of deforestation varied across all of the KBAs in the hotspot, but no substantial difference in forest loss was found when comparing sites that have received CEPF funding in the last 5 years with non-funded sites. Sierra Leone, Liberia, Ghana and Côte d'Ivoire have the KBAs with the highest deforestation rate.

Threats

There are several key threats (those most frequently recorded within the threat assessments) which are particularly prevalent within the CEPF Biodiversity Hotspot. The most common threat was hunting, closely followed by agriculture and aquaculture within a protected area, and natural system modification. From the change in threats information available for a small sample of funded sites it seems that most threats have either stayed the same or are becoming more significant with time.

6.2 Recommendations

Based on the results of this analysis, we provide the following four recommendations to the BirdLife CEPF Regional Implementation Team and/or other donors for potential continued investment in the region:

1. **Increase regular protected area effectiveness assessments through capacity building**
   We recommend further investment in capacity building to promote the regular use of METT to monitor changes in protected area effectiveness over time. Where possible, we recommend using the newest version of the METT (METT 4) developed in 2020. METT 4 draws together the lessons learned from applying the tool around the world. For the first time, METT 4 is presented as an Excel tool which aids implementation and compilation of results. Additional

worksheets in METT 4 allow for more detailed assessments of community relations, planning processes, condition of natural and cultural values, key species and habitats.

The Biodiversity and Protected Areas Management (BIOPAMA) Programme is providing Small Technical Grants for Assessment (STGA) in the region. The purpose of these grants is to identify priority actions for improved protected and conserved areas management and governance. The eligible assessments tools include IMET, METT, RAPPAM, the IUCN Green List, Enhancing our Heritage (EoH), SAGE, GAPA or equivalent. Assessments must take place in priority areas including KBAs and protected areas (BIOPAMA, 2020). Aligning the future CEPF funded projects with those receiving support from BIOPAMA would be a good way forward to share data and ensure that there is no duplication in effort.

2. **Invest in coordination mechanism to support data collection and analysis**
   The process of choosing sites for investment and conservation prioritisation, assessing their management effectiveness using the METT, collecting and storing data, and performing analysis at the site level is complex and requires the combination of multiple datasets. As previously noted in the global report (Shennan-Farpón et al. 2017), these datasets currently lack consistent common identifiers. This is in part due to the multiple organizations involved in supporting these datasets (i.e. CEPF, BirdLife International and UNEP-WCMC), but also due to a lack of communication and coordination in the process of data collection and analyses by different teams down the line. Addressing these issues could help to improve data collection and analysis which will in turn help to inform future investment decisions.

3. **Invest in projects which help to address threats, particularly hunting**
   According to our analysis, biological resources use (especially hunting), agriculture/aquaculture, and natural system modifications are the top three threats currently facing CEPF sites (based on available data). We therefore recommend investing in projects that help to promote sustainable resource use and help to address human-wildlife interactions. The use of tools such as SMART could help in this context. Other more detailed threat assessments (see for example Hockings et al., 2008) could be considered to help gain a more complete picture of protected area threats.

4. **Invest in the protection of deforestation hotspots**
   This study did not show a link between CEPF funding and reduced deforestation, however this does not mean that funding is ineffectual. Rather, this study highlights the need for data which monitors threats over time, and links management inputs with conservation outcomes. This study shows that there are several vulnerable KBAs which continue to have a substantial forest cover that can still be a priority for protection, particularly in Sierra Leone, Liberia, Côte d'Ivoire and Ghana.

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8 Annexes

8.1 METT scores for unfunded KBAs

Equivalent to Table 2, but non-funded sites with the percentage of effectiveness of each of the six key PAME elements based on METT scores.

Country	KBA name	Year of assessment	Context	Planning	Inputs	Process	Outputs	Outcomes
Ghana	Ankasa Resource Reserve - Nini-Sushien National Park	2003	100	58	67	72	50	60
Côte d'Ivoire	Azagny National Park	2009	100	71	63	58	50	67
Côte d'Ivoire	Azagny National Park	2014	100	47	50	48	50	56
Côte d'Ivoire	Azagny National Park	2015	100	73	71	61	67	67
Côte d'Ivoire	Azagny National Park	2016	100	73	79	70	50	67
Côte d'Ivoire	Azagny National Park	2017	100	80	79	79	83	56
Côte d'Ivoire	Azagny National Park	2018	100	80	75	82	83	67
Côte d'Ivoire	Azagny National Park	2019	100	73	71	79	83	67
Cameroon	Bakossi mountains	2004	67	0	8	16	0	22
Cameroon	Bakossi mountains	2006	67	17	8	18	17	33
Cameroon	Bakossi mountains	2008	100	17	17	29	33	33
Cameroon	Banyang Mbo Wildlife Sanctuary	2012	100	47	33	27	17	67
Ghana	Bia National Park and Resource Reserve	2009	100	71	71	75	50	100
Côte d'Ivoire	Bossematie Forest Reserve	2010	100	50	38	28	33	33
Liberia	Grand Kru Southwest forest blocks	2009	33	25	17	14	0	33
Ghana	Kakum National Park - Assin Attandaso Resource Reserve	2003	100	58	71	86	67	80

Sierra Leone	Kangari Hills Non-hunting Forest Reserve	2006	100	42	25	21	17	30
Ghana	Kyabobo (proposed) National Park	2003	67	50	46	53	67	70
Côte d'Ivoire	Sangbe Mountain National Park	2014	100	60	50	42	33	33
Côte d'Ivoire	Sangbe Mountain National Park	2016	100	67	50	42	33	33
Côte d'Ivoire	Sangbe Mountain National Park	2017	100	80	58	58	50	44
Côte d'Ivoire	Sangbe Mountain National Park	2018	100	80	58	58	50	44
Côte d'Ivoire	Sangbe Mountain National Park	2019	100	73	71	70	67	56
Sierra Leone	Sierra Leone River Estuary	2010	33	31	17	24	0	33
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2003	100	83	67	81	67	70
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2005	100	75	83	86	83	90
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2012	100	87	63	47	83	44
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2014	100	100	71	67	83	44
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2015	100	100	75	72	83	67
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2016	100	100	75	81	83	89
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2017	100	93	79	85	83	100
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2018	100	93	75	81	83	100
Côte d'Ivoire	Tai National Park and Nzo Faunal Reserve	2019	100	80	71	79	83	100
Sierra Leone	Tingi Hills Non-hunting Forest Reserve	2006	100	17	25	21	0	30
Nigeria	Afi River Forest Reserve	2018	100	33	33	33	33	78

8.2 METT 2 threat assessment

List the **top two most important threats** to the PA values (please tick **ONLY TWO** boxes on this page)
Indicate reasons why these were chosen

1. Habitat conversion:
    - housing
    - industrial development
    - farms
    - plantations
    - ski areas
    - dams
    - other / non specified
2. Transportation/Energy infrastructure:
    - utility lines
    - roads
    - railroads
    - wind farms
    - other / non specified
3. Abiotic resource use:
    - mining
    - oil & gas drilling
    - geothermal energy
    - water withdrawal
    - other / non specified
4. Consumptive biological resource use:
    - Hunting
    - NTFP collection
    - Grazing
    - Logging
    - other / non specified
5. Non-consumptive biological resource use:
    - ATVs/snowmobiles
    - hiking/biking
    - scientific research
    - military manoeuvres
    - other / non specified
6. Pollution:
    - acid rain
    - solid waste
    - toxins
    - radioactive fallout
    - other / non specified
7. Invasive species (alien and native):
    - Plants
    - Animals
    - disease & pathogens
    - other / non specified
8. Modification of natural processes / ecological drivers / disturbance regimes:
    - climate change
    - loss of key predators
    - grazing patterns
    - fire regime
    - fragmentation
9. Other
    - other / non specified

8.3 METT 3 threat assessment

Please tick all relevant existing threats as either of high, medium or low significance. Threats ranked as of **high** significance are those which are seriously degrading values; **medium** are those threats having some negative impact and those characterised as **low** are threats which are present but not seriously impacting values or **N/A** where the threat is not present or not applicable in the protected area.

1. Residential and commercial development within a protected area

Threats from human settlements or other non-agricultural land uses with a substantial footprint

High	Medium	Low	N/A	
				1.1 Housing and settlement
				1.2 Commercial and industrial areas
				1.3 Tourism and recreation infrastructure

2. Agriculture and aquaculture within a protected area

Threats from farming and grazing as a result of agricultural expansion and intensification, including silviculture, mariculture and aquaculture

High	Medium	Low	N/A	
				2.1 Annual and perennial non-timber crop cultivation
				2.1a Drug cultivation
				2.2 Wood and pulp plantations
				2.3 Livestock farming and grazing
				2.4 Marine and freshwater aquaculture

3. Energy production and mining within a protected area

Threats from production of non-biological resources

High	Medium	Low	N/A	
				3.1 Oil and gas drilling
				3.2 Mining and quarrying
				3.3 Energy generation, including from hydropower dams

4. Transportation and service corridors within a protected area

Threats from long narrow transport corridors and the vehicles that use them including associated wildlife mortality

High	Medium	Low	N/A	

				4.1 Roads and railroads (include road-killed animals)
				4.2 Utility and service lines (e.g. electricity cables, telephone lines,)
				4.3 Shipping lanes and canals
				4.4 Flight paths

5. Biological resource use and harm within a protected area

Threats from consumptive use of "wild" biological resources including both deliberate and unintentional harvesting effects; also persecution or control of specific species (note this includes hunting and killing of animals)

High	Medium	Low	N/A	
				5.1 Hunting, killing and collecting terrestrial animals (including killing of animals as a result of human/wildlife conflict)
				5.2 Gathering terrestrial plants or plant products (non-timber)
				5.3 Logging and wood harvesting
				5.4 Fishing, killing and harvesting aquatic resources

6. Human intrusions and disturbance within a protected area

Threats from human activities that alter, destroy or disturb habitats and species associated with non-consumptive uses of biological resources

High	Medium	Low	N/A	
				6.1 Recreational activities and tourism
				6.2 War, civil unrest and military exercises
				6.3 Research, education and other work-related activities in protected areas
				6.4 Activities of protected area managers (e.g. construction or vehicle use, artificial watering points and dams)
				6.5 Deliberate vandalism, destructive activities or threats to protected area staff and visitors

7. Natural system modifications

Threats from other actions that convert or degrade habitat or change the way the ecosystem functions

High	Medium	Low	N/A	
				7.1 Fire and fire suppression (including arson)
				7.2 Dams, hydrological modification and water management/use
				7.3a Increased fragmentation within protected area
				7.3b Isolation from other natural habitat (e.g. deforestation, dams without effective aquatic wildlife passages)
				7.3c Other 'edge effects' on park values
				7.3d Loss of keystone species (e.g. top predators, pollinators etc)

8. Invasive and other problematic species and genes

Threats from terrestrial and aquatic non-native and native plants, animals, pathogens/microbes or genetic materials that have or are predicted to have harmful effects on biodiversity following introduction, spread and/or increase

High	Medium	Low	N/A	
				8.1 Invasive non-native/alien plants (weeds)
				8.1a Invasive non-native/alien animals
				8.1b Pathogens (non-native or native but creating new/increased problems)
				8.2 Introduced genetic material (e.g. genetically modified organisms)

9. Pollution entering or generated within protected area

Threats from introduction of exotic and/or excess materials or energy from point and non-point sources

High	Medium	Low	N/A	
				9.1 Household sewage and urban waste water
				9.1a Sewage and waste water from protected area facilities (e.g. toilets, hotels etc)
				9.2 Industrial, mining and military effluents and discharges (e.g. poor water quality discharge from dams, e.g. unnatural temperatures, de- oxygenated, other pollution)

				9.3 Agricultural and forestry effluents (e.g. excess fertilizers or pesticides)
				9.4 Garbage and solid waste
				9.5 Air-borne pollutants
				9.6 Excess energy (e.g. heat pollution, lights etc)

10. Geological events

Geological events may be part of natural disturbance regimes in many ecosystems. But they can be a threat if a species or habitat is damaged and has lost its resilience and is vulnerable to disturbance. Management capacity to respond to some of these changes may be limited.

High	Medium	Low	N/A	
				10.1 Volcanoes
				10.2 Earthquakes/Tsunamis
				10.3 Avalanches/ Landslides
				10.4 Erosion and siltation/ deposition (e.g. shoreline or riverbed changes)

11. Climate change and severe weather

Threats from long-term climatic changes which may be linked to global warming and other severe climatic/weather events outside of the natural range of variation

High	Medium	Low	N/A	
				11.1 Habitat shifting and alteration
				11.2 Droughts
				11.3 Temperature extremes
				11.4 Storms and flooding

12. Specific cultural and social threats

High	Medium	Low	N/A	
				12.1 Loss of cultural links, traditional knowledge and/or management practices
				12.2 Natural deterioration of important cultural site values
				12.3 Destruction of cultural heritage buildings, gardens, sites etc