#4

West Africa

#4 Table of contents

>0 _ Executive Summary 290

Aspects of West African biodiversity 290
Organisation of this chapter 290

>1 _ Special features of the West African region 294

1.1 Countries of West Africa 294
1.1.1 Development indicators 294
1.1.2 Conflict 296
1.1.3 Food crisis 296
1.1.4 West Africa and the Millennium Development Goals 296
1.1.5 Climate change 297
1.1.6 Conclusions 297
1.2 Overview of ecological characteristics of the West African region 297
1.2.1 Major ecotypes 298
1.2.2 Conservation issues and challenges (key and threatened, rare and high-value species) 298
1.2.2.1 Elephant 298
1.2.2.2 Sahelo-Saharan antelope 298
1.2.2.3 Primates 298
1.2.2.4 Carnivores 301
1.2.2.5 Other rare and threatened species 301
1.2.2.6 Birds 301
1.2.2.7 Aquatic species in inland waters 302
1.2.2.8 Rare and high-value trees 303
1.2.2.9 Final note 303
1.3 Overview of regional-specific aspects of the West African region 305
1.3.1 Regional institutional support 305
1.3.2 Conservation capacity building in West Africa 305

>2 _ Conservation issues and challenges 308

2.1 Key direct threats to conservation in West Africa 308
2.1.1 Availability of funds for PAs 309
2.1.2 Institutional governance of PAs 311
2.1.3 Illegal wildlife trade income and corruption 311
2.1.4 Weak planning, management effectiveness and monitoring of PAs 313
2.2 Key indirect threats to conservation 314
2.2.1 Population growth and poverty 314
2.2.2 Fragmentation, reduction and isolation of protected areas in the landscape 314
2.2.3 Coup d'États, rebellions, civil unrest and religious fundamentalism, Ebola and refugee crises 316
2.2.4 Negative economic trends 316
2.2.5 Policy and sectorial approach 316

>3 _ Ongoing conservation efforts 320

3.1 DESERTS 320
3.2 SAVANNAHS 320
3.3 FORESTS 320
3.4 MANGROVES/COASTAL 321
3.5 CONCLUSION 321

>4 _ Lessons learned and promising approaches 324

4.1 NEGATIVE LESSONS LEARNED 324
4.2 POSITIVE LESSONS LEARNED 324
4.3 PROMISING APPROACHES 324
4.3.1 Constant and specific intervention on the ground 326
4.3.2 Biodiversity and management information system 326
4.3.3 Shared political and institutional decisions 329

>5 _ Indicative conservation actions 332

5.1 ACTIVE PROCESS 333
5.1.1 Dissemination and analysis of the proposals about sites and conservation priorities in West Africa 333
5.1.2 Support for conservation of the major ecotypes: deserts, savannahs, forests and mangroves/coastal 334
5.1.3 Specific strategies and actions for the major desert ecotypes 336
5.1.4 Specific strategies and actions for the major savannah ecotypes 341
5.1.5 Specific strategies and actions for the major forest ecotypes 350
5.1.6 Specific strategies and actions for the major mangrove/coastal ecotypes 362
5.1.7 Dismantling wildlife traffic network 367
5.1.8 Special analysis 368
5.1.9 Wildlife protection training 369
5.2 PROACTIVE PROCESS 370
5.2.1 Institutional support and coordination 370
5.2.2 Monitoring and planning 371
5.2.3 Communication 372
5.2.4 Biological research 372
5.2.5 Management – Governance training 373
5.3 CONCLUDING RECOMMENDATIONS 374
5.3.1 Recommendations for tackling key indirect threats to conservation 374
5.3.2 Recommendations for tackling general direct threats to conservation 374
5.3.3 Recommendations for tackling specific direct threats to conservation 375
5.3.3.1 Deserts 378
5.3.3.2 Savannahs 378
5.3.3.3 Forests 379
5.3.3.4 Mangroves 379

> _ Appendices 382

List of figures

Figure 1. West African countries included in this study 294
Figure 2. West Africa, development indicators (1), 1980-2012 296
Figure 3. West Africa, development indicators (2), 1990-2012 296
Figure 4. Main ecoregions of West Africa 300
Figure 5. Schematic representation of conservation in West Africa according to the major ecotypes 303
Figure 6. Land-cover types of the West African region 304
Figure 7. Protected areas in the West African region 310
Figure 8. Annual population growth rate in per cent as average of ten years (1993-2012) 315
Figure 9. Promising approach to improve the protection of biodiversity in West Africa 325
Figure 10. Map of proposed KLCs and KCAs in the West African region 335
Figure 11. The Senegal Delta KLC 337
Figure 12. West African ecosystems – KLCs, KCAs and priorities 340
Figure 13. The WAPOK KLC 343
Figure 14. The Comoé-Mole KLC and the Volta Transboundary Ecosystem KLC 344
Figure 15. The Niokolo-Badiar-Bafing-Baoulé-Falémé-Fouta KLC 345
Figure 16. The Gourma Elephant, Sahel Faunal Reserve and Inner Niger Delta Savannah KLC 346
Figure 17. The Lion KCAs with two national parks in Nigeria: Kainji Lake NP and Yankari NP 347
Figure 18. The Cross River-Korup-Mount Cameroon-Tamakanda-Gashaka-Tchabel-Faro Forests 353
Figure 19. The Taï-Grebo-Sapo Forest KLC 354
Figure 20. The Mount Nimba KLC 355
Figure 21. The Gola-Lofa-Foya KLC 357
Figure 22. The Rio Cacheu-Bijagos KLC 364

List of tables

Table 1. Population, annual growth (%) and estimated doubling time of population of West Africa 295
Table 2. Major ecoregions, formally protected areas and indicative conservation status in West Africa 299
Table 3. Synthetic indications of trends of the key, rare and high-value species of major ecotypes 302
Table 4. Composite strategic approach for interventions in the four major ecotypes 326
Table 5. Key elements of the Niger-Chad-Algeria Desert KLC 336
Table 6. Key elements of the Senegal-Mauritania Atlantic Coastal KLC 337
Table 7. Key elements of the Mauritania-Western Sahara Atlantic Coastal KLC 338
Table 8. West African deserts – Main KLCs and KCAs and priorities 339
Table 9. Key elements of the WAPOK Savannah KLC 343
Table 10. Key elements of the Comoé-Mole (CM) Savannah KLC 344
Table 11. Key elements of the Niokolo-Badiar-Bafing-Baoulé-Falémé-Fouta (NBBBFF) Savannah KLC 345
Table 12. Key elements of the Gourma Elephant, Sahel Faunal Reserve and Inner Niger Delta Savannah KLC 346
Table 13. Key elements of the Lion KCAs 347
Table 14. Key elements of the Volta Transboundary Ecosystem Wildlife Corridors KLC 348
Table 15. West African savannahs – Main KLCs and KCAs and priorities 349
Table 16. Key elements of the Cross River-Korup-Mount Cameroon-Tamakanda-Gashaka-Tchabel-Faro (CKTGTF) Forest KLC 352
Table 17. Key elements of the Taï-Grebo-Sapo (TGS) Forest KLC 354
Table 18. Key elements of the Mount Nimba (MN) Forest KLC 355
Table 19. Key elements of the Gola-Lofa-Foya (Sierra Leone-Liberia Transborder Peace Park) and Mano-Wologizi-Wonegizi-Ziama (GLF-MWWZ) Forests KLC 356
Table 20. Key elements of the Outamba-Kilimi-Kuru-Pinselli-Soya (OKKPS) Forest KLC 358
Table 21. Key elements of forest KCAs 359
Table 22. West African forests – Main KLCs and KCAs and priorities 360
Table 23. Mangrove areas falling within protected areas 362

Table 24.	Key elements of the Rio Cacheu-Cufada-Cantanhez-Rio Buba-Iles Tristao (CCCBT) mangrove KLC	364
Table 25.	Key elements of the mangrove/coastal KCAs	365
Table 26.	West African mangrove/coastal – Main KLCs and KCAs and priorities	366
Table 27.	Summary table of KLCs and KCAs and priorities for West Africa	376
Table 28.	Countries currently subject to a recommendation to suspend trade (CITES) (9 September 2013)	382
Table 29.	The biodiversity features of West Africa	383
Table 30.	Internationally protected areas in West Africa	384
Table 31.	Biomes and ecotypes of West African countries	385
Table 32.	Data for West African countries	386

List of boxes

Box 1.	Importance of WAPOK	312
Box 2.	Biodiversity and Protected Areas Management Programme (BIOPAMA)	327
Box 3.	Digital Observatory for Protected Areas (DOPA)	328
Box 4.	The decline of wetlands	342
Box 5.	Importance of Cameroon-Nigeria border and transborder conservation measures	353
Box 6.	The Gola-Lofa-Foya and Mano-Wologizi-Wonegizi-Ziama forests – An example of long-term international and local partnerships for landscape and transfrontier conservation	357

List of acronyms

ABS	Access and Benefits Sharing
ACP	African Caribbean Pacific
ADB / AfDB	African Development Bank
AFD	Agence française de développement
AfESG	African Elephant Specialist Group
ANP	Africa Parks Network
ASG	Antelope Specialist Group
AU	African Union
AWF	African Wildlife Foundation
AZE	Alliance for Zero Extinction
BFTPA	Bafing-Falémé transborder protected area
BIOPAMA	Biodiversity and Protected Areas Management Programme
CBD	Convention on Biological Diversity
CBNRM	Community-based Natural Resource Management
CCCBT	Rio Cacheu-Cufada-Cantanhez-Rio Buba-Iles Tristao
CCPAWA	Climate Change and Protected Areas in West Africa
CENAGREF	Centre national de gestion des réserves de faune
CI	Conservation International
CITES	Convention on International Trade in Endangered Species
CKTGTF	Cross River-Korup-Mont Cameroon-Tamakanda-Gashaka-Tchabel-Faro
CM	Comoé-Mole
CoP	Conference of the Parties
DNA	deoxyribonucleic acid
DOPA	Digital Observatory for Protected Areas
DRC	Democratic Republic of Congo
EAGLE	Eco Activists for Governance and Law Enforcement
EBA	Endemic Bird Area
ECOFAC	Programme régional de conservation et utilisation rationnelle des écosystèmes forestiers d'Afrique centrale
ECOWAS	Economic Community of West African States
EDF	European Development Fund
EFG	École de faune de Garoua
EN	endangered (Red List)
ENEF	École nationale des eaux et forêts
ERAIFT	École régionale d'aménagement intégré des forêts et territoires tropicaux
ETIS	Elephant Trade Information System
EU	European Union
FAO	Food and Agriculture Organisation
FEM	Fonds pour l'environnement mondial
FFEM	Fonds français pour l'environnement mondial
FLEGT	Forest Law Enforcement, Governance and Trade
FSC	Forest Stewardship Council
FZS	Frankfurt Zoological Society
GBIF	Global Biodiversity Information Facility
GDP	gross domestic product
GEF	Global Environment Fund
GIZ	Deutsche gesellschaft für technische Zusammenarbeit (German technical cooperation)
GLF-MWWZ	Gola-Lofa-Foya and Mano-Wologizi-Wonegizi-Ziama
GNI	gross national income
GRASP	Great Apes Survival Partnership
GRNP	Gola Rainforest National Park
HEC	human-elephant conflict
HWC	human-wildlife conflict
IBA	Important Bird and Biodiversity Area

IBRD	International Bank for Reconstruction and Development (UN)
ICCWC	International Consortium on Combating Wildlife Crime
ICDP	Integrated Conservation and Development project
IDA	International Development Association
IUCN	International Union for Conservation of Nature
IUCN-PAPACO	Programme Aires protégées pour l'Afrique du Centre et de l'Ouest (Programme on African Protected Areas & Conservation)
JRC	Joint Research Centre
KCA	Key Conservation Area
KfW	Kreditanstalt für Wiederaufbau (German financial cooperation)
KLC	Key Landscape for Conservation
LAGA	Last Great Ape Organisation
LEM	Law Enforcement Monitoring
LMD	Licence-Master-Doctorate
MAB/UNESCO	Man and the Biosphere Program
MEA	Multilateral Environmental Agreement
MIKES	Minimising the Illegal Killing of Elephants and other Endangered Species
MIST	Management Information System
MN	Mount Nimba
MoU	Memorandum of Understanding
MPA	marine protected area
MWS	Mauritania-Western Sahara
NBBBFF	Niokolo-Badiar-Bafin-Baoulé-Falémé-Fouta
NC	not classified
NCA	Niger-Chad-Algeria
NEPAD	New Partnership for Africa's Development
NGO	non-governmental organisation
NNR	national nature reserve
NP	national park
NRM	Natural Resource Management
NTFP	non-timber forest products
OFAC	Central African Forest Observatory
OFINAP	Office national des aires protégées du Burkina Faso
OKKPS	Outamba/Kilimi-Kuru-Pinselli-Soya
PA	protected area
PES	Payment for Ecological Services
PES	Payments for Ecosystem Services
PFM	Participatory Forest Management
PHVA	population and habitat viability assessment
PPP	public-private partnership
PVA	population viability analysis
Ramsar	The Ramsar Convention is an international treaty for the conservation and sustainable utilisation of wetlands
REDD+	Reduced Emissions from Deforestation and Forest Degradation
RRIS	Regional Reference Information System
SM	Senegal-Mauritania
SMART	Self-Monitoring, Analysis and Reporting Technology
SSC	Species Survival Commission
STEWARD	Sustainable and Thriving Environments for West African Regional Development
TEEB	The Economics of Ecosystems & Biodiversity
TFCA	transfrontier conservation area
TGS	Taï-Grebo-Sapo
ToR	terms of reference

TRAFFIC	The wildlife trade monitoring network
UICN	Union internationale pour la conservation de la nature
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Science and Culture Organisation
UNODC	United Nations Office on Drugs and Crime
USAID	United States Agency for International Development
USD	US dollar
USFWS	United States Fish and Wildlife Service
VC	Volta Corridors
WAEMU	West Africa Economy and Monetary Union
WAMPAN	West Africa Marine Protected Areas Network
WAP	W, Arly and Pendjari National Parks
WAPAN	West Africa Protected Areas Network
WAPOK	W, Arly, Pendjari Oti Monduri, Keran (between Benin, Burkina Faso, Niger and Togo)
WAZA	World Association of Zoos and Aquariums
WCMC	World Database of Protected Areas
WCS	Wildlife Conservation Society
WHS-UNESCO	World Heritage Site
WL	wetland
WWF	World Wide Fund for Nature

0

Executive Summary

>0 _ Executive Summary

Aspects of West African biodiversity

The following aspects characterise the biodiversity of West Africa:

- wide diversity of habitats and species;
- strong degradation;
- greatest richness of biodiversity in lowland and mountain forests (the Guinea forest in West Africa contains half the mammal species on the African continent);
- presence of some of the largest and most beautiful antelopes in the world;
- a pattern of extinction of mammals in the wild that becomes progressively greater, moving from the coastal and forest biomes to the deserts (including the desert protected areas);
- progressive decline in the representation of biomes in protected areas (PAs), moving from the desert towards the forest and coastal areas.

The current interventions for conservation in West Africa do not ensure the protection of wildlife or its biodiversity heritage. Those interventions that assist *in situ* conservation are highly concentrated in the savannah areas. Interventions in favour of *ex situ* conservation do not protect some of the key endemic mammals at risk of extinction (e.g. West African lion). The survival of some key species (e.g. oryx) requires the adoption of a mixed strategy of *in situ* and ex situ conservation due to poor genetic heritage of the mammals supposedly extinct in nature and existing only in captivity. The effects of climate change and the important development of industrialisation in the southern countries in West Africa are causing significant in-migration of human populations. The effects of these phenomena are higher pressure on and consequently greater degradation of coastal and lowland forest ecosystems, which are the most threatened ecotypes in the region. The current fragility of biodiversity and the significant threats to the overall biodiversity heritage of West Africa require conservation interventions that are highly specific to this region – this is in addition to the more general strategic approach outlined in the summary document – Synthesis.

For the strategic approach to wildlife conservation in West Africa, there is specific need for the following:

- *In situ* support for conservation which includes: i) specific strategies and actions for the four ecotypes: (a) deserts, (b) savannahs, (c) forests and (d) mangroves/coastal area; ii) special analysis of species and habitats that are highly threatened with extinction; and iii) specific training in wildlife protection on the ground (see Sections 5.1.2, 5.1.8, 5.1.9).
- Strengthening management capacity in wildlife conservation with a focus on regional coordination through the following: i) institutional support to raise capacity for wildlife conservation and strengthen coordination between countries of the region; and ii) governance training for management authorities so that the landscape approach proposed by this strategic approach can be adopted (see Sections 5.2.1, 5.2.5).

Organisation of this chapter

The first section presents the key elements of the West African countries concerning: (i) development indicators, driving forces causing wildlife decline and the impacts of climate change; (ii) an overview of the wildlife in West Africa following an analysis of four major ecotypes (deserts, savannahs, forests and mangroves/coastal) including the coastal and marine PAs, the more threatened species and the risks of species disappearing; (iii) a quick analysis of two elements connected with long-term wildlife conservation: the need for regional institutional support and for conservation capacity building in West Africa.

The second section indicates the key direct threats and the key indirect threats to conservation in West Africa. The section presents an analysis of:

- four key direct threats to conservation: (i) availability of funds; (ii) institutional governance; (iii) illegal wildlife income and corruption, and iv) weak planning, management, effectiveness and monitoring;
- five key indirect threats to conservation: (i) population growth and poverty; (ii) fragmentation, reduction and isolation of PAs in the landscape; (iii) coup d'États, rebellions, civil unrest and religious fundamentalism, Ebola crisis (epidemics/pandemics), and refugee crises; (iv) negative economic trends; (v) policy and sectorial approaches.

The third section is a short presentation of the ongoing conservation effort organised for the four major ecotypes: deserts, savannahs, forests and mangroves/coastal. At present the ongoing conservation efforts are characterised by: (i) low funding for desert PAs with a strong involvement of non-governmental organisations (NGOs), (ii) comparatively strong support in the savannah area; (iii) low funding for rainforest areas, with mixed interventions by government and NGOs; (iv) a small-scale success story for the recovery of mangrove forests through a public-private partnership.

The fourth section looks briefly at the negative and positive lessons learned and promising approaches. The success of the promising approaches depends on the functional integration of three strategies: (a) consistent, uninterrupted interventions on the ground with a specific strategic approach of intervention for each major ecotype but coordinated between them, (b) a decision support system based on the collection and organisation of information on biodiversity and management effectiveness in collaboration with BIOPAMA (Biodiversity and Protected Areas Management

The coasts of West Africa offer many stop-over sites for members of the Palearctic population of greater flamingos.

Programme, a European Union programme), and (c) shared decision-making at institutional and political levels.

The fifth section is the most developed and gives details about the two parallel processes, active and proactive, to try to establish or restore the fundamentals for a better wildlife conservation in West Africa. The active process has a focus on more feet on the ground to take action against key direct threats and for the protection of areas of high biodiversity, while the proactive process is an external support for better governance, monitoring and planning, and against the key indirect threats on PAs.

The active process has five main activities:

1. dissemination and analysis of the proposals about sites and priorities for conservation in West Africa;
2. specific strategies and actions for the major ecotypes: deserts, savannahs, forests and mangroves/coastal;
3. dismantling wildlife traffic networks;
4. special analysis;
5. wildlife protection training.

The objectives of the active process are:

(i) to balance the interventions between the four major ecotypes;
(ii) to save threatened species from extinction;
(iii) to preserve critical habitats (e.g. wetland, Mount Nimba, mangrove);
(iv) to improve the management effectiveness of national and transborder parks;
(v) to promote landscape conservation initiatives for maintaining connections between the blocks of PAs;
(vi) to ensure a better representation of the realities of wildlife in West Africa.

The proactive process attempts, by creating 'institutional support and coordination' under the West Africa Economy and Monetary Union (WAEMU), to coordinate and promote:

1. monitoring and planning;
2. communication;
3. biological research;
4. management-governance training.

The objectives of the proactive process are:

(i) to improve the availability and proper use of resources;
(ii) to ensure a shared and harmonised implementation between countries;
(iii) to develop a stronger balance of conservation initiatives in the macro-ecotypes of West Africa;
(iv) to give greater attention to the specificities of conservation at national, regional and interregional level (e.g. highly threatened species, wetlands at risk of extinction, mangrove ecosystems).

At present there is no organisation that provides the required institutional, technical and scientific capacities in West Africa. This document therefore recommends the combination of existing institutions and organisations with adequate support to establish a unit to implement the proposed strategic approach.

The Appendix 1 present basic information that will support the development of a strategic approach to the conservation of biodiversity in West Africa:

(i) key, threatened, rare and high-value species;
(ii) data on the main conservation projects in West Africa, and
(iii) miscellaneous data on West Africa.

1

Special features of the West African region

>1 _ Special features of the West African region

1.1 Countries of West Africa

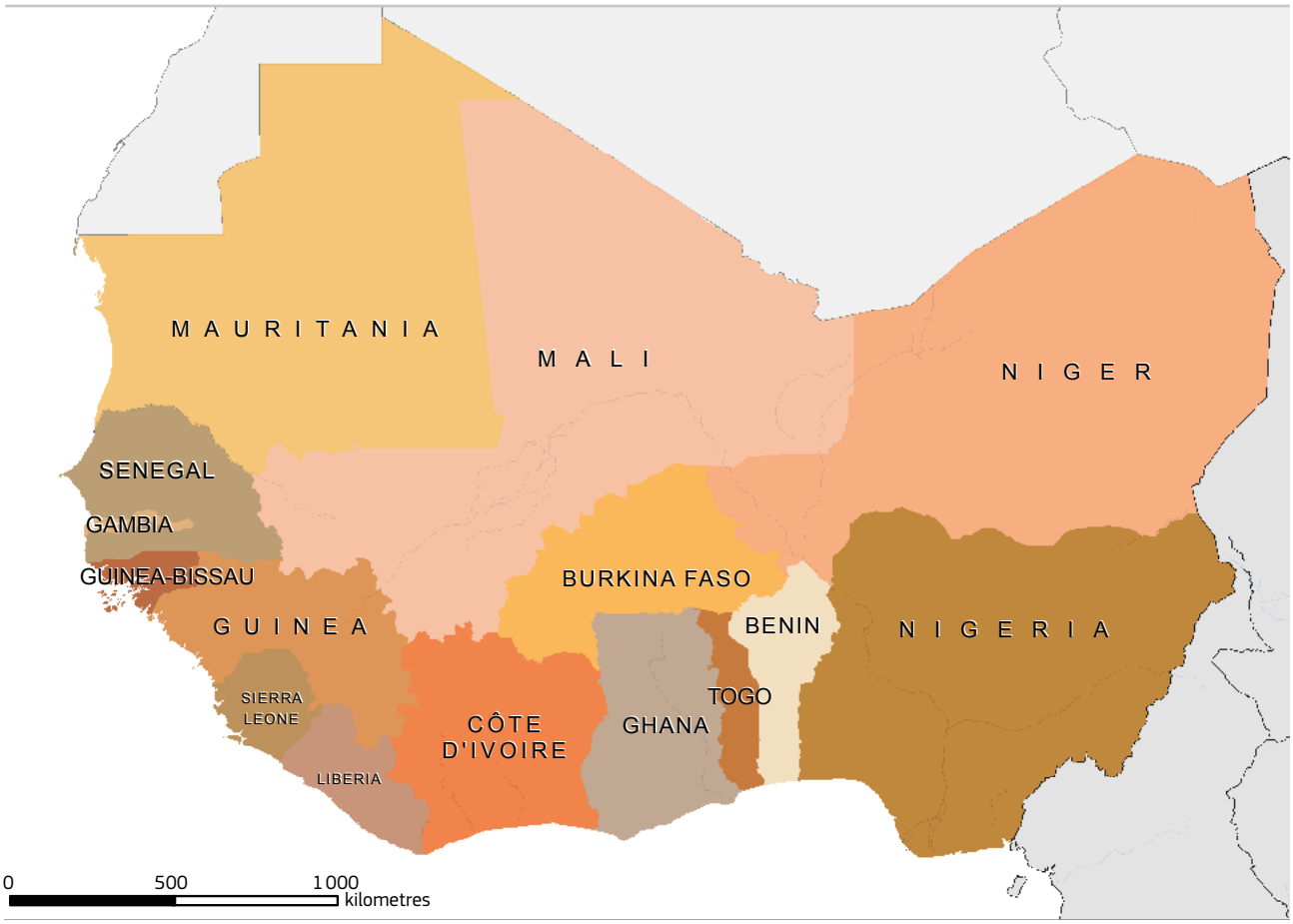
The West African region as defined for purposes of this report comprises 15 countries: **Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone** and **Togo**.

Cape Verde was not considered in the report because there are no protected areas (PAs) in the country, but it was associated with this strategic approach in a few specific analyses. Moreover, a specific analysis of this country will be conducted in a study dedicated to African insular ecosystems.

1.1.1 Development indicators

The countries of West Africa have a population of 340 million; about 60 % of the inhabitants live in rural areas. The average yearly income for each person in West Africa is USD 800 (2011). This compares with an average yearly income for each person in Sub-Saharan Africa of USD 1 500. The region's economic growth has averaged only 2.9 % during the past three years, in contrast with what was the best gross domestic product (GDP) growth for Africa in the past, while its population has been growing by 2.8-2.9 % a year. It is estimated that economic growth of about 6-7 % a year would be required to meet the goal of cutting extreme poverty in half by 2020 (see Table 1, Figures 2 and 3).

Figure 1. West African countries included in this study



Bassari women in a market in east Senegal.
The population of West Africa, currently estimated at 340 million, is projected to double over the next 25 years.

TABLE 1. Population, annual growth (%) and estimated doubling time of population of West Africa

Country	1 July 2013 projection	Average relative annual growth (%)	Estimated doubling time (years)
Benin	9 742 000	3.24	22
Burkina Faso	17 323 000	3.28	21
Côte d'Ivoire	23 919 000	3.09	23
Gambia	1 794 000	2.75	26
Ghana	26 441 000	2.56	27
Guinea	11 861 000	3.09	23
Guinea-Bissau	1 699 000	2.60	27
Liberia	3 881 000	2.10	33
Mali	16 678 000	3.29	21
Mauritania	3 461 000	2.58	27
Niger	17 493 000	3.85	18
Nigeria	177 096 000	3.24	22
Senegal	13 567 000	3.06	23
Sierra Leone	5 823 000	1.84	38
Togo	6 675 000	2.88	24
Total	**337 453 000**	**2.90**	**25**

1.1.2 Conflict

Over the past 15 years, nine of the 15 members of the Economic Community of West African States (ECOWAS) – Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Côte d'Ivoire, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo – have experienced conflict ranging from high intensity civil wars to violence during elections. One of the most common reasons advanced for the prevalence of conflict is weak governance. The area accounts for more than 70 % of military coups in Africa. There is a high degree of illicit trade in diamonds, timber and wildlife, which can be directly related to the conflict. In the last years, the conflicts in Côte d'Ivoire and Mali have been particularly damaging for the region and also for biodiversity in the country. Maintaining peace in the region is seen as a prerequisite for improving its development outcomes. In 1999, it was estimated that USD 800 million that could have been used for development was instead diverted into conflicts.

1.1.3 Food crisis

Underdevelopment, low rainfall, climate change, coup d'État, rebellion, civil and religious fundamentalism, epidemic (Ebola) and unrest continue to disrupt local and cross-border staple food and livestock markets. Consequently the forced migrations, poverty, declining food stocks and rising food prices are all key factors that are contributing toward a chronic food crisis in West Africa. Fifteen million people across the region are directly or periodically affected by the food crisis. Also a higher-than-average staple food price is causing an increase in the illness rate in West Africa as many people are becoming severely malnourished.

1.1.4 West Africa and the Millennium Development Goals

West Africa is lagging behind in its efforts to meet the Millennium Development Goals [1] for the following reasons:

- over 55 % of West Africans live on less than USD 1 per day;
- life expectancy at birth is only 46 years;
- secondary school enrolment is at 20 %;
- 42 % of adults are illiterate;
- malnutrition affects 29 % of children under the age of five.

Figure 2. West Africa, development indicators (1), 1980-2012

Note the increasing population density and agricultural land with decreasing forest areas and formally maintained protected areas.

Source: World Bank, Africa Development Indicators, specific elaboration.

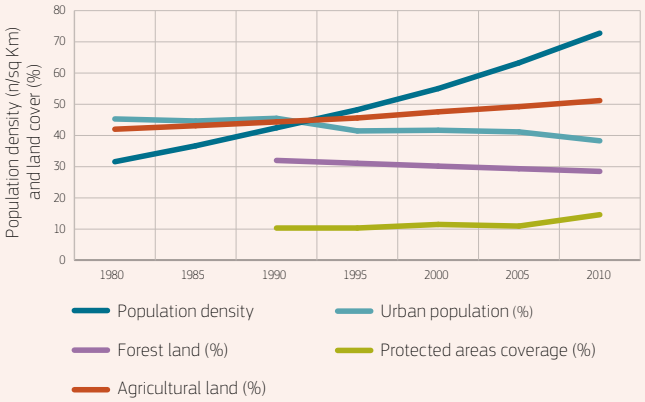
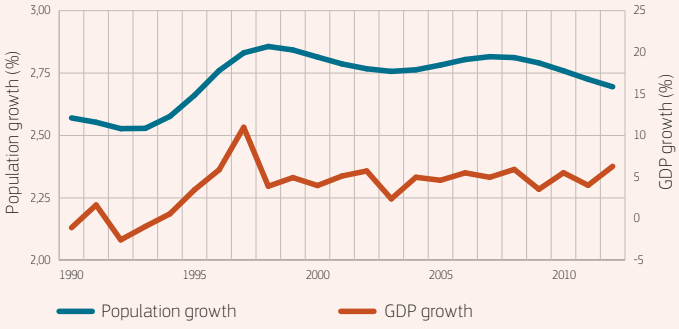


Figure 3. West Africa, development indicators (2), 1990-2012

Note the permanently high population growth and the increasing but volatile GDP growth.

Source: World Bank, Africa Development Indicators, specific elaboration.



(1) Source: World Bank, Africa Development Indicators.

Scimitar-horned Oryx in semi-captivity in Bouhedma National Park, Tunisia. Previously common, over-hunting and habitat destruction during the 20th century has resulted in the extinction of this species in the wild.

1.1.5 Climate change

For West Africa, the most recent estimates of the effects of climate change show the following:

- high risk for the desert and savannah areas of the Sahelian zone;
- increasing desertification of Sahelian acacia savannah ecotypes and the West Sudanian savannah;
- probable degradation of agricultural systems for: (i) the south-east of Nigeria; (ii) the cross-border area between Guinea, Côte d'Ivoire, Liberia and Sierra Leone; (iii) the cross-border area between Senegal, Gambia, Guinea and Guinea-Bissau;
- increased threat of floods on the Niger Delta.

1.1.6 Conclusions

West Africa has a number of negative aspects that are acting as constraints on conservation actions:

1. high political instability and security risks;
2. high population growth (featuring high concentrations in big cities but a reduction in the urban population) with an estimated doubling time of the population over the next 25 years;
3. slow-growing economy in relation to the objectives of the Millennium Goals;
4. significant environmental fragility due to the pressures of deforestation, cyclical periods of drought and climate change;
5. constant food crises which increase the tendency of migration to coastal areas, and reduce the effectiveness of conservation in savannah and coastal areas because of the higher pressures on natural resources, pressure on land, and economic activities;
6. the high risks arising from climate change;
7. an insufficient awareness of wildlife by civil society.

1.2 Overview of ecological characteristics of the West African region

West Africa has high biodiversity value because of the wide range of ecosystems: deserts, savannahs, forests, big rivers and floodplains, mountains, mangroves and seas. Despite greatly reduced wildlife populations, the region still has a high conservation value[2] because of the following:

- large antelopes which can be considered among the most beautiful in Africa, such as the giant eland, roan antelope, major (or western) hartebeest, addax, and also some spectacular small antelopes such as zebra duiker and Jentink's duiker, including a newly discovered (2009) species of duiker (*Philantomba walteri*);
- extensive and important terrestrial ecosystems, including the cross-border WAPOK complex of parks (W, Arly, Pendjari, Oti Monduri, Keran and hunting reserves of about 38 000 km²) that host the largest elephant population in the region (with 20 to 60 elephants per 100 km²)[3];
- many endemic and isolated populations of wildlife – giraffe (*G. c. peralta*), pygmy hippopotamus, manatee, lion, cheetah and African wild dog;
- populations of two subspecies of chimpanzee and one highly threatened subspecies of gorilla;
- very important area for migrating birds from Europe, both waterbirds and landbirds[4];
- inland waters supporting a high diversity of aquatic species with high levels of endemism;
- unique and critical habitat for the conservation of amphibians (e.g. Mount Nimba), which are the most endangered class of animals in the world.

(2) The report analyses only the terrestrial biodiversity.
(3) Source: African Elephant Database (AED) / IUCN / SSC African Elephant Specialist Group (AfESG), 1995-2005.
(4) The action that is needed to tackle declines in waterbirds and landbirds is outlined in two CMS instruments, namely the African-Eurasian Waterbirds Agreement (AEWA) and the African-Eurasian Migratory Landbirds Action Plan (AEMLAP).

1.2.1 Major ecotypes

The West African region is analysed on the basis of four major ecological zones plus the wetlands that correspond to the biomes and ecoregions adopted by the World Wide Fund for Nature (WWF). Due to the geopolitical area limitation, the biomes and some ecoregions of West Africa also fall in other regions of Africa. The major ecological zones (or ecotypes) of West Africa are (see Table 2 and Figure 4):

- **A – Deserts (Realm: Palearctic; Biome: Deserts and xeric shrubland).** The ecotypes of the desert area are: (D1) Sahara Desert; (D2) Atlantic coast; (D3 and D4) south Saharan steppe and woodlands; (D5) west Saharan montane xeric woodlands; and Senegal Delta.

- **B – Savannahs (Realm: Afrotropics; Biome: Tropical and subtropical grasslands, savannahs and shrublands).** The ecotypes of the savannah area are: (S1) Sahelian acacia savannah; (S2) west Sudanian savannah; (S3) Guinean forest-savannah mosaic; (S4) Jos Plateau forest-grassland mosaic; and Inner Niger Delta, Lake Chad Basin and Hadeja-Nguru.

- **C – Forests (Realm: Afrotropics; Biome: Tropical and subtropical moist broadleaf forests.** The ecotypes of the forest area are: (F1) Guinean Montane Forests; (F2) western Guinean lowland forests; (F3); eastern Guinean forests; (F4) Nigerian lowland forests; (F5) Cameroonian Highlands forests; (F6) Cross-Sanaga-Bioko coastal forests; (F7) Niger Delta swamp forests; (F8) Cross-Niger transition forests.

- **D – Mangroves/coastal (Realm: Afrotropics; Biome: Mangrove)**. The ecotypes of the mangrove area are: (M1) Guinean mangroves and (M2) Central African mangroves.

1.2.2 Conservation issues and challenges (key and threatened, rare and high-value species)

1.2.2.1 Elephant

West Africa has lost more than 90% of its elephant population in the 20th century. There is little reliable data on the numbers of elephants in West Africa but estimates indicate that elephant populations are small and isolated. Nearly two-thirds of them consist of little more than 100 elephants, with the exception of one population in the WAPOK complex, which has a density of 0.58 elephant/km² (CR 28%)[5].

1.2.2.2 Sahelo-Saharan antelope

These vast arid lands contain relatively few antelope, but those that are here are highly charismatic and emblematic of the species. As a result of the successive droughts during the 1980s and increasing human pressures, the Sahelo-Saharan antelopes are seriously threatened (addax, Dama gazelle and Darcas gazelle) or even probably extinct (oryx). The desert antelopes survive essentially through *ex situ* conservation but their genetic heritage must be improved to ensure the survival of these species. In the future there should be carefully planned reintroductions, adapted to the specific needs of these highly mobile species, into an effectively managed network of protected areas.

1.2.2.3 Primates

Logging is considered to be one of the most serious threats to biodiversity and particularly to great apes. In recent years in Africa, this view is more nuanced in the case of responsible sustainable logging, in particular in Forest Stewardship Council (FSC)-certified concessions, where specific ecological and social requirements are imposed, and the ban on hunting of primates and especially great apes is strictly enforced. This is not the case in West Africa. In West Africa an estimated 80% of the region's original forest cover was gone by the 1980s, affecting not only the habitats of great apes but also the rainfall; during the last three decades, precipitation has diminished in West Africa even faster than it has in the drier regions of the Sahel[6;7]. In West Africa, the International Union for Conservation of Nature (IUCN) Red List gives the following primates as critically endangered: Niger Delta red colobus, Preuss's red colobus and Cross River gorilla. The endangered primates (IUCN Red List) are white-naped mangabey, drill, Preuss's guenon, Roloway monkey, Benin subspecies of red-bellied guenon, Badius species of red colobus and Nigeria-Cameroon chimpanzee.

(5) See: http://www.elephantdatabase.org/preview_report/2013_africa_final/Loxodonta_africana/2013/Africa/West_Africa/Burkina_Faso

(6) Paturel J-E., M. Ouedraogo, E. Servat, G. Mahé, A. Dezetter and J-F. Boyer (2003). The concept of rainfall and streamflow normals in West and Central Africa in a context of climatic variability, *Hydrological Sciences Journal*, 48:1, pp. 1125-1127, DOI: 10.1623/hysj.48.1.125.43479.

(7) Servat E., J-E. Paturel, C. Barrau, G. Mahé and A. Dezetter (2007). Modelling the impact of climatic variability on water resources in West and Central Africa from a non-calibrated hydrological model, *Hydrological Sciences Journal*, 52:1, pp. 38-48, DOI: 10.1623/hysj.52.1.38.

Table 2. Major ecoregions, formally protected areas and indicative conservation status in West Africa

	Biomes	Ecoregions	Km²	% formally protected	Conservation status	Countries of other regions
Realms: Palearctic	Deserts and xeric shrubland	**A. Deserts**				
		Sahara Desert (D1)	4 619 260	1.8	Vulnerable	Algeria, Chad, Egypt, Libya, Sudan
		Atlantic coast (D2)	39 883	17.0	Relatively intact	Morocco
		South Saharan steppe and woodlands (D3-D4)	1 101 700	6.0	Vulnerable	Algeria, Chad, Sudan
		West Saharan montane xeric woodlands (D5)	258 100	41.5	Relatively intact	Algeria
		Wetlands 1: Senegal Delta	3 400 in the past	820 Km²	Critical/Endangered	
Realms: Afrotropics	Tropical and subtropical grasslands, savannahs, and shrublands	**B. Savannahs**				
		Sahelian acacia savannah (S1)	3 052 854	9.4	Vulnerable	Cameroon, Chad, Sudan, South Sudan, Eritrea
		West Sudanian savannah (S2)	1 638 306	5.1	Critical/Endangered	
		Guinean forest-savannah mosaic (S3)	673 600	9.7	Critical/Endangered	
		Wetlands 2: Inner Niger Delta	25 000 in the past	0.0	Critical/Endangered	
		Wetlands 3: Lake Chad Basin	15 000 – 25 000	0.0	Critical/Endangered	Chad, Cameroon
		Wetlands 4: Hadejia-Nguru	300 – 3 600	0.0	Critical/Endangered	
	Montane grasslands and shrublands	Jos Plateau forest-grassland mosaic (S4)	13 208	0.0	Critical/Endangered	
	Tropical and subtropical moist broadleaf forests	**C. Forests**				
		Guinean Montane Forests (F1)	31 078	9.2	Critical/Endangered	
		Western Guinean lowland forests (F2)	206 666	15.6	Critical/Endangered	
		Eastern Guinean forests (F3)	189 724	21.9	Critical/Endangered	
		Nigerian lowland forests (F4)	67 335	17.3	Critical/Endangered	
		Cameroonian Highlands forests (F5)	38 070	7.9	Critical/Endangered	Cameroon
		Cross-Sanaga-Bioko coastal forests (F6)	52 314	22.6	Vulnerable	Cameroon
		Niger Delta swamp forests (F7)	14 503	6.6	Critical/Endangered	
		Cross-Niger transition forests (F8)	20 718	2.6	Critical/Endangered	
	Mangroves and flooded systems	**D. Mangroves/coastal**				
		Guinean Mangroves (M1)	22 790	11.3	Vulnerable	
		Central African mangroves (M2)	29 783	10.9	Critical/Endangered	Cameroon, Equatorial Guinea, Gabon

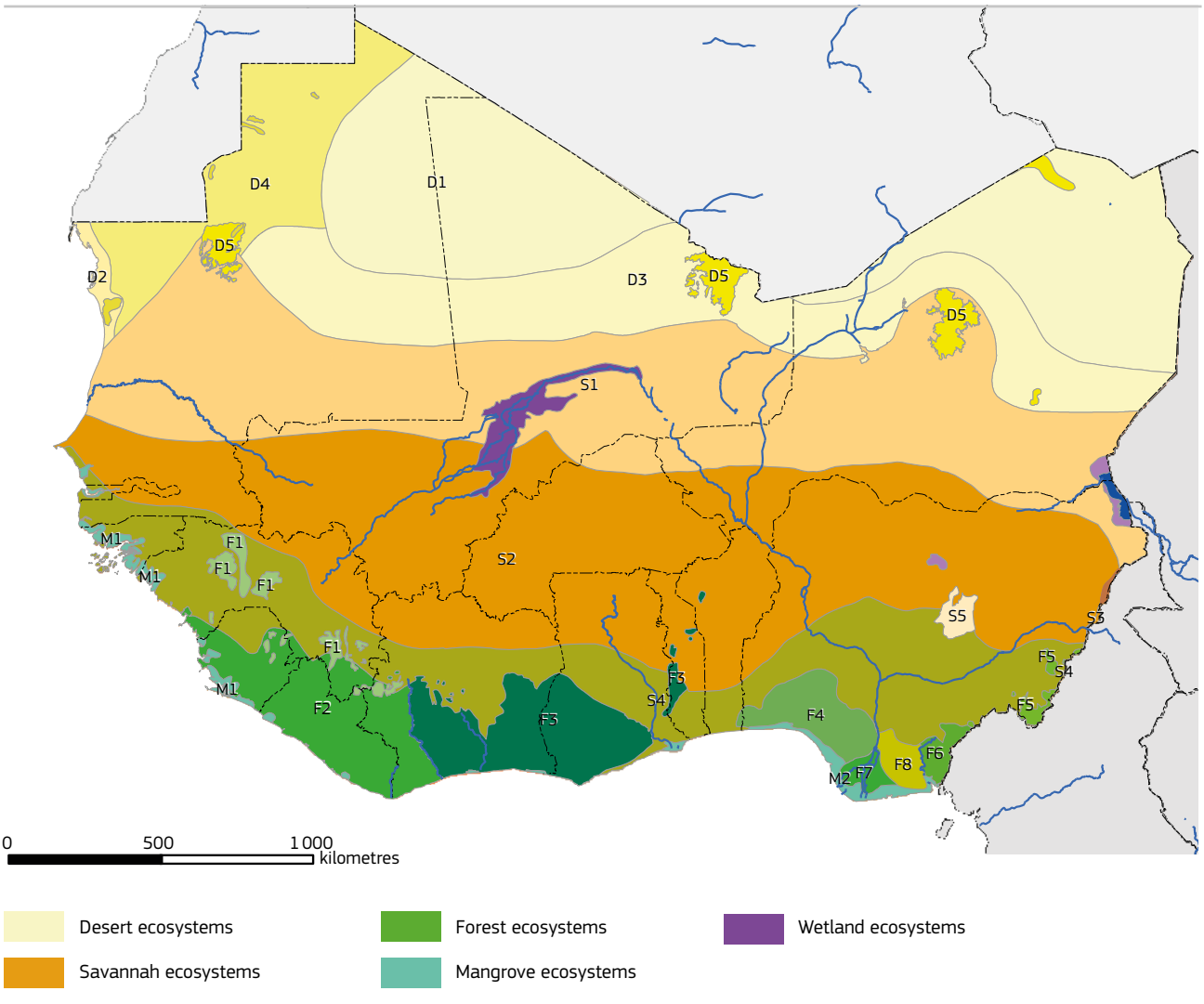
^

Aïr and Ténéré Natural Reserves, Niger.
This World Heritage Site is the largest protected area in Africa covering 7.7 million hectares, although the protected sanctuary constitutes only one sixth of the total area.

Figure 4. Main ecoregions of West Africa

Source: Olson, 2000

Note: The four main types (deserts, savannahs, forests, mangroves) and wetlands are displayed in the main colours (yellow, orange/brown, green, turquoise, purple), while the variations correspond to sub-types listed in Table 2.



^

West African Crocodile, Senegal.
With climate change and the increasing frequency of droughts in West Africa, a number of water-dependent species, such as manatees and crocodiles, will come under increasing threat.

1.2.2.4 Carnivores

West African lions have unique genetic sequences not found in any other lions, including those held in zoos or other form of captivity. Recent surveys (January 2014) have suggested that the African lion population is facing extinction across the entire West African region[8]. The results represent a massive survey effort taking six years and covering 11 countries where lions were presumed to exist in the last two decades. The team discovered that West African lions now survive in only three national parks and in the transfrontier W, Arly and Pendjari National Parks or WAP complex. The PAs with lion are only in five countries of West Africa: Senegal, Nigeria, Benin, Niger and Burkina Faso. Counting lions is extremely difficult, and we may never know precisely how many lions there are in West Africa, especially if, as the few specialists suggest, we could find lions outside the PAs. In West Africa, the primary threats to lions are the loss, degradation and fragmentation of lion habitats; the decline of the lion's wild prey base; and human-lion conflict. The lion is the principal predator of domestic cattle, so livestock loss combined with poor capacity for managing human-lion conflict lead to the elimination of lions, particularly by poisoning[9]. Trophy hunting is only practiced in three lion conservation units.

A West and Central Africa regional conservation strategy for cheetah and African wild dog is being drafted. The **Saharan cheetah** (listed as critically endangered since 2009 on the IUCN Red List) is very rare but can still be found in small numbers in Algeria (Ahaggar and Tassili N'Ajjer) and Niger (Termit and Aïr), and possibly also in Mali, Chad and Mauritania. In the south, cheetahs are known to occur in the W Transborder Park and the Arly Pendjari PAs. Although a persecuted species, this large carnivore is probably scarce by nature and also impacted by the effects of periodic droughts on its prey species.

African wild dogs have disappeared from much of their former range in West Africa where they were present in all regions, from deserts to mountain summits, with the exclusion of the lowland rainforest and the driest deserts. The species is virtually eradicated from West Africa, and survives only in Bafing-Niokolo Koba areas.

In West Africa, **leopards** remain widespread, albeit now patchily distributed within the region. The most marked range loss in West Africa has been in the Sahel belt, as well as in Nigeria. They have been locally extirpated from densely populated areas or where habitat conversion is extreme. There are no reliable continent-wide estimates of population size, but it is supposed that in the northern part of the West African savannah-forests there is a low density with less than 1 000 individuals, and in the southern part of the savannah-forests there is a medium density with between 1 000 and 10 000 individuals.

1.2.2.5 Other rare and threatened species

The Guinea forest in West Africa contains half the mammal species on the African continent. Other important regional biodiversity values must be mentioned, including the West African manatee, the rare pygmy hippopotamus, the zebra duiker and the drill, etc. In view of climate change and the increasing frequency of droughts in West Africa, the number of water-dependent species, such as manatees and crocodiles, will come under increasing threat.

1.2.2.6 Birds

West Africa plays a fundamental role for Afro-Palearctic (European-African) long-distance migratory birds that use the Palearctic Western route from Western Europe through Spain across the Straits of Gibraltar. The ecological networks of habitats play a decisive role for migratory birds because they provide key sites along migration routes where birds can recover from their strenuous journeys. Many migratory birds have little choice in the selection of suitable areas to use. They need access to specific sites located along their

(8) The lion in West Africa is critically endangered. See Panthera's Lion Program Survey, Dr Philipp Henschel, PLOS ONE, 2014.
(9) Di Silvestre I. (2002). Lion (Panthera leo) in: Suivi de la population des grands carnivores de la Réserve de la Biosphère de la Pendjari.

migration routes. If one of these important sites is damaged or destroyed, it usually means disaster for the birds that depend on that area. So it is vital for West Africa to preserve a functional network of habitats, especially the several wetlands in the Sahelian zone, such as the Niger and Senegal rivers, the inner Niger delta (30 000 km^2 situated in the middle of the Sahelian landscape), the Hadejia Jamare Komadogu Yobe Basin and the floodplains in Senegal and Niger, which are very important for millions of migratory birds.

1.2.2.7 Aquatic species in inland waters

The inland waters of West Africa support a high diversity of aquatic species with high levels of endemism. Many of these species provide direct (e.g. fisheries) and indirect (e.g. water purification) benefits to people. More than 14 % of species across the region are currently threatened and future levels of threat are expected to rise significantly due to a growing population and the corresponding demand on natural resources. The West African region supports a significant proportion of the world's species that are dependent upon freshwater wetland habitats. Given that the region represents approximately 5 % of total global land mass (excluding Antarctica), it is apparent that many groups – waterbirds, plants and mammals in particular – are well represented within the region. Of the 1 435 species assessed here at the regional scale, just over 14 % are regionally threatened.

Table 3. Synthetic indications of trends of the key, rare and high-value species of major ecotypes

A - Deserts	B - Savannahs	C - Forests	D - Mangroves
Scimitar oryx ▼▼▼	Lion ▼▼▼	Niger Delta red colobus ▼▼▼	Niger Delta red colobus ▼▼▼
Saharan cheetah ▼▼▼	Wild dog ▼▼▼	Preuss's red colobus ▼▼▼	West African manatee ▼▼▼
Dama gazelle ▼▼	Cheetah ▼▼▼	Cross River gorilla ▼▼▼	
Addax ▼▼	Leopard ▼▼▼	Roloway monkey ▼▼▼	
Dorcas gazelle ▼	Giant eland ▼▼▼	Drill ▼▼▼	
Afrotropical-Palaearctic and piscivorous birds ▼	Manatee ▼▼	Nigeria-Cameroon chimpanzee ▼▼▼	
	Elephant ▼	Pygmy hippopotamus ▼▼▼	
	Afrotropical-Palaearctic and intra-African migration birds ▼	Jentink's duiker ▼▼▼	
	Chimpanzee =	Forest elephant ▼▼▼	
	Giraffe ▲		
	Roan antelope ▲		
	Buffalo ▲▲		

Note: The number of arrows indicates the strength of the decline (red) or recovery (green).

1.2.2.8 Rare and high-value trees

In West Africa, the movement of people south towards the humid tropical areas has resulted in the depletion of natural resources: loss of primary forests and woodlands, repeated logging of secondary vegetation, and the depletion of a number of plant species. These include the extraction of trees for charcoal making, general timber and high-value woods. Most affected of the high-value woods are:

- Afromosia or African teak (*Pericopsis elata*) – endangered or critically endangered, with levels of exploitation that have been unsustainable in all countries and the species' habitat has declined, especially in Côte d'Ivoire[10], Ghana and Nigeria;
- the Meliacaea family (*Khaya species*);
- Vène (*Pterocarpus erinaceus*);
- African blackwood (*Dalbergia melanoxylon*).

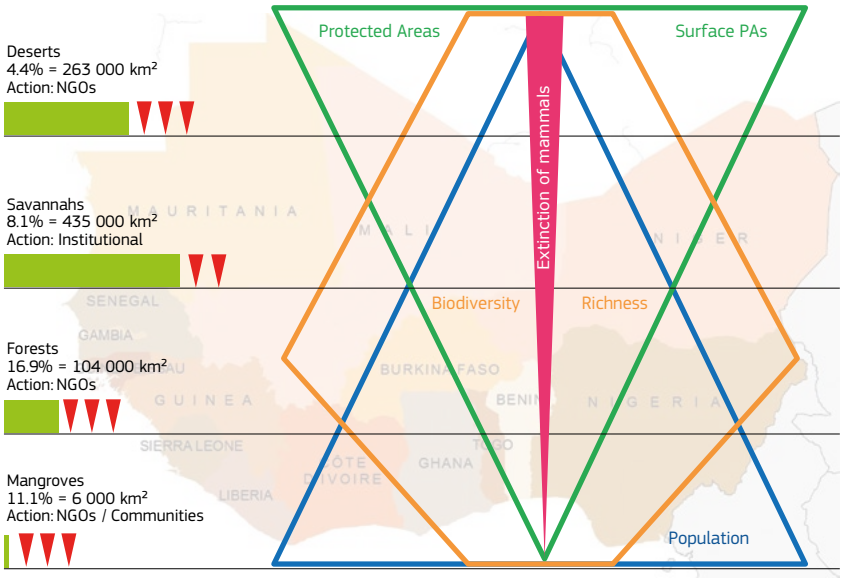
1.2.2.9 Final note

This strategic approach document cannot analyse all the biodiversity aspects of the West African region. Consequently, we used the information from several sources already organised as macro-indicators and indicators or as aggregated data to examine the trends in the conservation status of key species. The analysis was complex because of the difficulties of obtaining updated and structured data. The results of the exercise should be considered only as indicative of trends in conservation status based on information currently available (see Table 3 and Figure 5).

Figure 5. Schematic representation of conservation in West Africa according to the major ecotypes

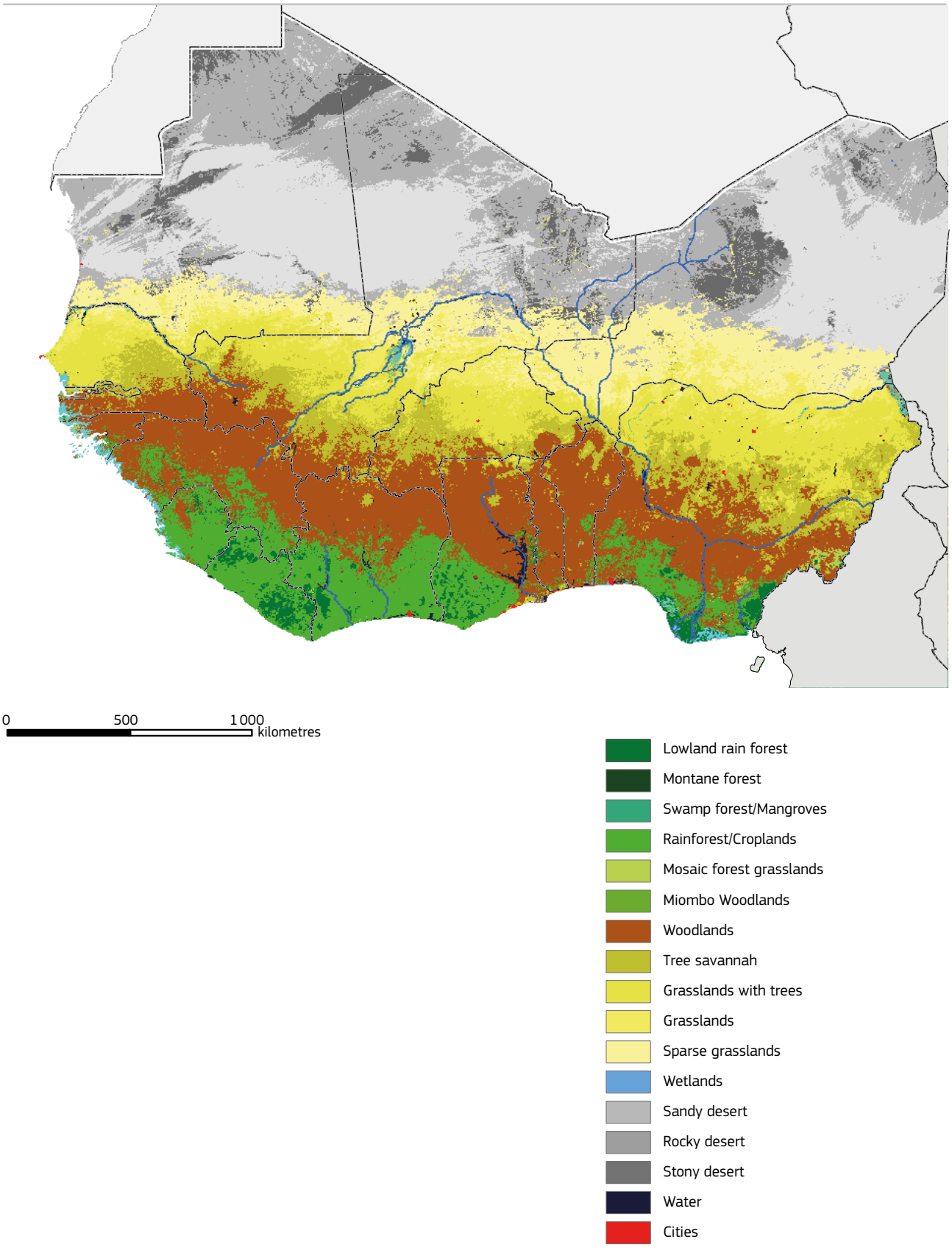
Note for each major ecotype:

1. The geometric rhomboids shows indicatively (a) the proportion (of ecotype surface area) of PAs between the different ecotypes, becoming progressively smaller from deserts to mangrove areas (green); (b) human population size, becoming progressively larger from deserts to coastal areas (blue); (c) biodiversity richness, more important in forest ecotypes (orange); and (d) mammal extinctions, stronger in the desert and savannah than in the forest and mangrove ecotype (pink).
2. The green histogram represents the combined area of PAs in each ecotype as a percentage of the total area of PAs in West Africa; red arrows denote declines in species status. High species declines in the desert areas indicate problems facing desert mammals.



(10) According to the Convention on International Trade in Endangered Species (CITES), 7 September 2012, the country is currently subject to a recommendation to suspend trade of *Pericopsis elata*.

Figure 6. Land-cover types of the West African region



1.3 Overview of regional-specific aspects of the West African region

1.3.1 Regional institutional support

There are two principal economic and political regional institutions: the Economic Community of West African States (ECOWAS) with 15 countries (Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Côte d'Ivoire, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo) and the West Africa Economy and Monetary Union (WAEMU) with eight countries (Benin, Burkina Faso, Guinea-Bissau, Côte d'Ivoire, Mali, Niger, Senegal and Togo). The WAEMU is more operational than the ECOWAS and acts more directly on the harmonisation of policies and interventions in the areas of agriculture, forestry and conservation. The WAEMU may occur throughout the West African region at the request of countries; institutions use this possibility for moving forward on convergence plans (strategic plans) on management of wildlife and forest resources. This approach could help if orientated towards the definition of a common regional conservation strategy.

1.3.2 Conservation capacity building in West Africa

This analysis considers the available institutional capacities and the present and future management needs of protected areas in West Africa [11]. The IUCN training-needs study for West and Central Africa highlights current inadequacies. In particular it concludes that training institutions in West and Central Africa do not provide skills for improving management effectiveness of PAs, do not provide an adequate knowledge base and practical tools for PA management, and do not adequately address the needs of biodiversity conservation. The study identifies the most important training needs and the institutions that offer courses on the subject, but does not address the training requirements for rangers in terms of protection and interactions with resource-users in the buffer zones. We recommend that capacity building for PA management effectiveness is enhanced by integrating West African and Central African training institutions.

In West Africa there are currently two training schemes supported by IUCN that are implemented in collaboration with the University of Senghor in Egypt:

- a training in protected area management for university-level graduates (eight weeks training in Ouagadougou, Burkina Faso;
- a Masters in Development, specialising in the management of protected areas (two years in Alexandria, Egypt).

In Central Africa, the formal training options are:

- a Masters, with an option in PA management, at the *École nationale des eaux et forêts* (ENEF) in Cape Esterias, Gabon;
- a training L-M-D with the *École régionale d'aménagement intégré des forêts et territoires tropicaux* (ERAIFT) in Kinshasa, Democratic Republic of Congo;
- a three-year professional certificate to be developed at the *École de faune de Garoua* (EFG) in Cameroon.

Further analysis is required of existing activities in capacity building; also the new skills required by PA managers and rangers are still to be identified. The recipients of capacity building should be:

- the departments of wildlife and protected areas;
- the parastatal agencies responsible for PA management, e.g. the *Centre national de gestion des réserves de faune* (CENAGREF) in Benin or the *Office national des aires protégées* (OFINAP) in Burkina Faso;
- PA managers and rangers;
- the national and international conservation and development NGOs;
- the local administrations and communities as part of the implementation of decentralised natural resource management policies;
- the private sector (companies related to the sectors of forest, ecotourism and safari hunting).

Finally, if the future PA management and governance training requirements are to be adequately covered in West and Central Africa, the type of training offered by regional institutions must evolve in line with modern conservation approaches. The capacities of the institutions to dispense this training must be greatly strengthened. In addition a selected number of PAs where ranger training can be given must be identified, and long-term financial and technical partnerships built to ensure uninterrupted, high-quality training opportunities.

([11]) Hausser Y. 2013. Assessment of the regional needs and training availabilities for professionals of protected areas in West and Central Africa, IUCN.

2

Conservation issues and challenges

>2 _ Conservation issues and challenges

2.1 Key direct threats to conservation in West Africa

In this report on Africa, we differentiate between 'direct threats', which comprise the proximate human activities or processes that impact on wildlife (in the past, present or future) such as unsustainable agriculture and agricultural expansion, fishing and logging, as well as wild fires and poisoning of wildlife, and 'indirect threats', which are the ultimate drivers of biodiversity decline such as human population growth, poverty increase and government budget reductions. Thus direct threats are synonymous with sources of stress and proximate pressures. The principal direct threats to the survival of wildlife in the various ecosystems of West Africa are **loss of habitat for wildlife** and **unsustainable hunting** by humans.

West Africa still has one of the highest annual population growth rates of any region on the continent (or in the world), estimated at about 2.6% in 2012[12]. Economic development (and particularly the growth of commercial agriculture and extractive industries) has accelerated in forest-zone countries as several civil conflicts have subsided. West Africa currently has the fastest rate of GDP growth on the continent, predicted at 6.8% in 2013 and 7.4% in 2014[13]. These drivers are reinforced by the tendency of all human beings (not just those in West Africa) to give priority to their short-term self-interests, and to consume resources beyond their immediate survival needs.

In the forest zone of West Africa, the **area of relatively undisturbed high-canopy rain forest has been steadily declining over the last 100 years**. Outside the few national parks that protect rainforests and some forest reserves, the rate of forest loss may recently have accelerated. Good data is lacking for many countries in the region, but the estimated annual percentage forest loss in Nigeria in 2000-2010 was the highest in the world, at 3.7%[14]. Forest is being lost to subsistence agriculture, the expansion of industrial-scale plantations of oil palm and other crops (including 'land grabs' that involve foreign companies), timber and fuelwood harvesting, mining operations, road and dam construction, and the spread of settlements. In other words, West Africa today is being affected by the same kinds of development that long ago destroyed the original forest cover of much of Europe, the United States of America and large areas of East Asia. It is difficult to single out one of these threats as more significant than another – and they vary in extent from country to country – but **farming and plantation agriculture are probably causing greater forest loss than any other activities**.

Hunting of wild animals for meat has been a major factor in the decline of larger mammals in West Africa for a very long time, probably related in significant part to high human population density and long-established trade networks. Hunting for subsistence has always been important, but as human populations have continued to grow and urbanisation increases, hunting has become increasingly commercialised, and supports an important 'bushmeat trade'.

The bushmeat trade is pushing some mammal species (**and rain-forest primates especially**) **towards extinction**, in part because their populations have often been reduced to small, highly vulnerable isolates by loss of habitat[15]. Mammal species of the West African forest zone rated as critically endangered (CR) or endangered (EN) on the IUCN Red List are: *Cephalophus jentinki* (Jentink's duiker, EN); *Choeropsis liberiensis* (pygmy hippopotamus, EN); *Gorilla gorilla* (gorilla, CR – only in Nigeria in West African); *Mandrillus leucophaeus* (drill, EN – only in Nigeria in West Africa); *Pan troglodytes* (chimpanzee, EN); *Procolobus badius* (West African red colobus, EN); *Procolobus preussi* (Preuss's red colobus, CR – only in Nigeria in West Africa). Several subspecies are also rated as CR or EN, and many species and subspecies (including the African elephant) are listed as 'vulnerable'.

There are only a few areas within the West African forest zone where all wildlife is fully protected by law. From Guinea to the Nigeria-Cameroon border there are **only 11 national parks distributed across eight countries in the forest zone**, together with a handful of wildlife or game sanctuaries. Most of the national parks are small (less than 50 000 ha in area) and therefore not of maximum value for the long-term protection of viable populations of large mammals. Liberia, which lies at the heart of the Upper Guinea forest region, and which is clearly a biodiversity hotspot, has only a single national park, Sapo. Even within the few national parks, management is generally weak and hunting for bushmeat often rife.

---

(12) African Development Bank Group 2012. Africa's Demographic Trends.
See: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/FINAL%20Briefing%20Note%204%20Africas%20Demographic%20Trends.pdf

(13) African Development Bank Group 2013. West Africa Monitor.
S See: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/West_Africa_Monitor_2013.pdf

(14) Food and Agriculture Organisation of the United Nations (2010). Global Forest Resources Assessment 2010, FAO, Rome, Italy.

(15) Aaelen F.H.A., M.J. Grainger, F. Hilbert, M. Hoffmann, D.P. Mallon, P.J.K. McGowan and N. van Vliet (2015). An IUCN situation analysis of terrestrial and freshwater fauna in West and Central Africa. An occasional paper of the IUCN Species Survival Commission, IUCN, Gland, Switzerland.

Drills at the Pandrillus Sanctuary, Nigeria. The Drill is one of many West African mammal species classified as Endangered in the IUCN Red List of Threatened Species.

2.1.1 Availability of funds for PAs

Analysis

Funding is a critical limiting factor for all the PAs in West Africa. International and domestic funding for PAs have struggled to keep pace with the growth in the number and area of PAs and the economic crisis. Governments have progressively reduced funding due to the negative economic trend in the region that began in 1960, with the most difficult times in the 1990s. Despite the current economic recovery in West Africa, and the endorsement of international environmental treaties and the commitments for the creation of more protected areas, government funding for PAs is still very low. On an area basis of just USD 150/km²/year, only a few European Union (EU) projects of PAs in West Africa spend close to this target (about USD 120-140/km²/year), while private funding for game reserves in West Africa is far less, although the size of this contribution is unclear. In conclusion, the current spending on PAs is grossly inadequate, not only to support the costs of existing sites, but also to ensure the creation and effective management of a representative regional system of PAs.

The existing low level of financial support for biodiversity in West Africa is mirrored by a low capacity level in the management of PAs. It is extremely rare to find examples of effective wildlife management in the region. The funds invested in conservation provide only weak and very short-term effects without long-term sustainability outcomes. This funding gap has historical reasons arising from the way that institutions were established. Whereas institutions providing capacity building in forest management and strong forestry bodies in the countries were developed, the same process was not implemented for wildlife management. The lack of capacity to manage wildlife has led to a general underestimation of the value of wildlife within government. The final result was the development of an operating strategy for natural resources that did not incorporate an improved management of wildlife. This situation stands in marked contrast with that in Eastern and Southern Africa.

High population growth, political instability and unfavourable natural processes (desertification and fragility to climate change) have contributed to the reduction of protected areas as they become utilised for agricultural and pastoral uses.

Investments in wildlife conservation in West Africa must be orientated in a variety of activities: building PA management capacity, protecting endangered species, improving communication about the values of biodiversity, improving the monitoring of biodiversity, and tackling corruption and illegal trafficking. The only hope for West African biodiversity is to restore the fundamentals of conservation and to bring about sustainability in the uses of natural resources.

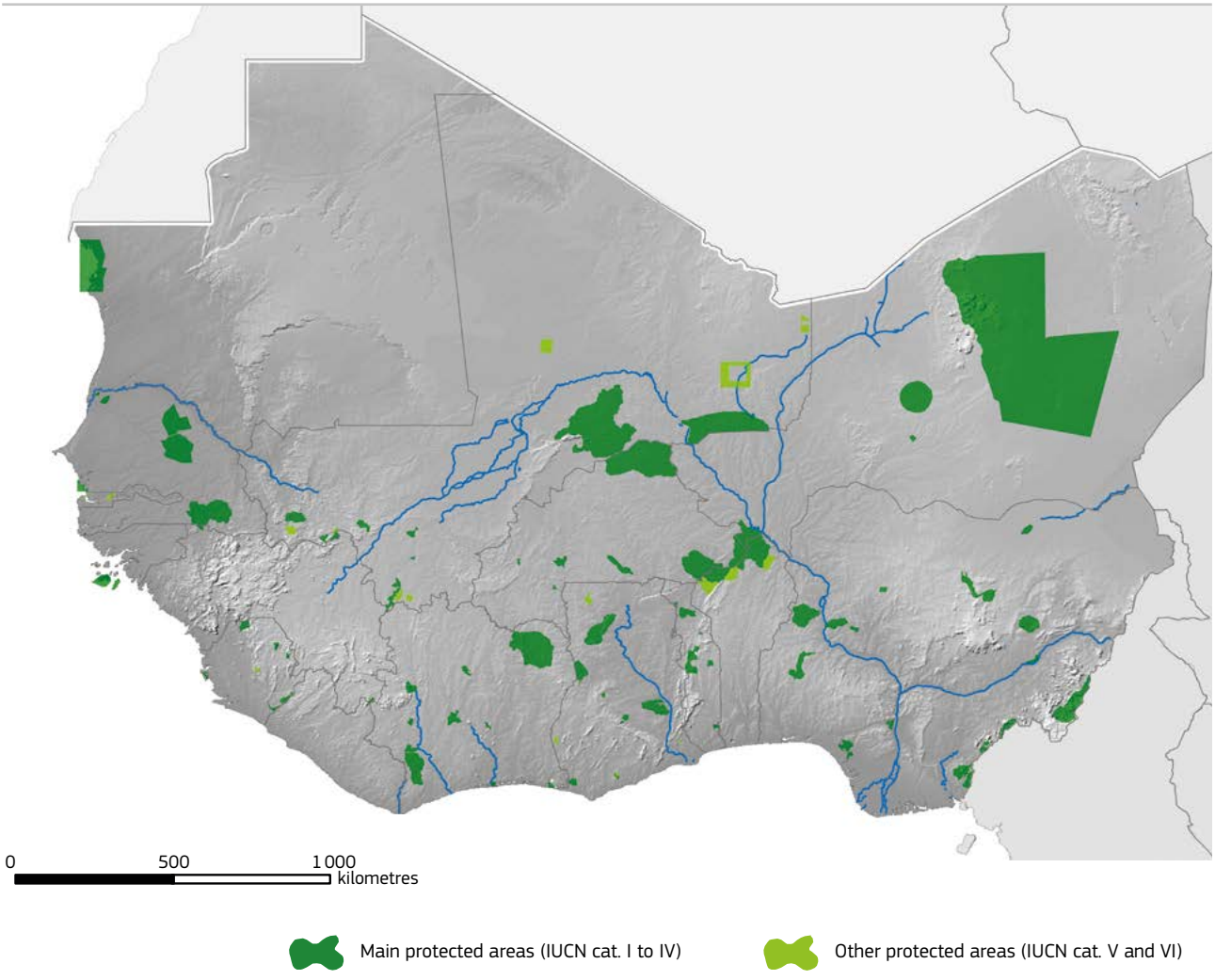
Effects

Under-resourcing is the most important constraint acting on management effectiveness. The PAs of West Africa do not have enough staff, resources, equipment and infrastructure to ensure the control of conservation areas (including anti-poaching measures and bio-monitoring) and to develop community-based supporting activities in the buffer zones. This results in degradation and encroachment of the PAs, which can ultimately lead to their degazettement.

^

Domestic cattle and the rare West African (or peralta) giraffe share the same habitat at Kouré, near the W National Park, Niger. The Association to Safeguard Giraffes in Niger works with the local communities of Kouré to safeguard the last remaining population of this highly endangered sub species.

Figure 7. Protected areas in the West African region



Pangolin and cane rats on a market stall in Lagos, Nigeria (left) and an African palm civet for sale in a village in Cross River state, Nigeria (right). The high rate of bushmeat harvest in West Africa, combined with habitat loss and alteration, has led to very severe population declines with widespread local extinctions throughout the Upper Guinea Forest Ecosystem.

2.1.2 Institutional governance of PAs

Analysis

In most West African countries, the state is the owner of the land and of the natural resources. In the past, governments established numerous and large protected areas, and classified forests and game reserves. To manage the various conservation aspects, the governments created centralised institutions for forestry, parks or wildlife and more recently for the environment.

Effects

The indirect drivers such as population growth, increased poverty, government budget reductions, increased democratisation and decentralisation, and sectorial approaches render ineffective many aspects of direct centralised management of wildlife and protected areas by the state. Also their institutions are ill adapted to cope with rapid structural changes in the countries. Protected area agencies are seen by West African governments as a relatively low priority, and until now tend to be too centralised. Their staff structures are often out of date, staff training is inadequate, and their enabling legislation is too restrictive.

2.1.3 Illegal wildlife trade income and corruption

Analysis

Given the decline in the purchasing power of salaries over the past 30 years and the increased incomes possible from illegal wildlife trade, corruption has spread and it is growing at all levels with the involvement of populations, local and central government bodies, including forest rangers and officers, police, army and justice. The increasing importance of the West African coast as a key transit hub for drugs is another potential danger for the illegal wildlife trade.

Poaching levels of elephant in West Africa have increased since 2006 but not as rapidly as in other regions. However in West Africa, the rise in poaching is particularly worrying because the small fragmented populations could disappear completely. In the WAPOK complex however, the population is estimated at nearly 8 000 individuals[16], which is more robust although 150 elephant were lost in 2013 (Box 1).

The issue of bushmeat hunting is highly politicised and the commercial circuits are well organised to supply the urban areas where it is consumed. The high rate of bushmeat harvest, combined with habitat loss and alteration, has led to very severe population declines. It has already resulted in widespread local extinctions throughout the Upper Guinea Forest Ecosystem of West Africa. The forests and savannahs with no large animals are known as the 'empty forest' or 'savannah syndrome'.

The large and small antelopes of West Africa can be considered amongst the most beautiful in the continent (including giant eland, roan antelope, major hartebeest and zebra duiker) but they are targets for black-market traders who will smuggle live animals into wealthy countries, including other African countries such as South Africa.

([16]) PNUD, Projet WAPO (2013). Inventaire pédestre de la grande faune de l'écosystème W Arly Pendjari, WAEM/UNDP, p. 27.

Roan Antelope in W National Park, Niger.

Box 1. **Importance of WAPOK**

The WAPOK complex is a large area of about 38 000 km² of intact habitat that is of great importance to the survival of large mammals in West Africa, including many that are endangered. These different blocks constitute the largest remaining wilderness and the only functional ecological complex in West Africa.

This large landscape of contiguous conservation areas is located at the borders with Burkina Faso, Benin, Niger and Togo. The landscape encompasses one transborder park (W), two national parks (Pendjari and Keran), two more important faunal reserves (Arly and Oti Monduri), one giraffe area not classified, ten hunting concessions and many adjacent village hunting zones.

The complex is situated in a transition zone between savannah and forest lands. The site reflects the interaction between natural resources and humans since Neolithic times and illustrates the evolution of biodiversity in this zone. The park is known for its large mammals: lion, cheetah, leopard, giraffe, buffalo, roan, hartebeest, manatee, baboon and hippopotamus. In West Africa, this complex provides a home for the largest, and in a few cases the last, populations of lion, elephant, cheetah, manatee and giraffe. The WAPOK area is also known for its bird populations, especially transitory migrating species, with over 350 species identified in the complex.

The PAs in the complex are listed as UNESCO World Heritage Sites (W in Niger and Pendjari in Benin – requested), all as Man and the Biosphere Programmes (MAB/UNESCO), many of them as Wetlands of International Importance (Ramsar) and as BirdLife International Important Bird and Biodiversity Areas (IBAs). The area is largely uninhabited by humans, having been (until the 1970s) a malarial and tsetse zone comprising wetlands formed by the delta of the Mekrou River with the Niger. Historically, the area was at one time a major area of human habitation, judging by the important archaeological sites found in the area (mostly tombs and furnaces) (see the analysis of the ECOPAS project*). It is quite possible that the Iron Age in the savannah areas of West Africa started in the W transborder park. The 'W' National Park was so named because of the local configuration of the Niger River and was the first MAB transborder regional park to be classified in Africa.

Benin, Burkina Faso and Niger have implemented an inter-state cooperation agreement, based on the ecological complex of adjacent protected areas with national parks, wildlife reserves and hunting zones forming a large regional complex (called WAP from the names of the major PAs of each country: Regional Park W, Arly Faunal Reserve and Pendjari NP). After several years of intervention, under the supervision of the WAEMU and the support of EU and German funds, there was an improvement in the status of the natural ecosystems. Given the success of the conservation intervention in the WAP complex, Togo, in the years 2006-2009, proposed to join the initiative with the adjacent PAs Oti-Mandouri and Keran, so the complex has been enlarged and has now become WAPOK (this name comes from the names of the most important PAs of the four neighbouring countries). At present, the situation in the WAPOK complex is at risk of degrading with increasing pressures from elephant poaching, mining, increasing poverty in rural and urban areas and desertification. Conservation interventions should be based on a participatory approach involving the political and technical representatives at central and decentralised levels, traditional authorities, users, people, private sector, NGOs, national and international institutions, and the civil society.

(*) Plan d'aménagement et de gestion de la réserve de biosphère transfrontalière W – 2006-2010, Programme régional parc W\ECOPAS.

A shipment of 115 pieces of raw ivory, weighing 1.4 tons, intercepted at Nairobi airport. The ivory was bound for Lagos, Nigeria. At least 12 West African countries are known to be acting as transit points for illegal ivory destined for Asia. According to the Elephant Trade Information System (ETIS) Nigeria and Togo are the major exit points for ivory, much of it coming from Central Africa and Eastern Africa.

Effects

Poaching in the small and highly fragmented elephant populations of West Africa is high, and increasing throughout the region. Ivory trafficking through Nigeria is the major illegal wildlife trade in West Africa. Elephant Trade Information System (ETIS) statistics[17] indicate that Nigeria and Togo are the major exit points but ten other countries are also involved, as source countries for export, transit countries or countries with significant domestic markets. Nigeria is the country with the largest flows of illicit ivory but more recently other countries such as Togo have become involved in large-scale smuggling of ivory. Most of this ivory appears to originate in Central Africa, but Nigeria was also identified as the destination of major shipments of ivory from Kenya, suggesting that ivory from as far away as Eastern Africa may now be moving through this country. The increasing involvement of Chinese buyers in Nigeria, as well as the involvement of organised crime syndicates in the illegal wildlife trade and in deforestation for cannabis cultivation, means that Nigeria is playing an increasingly important role in biodiversity loss in West Africa.

One favourable factor is that bushmeat is no longer the most important source of protein in the region because the wildlife populations have been so depleted by years of unsustainable hunting for meat. Furthermore, analyses in Ghana indicate that among cocoa farmers, the value of harvested bushmeat is relatively low and contributes little to household production. Rodents have replaced ungulates and primates as the most commonly eaten wild animals.

The illegal live mammals' trade is concentred in Togo. The country acts as a hub for the transit of large and small West African antelopes destined for hunting reserves in other African countries and even outside of Africa (see the officially sanctioned captures of giant eland in Niokola-Koba National Park for export)[18]. A small illegal wildlife trade in ivory trinkets, birds and live small animals occurs along the coasts from Nigeria to Mauritania.

2.1.4 Weak planning, management effectiveness and monitoring of PAs

The analyses of the illegal wildlife trade (above) have some common and specific aspects. First, some possible common solutions are presented here.

Analysis

The quality of PA management effectiveness in West Africa is poor, and in some cases very poor. The IUCN management assessments conducted in the PAs of West Africa scored far less than PAs in other African regions. To put this in a wider context, the overall mean for the assessment of African PAs is well below the world mean.

Effects

PAs in West Africa are managed with insufficient knowledge of the biodiversity values, trends and threats arising from direct and indirect causes. There is a lack of planning, monitoring, adaptive management and proactivity. Inadequate resources and weak capacities to implement the management processes lead to the

(17) UNEP, CITES, IUCN, TRAFFIC (2013). Elephants in the Dust – The African Elephant Crisis. A Rapid Response Assessment, United Nations Environment Programme, GRID-Arendal, www.grida.no

(18) East R. (2000). Antelope Captures in Niokolo-Koba National Park, Senegal, *Gnusletter* 19:2.

general loss of biodiversity in the region and a loss of ecosystem services provided by the PAs. At present, the WAPOK complex, composed of PAs and hunting reserves covering more than 38 000 km^2, is the only functional and stable ecological complex, despite the high threats that it faces. Major parks and reserves in West Africa are highly degraded, but even so a few can still be recovered. Specific projects are needed to preserve important or endemic species. In a few degraded protected areas, the administration still provides an institutional presence in the hope of a possible recovery of the area at some later date. The general tendency, however, is to reduce the conservation areas because of lack of funds and the capacities to manage them.

Possible global solutions to direct threats

As planning, management and monitoring are closely linked, integrated solutions must be found. The authors recommend the following general solutions:

- improving information to build a more effective monitoring and decision-support system in order to facilitate (i) legitimacy, accountability and fairness in park management, and (ii) adaptive management and proactivity;
- emphasising the role of stakeholders and rights-holders, local, national and international NGOs, private sector and other non-traditional partners with a view to improving management effectiveness over a broader landscape which includes the PAs and buffer zones;
- strengthening institutional capacities (and providing training opportunities) to govern management frameworks and for multi-scale management of protected areas at local, national and regional levels;
- integrating 'species-based' and 'habitat-based' approaches;
- protecting the original ecosystem is generally less costly than ecosystem restoration;
- integrating *in situ* and *ex situ* conservation of genetic diversity, which can serve the needs of restoring ecosystems and PAs.

2.2 Key indirect threats to conservation

Indirect threats to conservation have been defined as the ultimate factors, usually social, economic, political, institutional or cultural, that enable or otherwise add to the occurrence or persistence of proximate direct threats [19].

Halting biodiversity loss (or reducing it to a minimal level) requires tackling the combined effect of human activities. The indirect drivers of biodiversity loss are related to economic, demographic, socio-political, cultural and technological factors. Also, indirect drivers affect biodiversity loss differently from direct drivers. Charismatic mega-fauna, such as elephant, benefit from intense conservation efforts and research when subject to direct or indirect threats to their conservation. By contrast, many endangered species of antelopes, amphibians, insects and plants are affected by indirect drivers but fail to draw the same amount of attention as the charismatic mega-fauna.

The solutions are global and are listed at the end of this section.

2.2.1 Population growth and poverty

Analysis

In West Africa, population growth is between 2.5 % and 3.5 % per annum and this is resulting in increasing levels of poverty over an ever-enlarging area. The effect is greater than any of the other African regions and is placing enormous pressure on the capacity of the environment to provide services for human well-being (see Figure 8).

Effects

As the demand for resources increases, all the protected areas in West Africa face pressure from grazing and cultivation, the harvesting of wood, meat, fish, water and medicinal plants. In Burkina Faso, the populations in the buffer areas of some parks and reserves draw 33 % of their basic needs from the natural resources of the PAs.

2.2.2 Fragmentation, reduction and isolation of protected areas in the landscape

Analysis

As land outside protected areas is exploited more and more intensively in WA, the increasing isolation of protected areas in the landscape poses a serious threat to the long-term viability of many wildlife populations.

Effects

The primary effects of isolation of protected areas are:

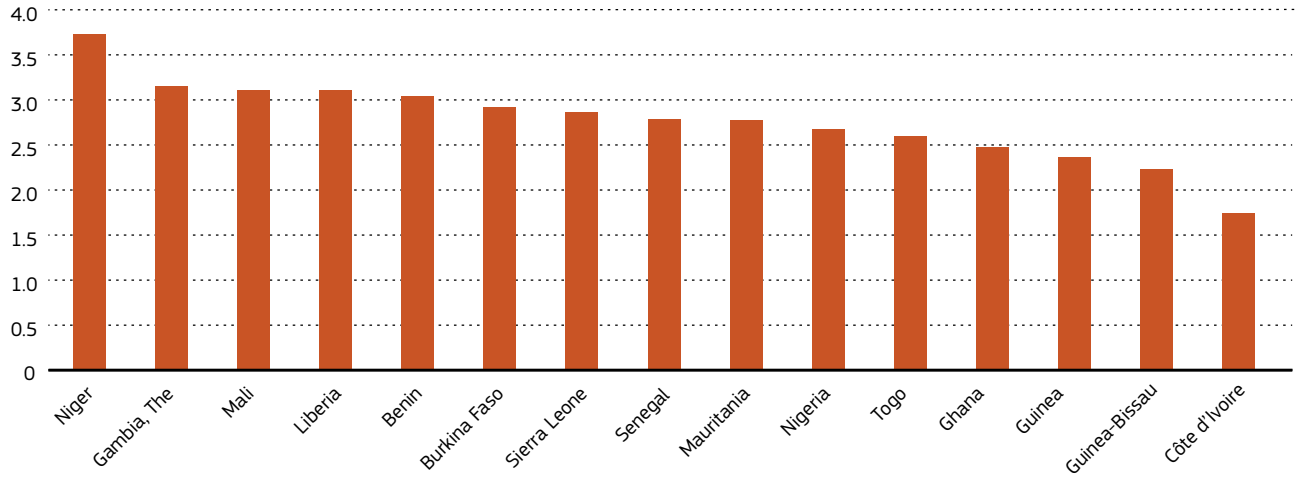
- habitat loss (pastoral and forested lands converted to agriculture);
- disturbance from human infrastructures (wildlife abundance increases with distance from human settlements);
- overhunting (widespread along protected area boundaries);
- disease (transmission from livestock, domestic animals and humans).

'Europe-like' intensification of large-scale, mechanised agriculture is rapidly spreading and forms perhaps the single biggest threat to many species such as migratory landbirds, to local livelihoods and to climate resilience. The savannah agroforestry mosaic, with long fallow cycles, provides a rich array of climate-coping mechanisms as well as habitat, yet this is the very landscape that is disappearing.

(19) Salafsky N., D. Salzer, A.J. Stattersfield, C. Hilton-Taylor, R. Neugarten, S.H.M. Butchart, B. Collen, N. Cox, L.L. Master, S. O'Connor and D. Wilkie (2008). A Standard Lexicon for Biodiversity Conservation: Unified Classifications of Threats and Actions, *Conservation Biology* 22:4, pp. 897-911.

A crowd in Lagos, Nigeria.
In West Africa, population growth is between 2.5 % and 3.5 % per annum resulting in increasing levels of poverty and increasing pressure on natural resources and wild areas.

Figure 8. Annual population growth rate in per cent as average of ten years (1993-2012)
Source: World Bank, Africa Development Indicators, specific elaboration



2.2.3 Coup d'États, rebellions, civil unrest and religious fundamentalism, Ebola and refugee crises

Analysis

With the exception of Senegal and Ghana, which have had a relatively long period of stability, the West African countries have suffered from political instability, conflicts with rebel movements, civil unrests, conflicts linked with religious fundamentalism and refugee crises.

Effects

Breakdowns in law and order generally have devastating effects on PAs, as recently seen in Côte d'Ivoire. Protected areas and their natural resources become targets for everyone: populations for land, grazing, wood, bushmeat, etc.; illegal traders who target the most precious woods and wildlife; armies who use wildlife and natural resources as sources of money and food; rebels and religious fundamentalist movements who use PAs as places of refuge and sources of funding. Protected areas in West Africa have, and are still suffering greatly from these effects. However in cases where there are decentralised systems, and where NGOs and community groups are involved, the PA management and governance have proved better able to partially save conservation areas (e.g. Sapo National Park in Liberia, where the local community is involved in the park's management).

2.2.4 Negative economic trends

Analysis

Between 1960 and 2002, declining national economies and steady population growth in West Africa meant that the combined effect of servicing international debts and providing education and health care for the burgeoning populations resulted in a reduction of funding for protected areas. Poverty has led to increasing levels of poaching and illegal activities in the PAs, and the prolonged political crisis in Côte d'Ivoire is also threatening the economic recovery in West Africa. The peaceful solution to the crisis in Côte d'Ivoire brought some relief, but higher international oil and food prices have now started to cause inflation.

Effects

The situation for PAs has remained unchanged. PA staff are poorly paid and equipped, materials and equipment are totally inadequate, and infrastructure is poorly maintained. Illegal grazing, woodcutting, agriculture and poaching in PAs continue, sometimes with the complicity of the PA rangers.

Destabilizing effects of political instability, civil unrest, armed conflict, religious fundamentalism and epidemics such as Ebola (above) severely weaken natural resource governance.

2.2.5 Policy and sectorial approach

Analysis

Investment in the primary sectors like agriculture (e.g. cotton), pastoralism (e.g. transhumance grazing systems), forestry (e.g. logging concessions or firewood provision), wildlife conservation (e.g. new PAs) or in sectors such as mining operations or energy infrastructure all affect the socio-economics of the region, raising a range of political, administrative, economic, industrial, environmental, infrastructural and energy issues. As elsewhere in Africa, the West African countries, with the support of donors and private funds, implement their policies, strategies and projects with a sectorial approach without the inter-sectorial coordination and collaboration that is essential to ensure the mainstreaming of natural resource conservation and management issues.

Effects

Governments and populations continue to regard PAs as unproductive areas to be exploited on a short time base (unsustainable exploitation) rather than as important economic and spatial elements of the landscape. Consequently pressures on PAs are increasing and resulting in biodiversity loss and the degradation of many ecosystem services.

Conservation and natural history lesson in a school in Kanare, Niger. Education of the younger generation is a vital long term strategy for building constituencies for natural resource conservation and management.

Possible global solutions to indirect drivers

People make decisions concerning biodiversity based on a range of values related to their well-being, including the use and non-use values of biodiversity and ecosystems. The well-being of local people must dominate many responses, including those relating to protected areas, governance and wildlife management. Responses to indirect drivers with a primary goal of conservation could be the following:

- manage protected areas for a wide range of sustainable uses (as is found in IUCN category VI PAs). This is extremely important where, as in West Africa, biodiversity loss is sensitive to changes in key drivers;
- design and manage PA systems in the context of an ecosystem approach, with due regard to the importance of corridors and interconnectivity of PAs, if possible;
- mainstream natural resource conservation and ecosystem services in all the primary sectors such as agriculture, pastoralism, forestry, fisheries, mining and in energy. Approaches should be explored to promote greater use of environmental safeguards that seek to minimise ecological and social problems arising from development projects. These include the International Finance Corporation's (of the World Bank) Performance Standards and the African Development Bank's Integrated Safeguards System [20];
- adopt inter-sectorial coordination and collaboration to ensure the mainstreaming of biodiversity conservation and management issues;
- capture the benefits and reduce the costs of wildlife for local communities, especially the local opportunity costs in line with the principle of equitable sharing;
- increase transparency and accountability of government and private-sector through involvement of concerned stakeholders and rights-holders in decision-making on biodiversity;
- increase coordination among multilateral environmental agreements and between environmental agreements and other international economic and social institutions;
- raise the level of public awareness, information-communication and education.

(20) Mallon D.P., M. Hoffmann, M.J. Grainger, F. Hibert, N. van Vliet and P.J.K. McGowan (2015). An IUCN Situation Analysis on Terrestrial and Freshwater Fauna in West and Central Africa, IUCN, Gland, Switzerland and Cambridge, United Kingdom.

3

Ongoing conservation efforts

>3 _ Ongoing conservation efforts

The historical analysis in West Africa over the last 15-20 years shows that the external funding for conservation was about USD 780 million. In terms of percentage of the allocation of these funds, Nigeria and Ghana received more than 15%, whilst the smaller countries (Gambia, Guinea-Bissau), the less secure countries (Sierra Leone) and the countries of the desert ecotype received about 1-3% of the funds. Funding for transborder protected areas was about 10% of the total. The regional programmes on conservation used about 12% of the available funds.

The analysis can also be extended to each major ecotype.

3.1 Deserts

International NGOs have long been involved in arid land conservation through reserve management, genetic research, wildlife monitoring, wildlife veterinary work, captive breeding and reintroductions, and tourism development (e.g. Zoological Society of London, Sahara Conservation Fund). Currently conservation in the desert ecosystem is focused on Termit & Tin Toumma (Niger). In the Atlantic coastal desert there are Important Bird Areas (IBAs), such as Banc d'Arguin National Park (NP) and Diawling NP (Mauritania), and Djoudj NP (Senegal).

3.2 Savannahs

Savannah PAs have received significant support, particularly from the EU. Today the effort is focused on the WAPOK complex (W, Arly, Pendjari, Oti Monduri, Keran in Benin, Burkina Faso, Niger and Togo). Other PAs receiving lower and more irregular levels of support are Comoé (Côte d'Ivoire), Mole (Ghana), Niokolo Koba NP (Senegal), Gourma Elephant FR (Mali), the Sahel Wildlife Reserve (Burkina Faso) and the Volta Transboundary Ecosystem Wildlife Corridors (Burkina Faso and Ghana).

3.3 Forests

There have been numerous projects in support of rainforest PAs but only a few of these areas still retain their biological value. Where the administration alone is responsible for management, the PAs are effectively 'paper parks'. PAs with important biological values are: Gola Forest Reserve and Loma Mountains (Sierra Leone), Sapo (Liberia), Tai (Côte d'Ivoire), Cross River (Nigeria), and Ankasa and Bia conservation areas (Ghana). There are interesting possibilities for a landscape approach in which the PA is at the core of wider sustainable land uses. The particular landscape approach could be adjusted according to a wide range of conditions and land-use practices, from strict protection to intensive development. The communities surrounding PAs could benefit from forest and biodiversity resources and services whilst contributing to their conservation.

At the same time, well-managed commercial forest blocks contribute to the protection of PAs and biodiversity. The landscape approach is, therefore, a wider mosaic of land uses where the protected areas form part of the overall socio-economic network: human settlements, agricultural areas, and forested and non-forested areas. Interesting possibilities for a landscape approach are: Gola Forest Reserve (Sierra Leone) and the Lofa and Foya Forest Reserves (Liberia); Mount Nimba and East Nimba nature preserves (Guinea, Côte d'Ivoire and Liberia); Outamba-Kilimi National Park (Sierra Leone); and Madina Oula, Soy and Oure Kaba sub-prefectures (Guinea). It is important to underline that there are still important forest blocks that could complement the overall biodiversity of this ecotype but these do not have protected area status. Granting this added protection should be a priority.

Fishermen in the Canchungo mangroves of Guinea-Bissau.
There are very few protected areas in mangroves in West Africa, and none at all in the Niger Delta, the most important area of mangrove forest in Africa. Mangroves forests are extremely productive ecosystems that provide many vital goods and services including fisheries and coastal protection.

3.4 Mangroves/coastal

There are few PAs in the mangrove forests. The Niger Delta, the most important area of mangrove forest in Africa, and the third most important in the world, does not have a protected area. In West Africa, the most important example of mangrove conservation is the public-private partnership (PPP) for conservation, management and sustainable use of mangrove forests in Guinea-Bissau (Orango NP, Tarafes Cacheu NP and Rio Cacheu Mangrove, Lagoas de Cufada, Rio Grande de Buba, Cufada, and Cantanhez Forest). In Guinea-Bissau, the intervention enabled six new conservation areas to be created – a rare success story in the conservation of this important ecosystem. In the other countries, actions on mangroves are basically shared between the administration, communities and NGOs, as with Songor Lagoon and Keta Lagoon Ramsar site (Ghana) and Niumi National Park (Gambia). Other coastal conservation actions target Important Bird Areas: the Banc d'Arguin NP and the Diawling NP (Mauritania), the Saloum Delta NP and the Lower Casamance NP (Senegal). The remaining blocks of mangrove forests constitute an opportunity for the establishment of new conservation areas. This action should also be a priority.

3.5 Conclusion

In conclusion, biodiversity conservation in West Africa is characterised by:

- low funding for desert PAs but with the benefit of strong involvement by NGOs;
- an almost constant level of support going to the protected savannah areas;
- low funding for rain forest protected areas with mixed interventions of government and NGOs;
- a small-scale success story for the recovery of mangrove forests through a PPP.

4

Lessons learned and promising approaches

>4 _ Lessons learned and promising approaches

4.1 Negative lessons learned

- The fragility of ecosystem conservation in West Africa is made worse by the continuing nature of the key indirect threats (instability, high population growth, etc.). The phenomenon is further amplified by the absence of a culture and tradition in PA management, and the lack of education and training in wildlife and protected area management.
- The futility over the long-term of short-term investments in conservation in countries where indirect threats to natural resources and biodiversity are high.
- The severe drought cycles linked to climate change have led to the spread of pastoralism and transhumance essentially at the expense of savannah PAs. This phenomenon is made even more acute by the investment of powerful and influential people (politicians, administrators, traders) in livestock. As a result it is extremely difficult to oppose the illegal occupation of PAs by transhumant herders.
- The enormous challenges posed by corruption, particularly in public institutions.
- Wasting a huge potential in promoting an exclusively ethnic and cultural tourism in the desert areas and omitting to invest in ecotourism and safari hunting, despite that potential (i.e. WAP transborder park and the wildlife reserves).
- The abandonment of the fundamentals of PA management (control of territory, anti-poaching activities, bio-monitoring, etc.) in favour of less expensive and more popular actions; new strategies for the maintaining of PA control alongside conflict management have not been instigated.
- Encouraging NGOs to take on a major role in conservation has not always helped state structures to address their issues of weak capacities. Furthermore, the predominant position occupied by NGOs has sometimes led to a situation where the main priority of the NGO is to maintain its position of power and influence rather than to pursue the conservation objectives.

4.2 Positive lessons learned

- Long-term and sustained conservation investments and professional management, as in the case of the EU-funded W transborder park project, have been shown to have very positive conservation outcomes in terms of reduced illegal activities, increased wildlife, ecotourism development and environmental education.
- The potential of PPPs for conservation and sustainable development in the mangrove forest ecosystem in Guinea-Bissau.
- The importance of the work of strongly motivated national and international NGOs with clear objectives: e.g. the conservation of desert antelopes, assisting government in law enforcement in relation to the trade in great apes and ivory, and the protection of great apes (e.g. Last Great Ape Organisation – an NGO in wildlife law enforcement), giraffes and other charismatic species.
- Using cultural heritage, even in times of conflict, to promote the protection of important areas, such as the conservation activities in the Gola Rainforest NP that have involved the communities of both Sierra Leone and Liberia which share similar cultures, as well as many species of plant and animal use.
- The potential of sport hunting areas (e.g. Burkina Faso), which help to maintain the only functioning ecosystem (including its elephant population) in the major savannah ecotype of West Africa.
- The potential for a species to become a national symbol as in the case of the giraffe in Niger. During the great drought of 1984, about 50 giraffes moved south to Niger from Mali. Currently the population numbers nearly 400 animals, living outside a PA and protected jointly by local populations and the national wildlife service.

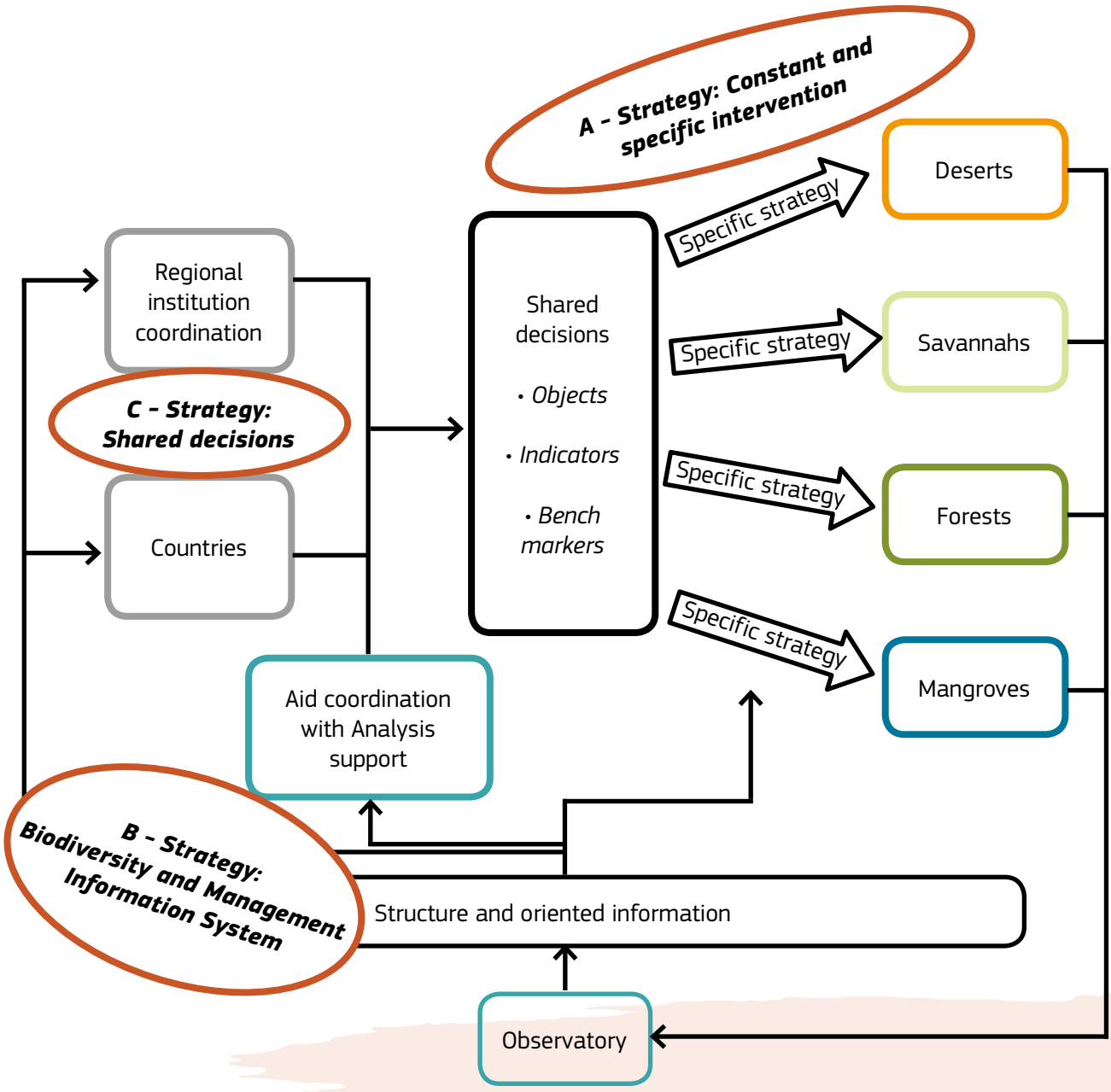
4.3 Promising approaches

Improving biodiversity conservation in West Africa should be based on the regional integration of three strategies:

- consistent, uninterrupted interventions on the ground with a specific strategic approach to each major ecotype, with strong coordination between ecotypes;
- a decision-support system based on the collection and organisation of information on biodiversity and management effectiveness in collaboration with the EU's BIOPAMA programme;
- shared decision-making at institutional and political levels (Figure 9).

The success of this overall approach will depend on the functional integration of these three specific strategies.

Figure 9. Promising approach to improve the protection of biodiversity in West Africa



Desert: Addax in the Termit Massif, Niger. The total population of Addax is estimated at less than 300 individuals across its range, with the majority of the population in the Termit-Tin Toumma region of Niger.

Savannah: In West Africa the giraffe formerly ranged from Senegal to Lake Chad, but the only viable surviving population within this entire area is a small population in south-western Niger.

4.3.1 Constant and specific intervention on the ground

The strategic approach is based on the consistency of interventions in the four major ecotypes: deserts, savannahs, forests and mangroves/coastal. The specific intervention strategies on the ground are based on a composite approach (arranged here only in alphabetical order): (i) composite in situ and ex situ conservation, (ii) ecosystem approach, (iii) habitat approach, (iv) *in situ* conservation, (v) species approach. Below are presented the proposed priority intervention approaches for each major ecotype in West Africa (Table 4).

4.3.2 Biodiversity and management information system

In West Africa, data on conservation is scattered, often out of date and not focused on the issues to be solved. The sources of information at the global level are very generic and do not allow the development of a strategic approach with a coordinated series of conservation activities. The BIOPAMA programme (Box 2) proposes the creation of regional observatories in Africa and then to connect the collected information in a more general system entitled the Digital Observatory for Protected Areas or DOPA (Box 3), which is managed jointly with IUCN. Through this project, the EU has an opportunity to turn the simple provision of information into a system that will enable conservation data to be organised and used in a decision-support system to identify priorities, formulate strategies and monitor the impact. The synergies between information, decision-making and conservation action are essential.

Table 4. Composite strategic approach for interventions in the four major ecotypes

Priority	Deserts	Savannahs	Forests	Mangroves/coastal
1	Species	*In situ* conservation	*In situ* conservation	Ecosystem
2	*In situ* conservation	Ecosystem	Ecosystem	*In situ* conservation
3	Composite *in situ* and *ex situ* conservation	Species	Species	Habitat
4	Habitat	Composite *in situ* and *ex situ* conservation	Habitat	Species
5	Ecosystem	Habitat	Composite *in situ* and *ex situ* conservation	Composite *in situ* and *ex situ* conservation

Forest: Black and white colobus monkey, Ghana. Small primates in West Africa are highly threatened by hunting and severe fragmentation of the Upper Guinea rainforests.

Mangrove: A Common Redshank wading in mangroves. Mangroves require much greater protection in West Africa.

Box 2. Biodiversity and Protected Areas Management Programme (BIOPAMA)

The Biodiversity and Protected Areas Management Programme (BIOPAMA) is an initiative of the ACP Secretariat funded by the European Union. BIOPAMA aims to address threats to biodiversity in African, Caribbean and Pacific (ACP) countries while reducing poverty in communities in and around protected areas. Specifically, the programme will enhance existing institutions and networks by making the best available science and knowledge accessible for building capacity in order to improve policies and better decision-making on biodiversity conservation, protected areas management and Access and Benefits Sharing (ABS).

BIOPAMA consists of two components:

1) protected areas component (jointly implemented by the IUCN and the European Commission's Joint Research Centre), which includes:
   a) capacity building for regional and national institutions and agencies, and PA managers;
   b) improved access to and availability of biodiversity data through the establishment of regional observatories and information systems to improve decision-making;
2) Access and Benefits Sharing (ABS), a component implemented by the Multi-donor ABS Capacity Development Initiative managed by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

The actions of the protected area component will be implemented in four BIOPAMA regions: West and Central Africa, Eastern and Southern Africa, the Caribbean, and the Pacific. One of the main objectives is establishing regional observatories that should support the conservation interventions in the field by:

- developing a Regional Reference Information System (RRIS);
- supporting decision-makers at various levels (regional, national, and local, i.e. PA level);
- strengthening capacity-building;
- operating a regional review on information needs and gap analysis;
- indicating priorities of PA funding (ACP/EU++) and addressing the Aichi targets and national reporting obligations to MEAs;
- supporting the assessment of biodiversity values mainstreaming biodiversity;
- contributing towards improving PA management effectiveness;
- proposing the assessment of ecosystem services – arguments for protection.

Box 3. Digital Observatory for Protected Areas (DOPA)

The Digital Observatory for Protected Areas (DOPA) has been developed by the Joint Research Centre (JRC) of the European Commission to support the EU's efforts 'to substantially strengthen the effectiveness of international governance for biodiversity and ecosystem services' (EC/COM/2006/0216 final) and more generally for 'strengthening the capacity to mobilize and use biodiversity data, information and forecasts so that they are readily accessible to policymakers, managers, experts and other users' (UNEP/CBD/COP/10/27).

DOPA is conceived as a set of distributed Critical Biodiversity Informatics Infrastructures (databases, web modelling services, broadcasting services, etc.) combined with interoperable web services to provide a large variety of end-users including park managers, decision-makers and researchers with means to assess, monitor and possibly forecast the state and pressures on protected areas at local, regional and global scales. Aside from the services hosted at the JRC, databases contributing to DOPA are typically The Red List of Threatened Species (IUCN), the World Database of Protected Areas (IUCN and United Nations Environment Programme-World Database of Protected Areas), and the species occurrences provided by the Global Biodiversity Information Facility (GBIF).

In particular, DOPA aims to:

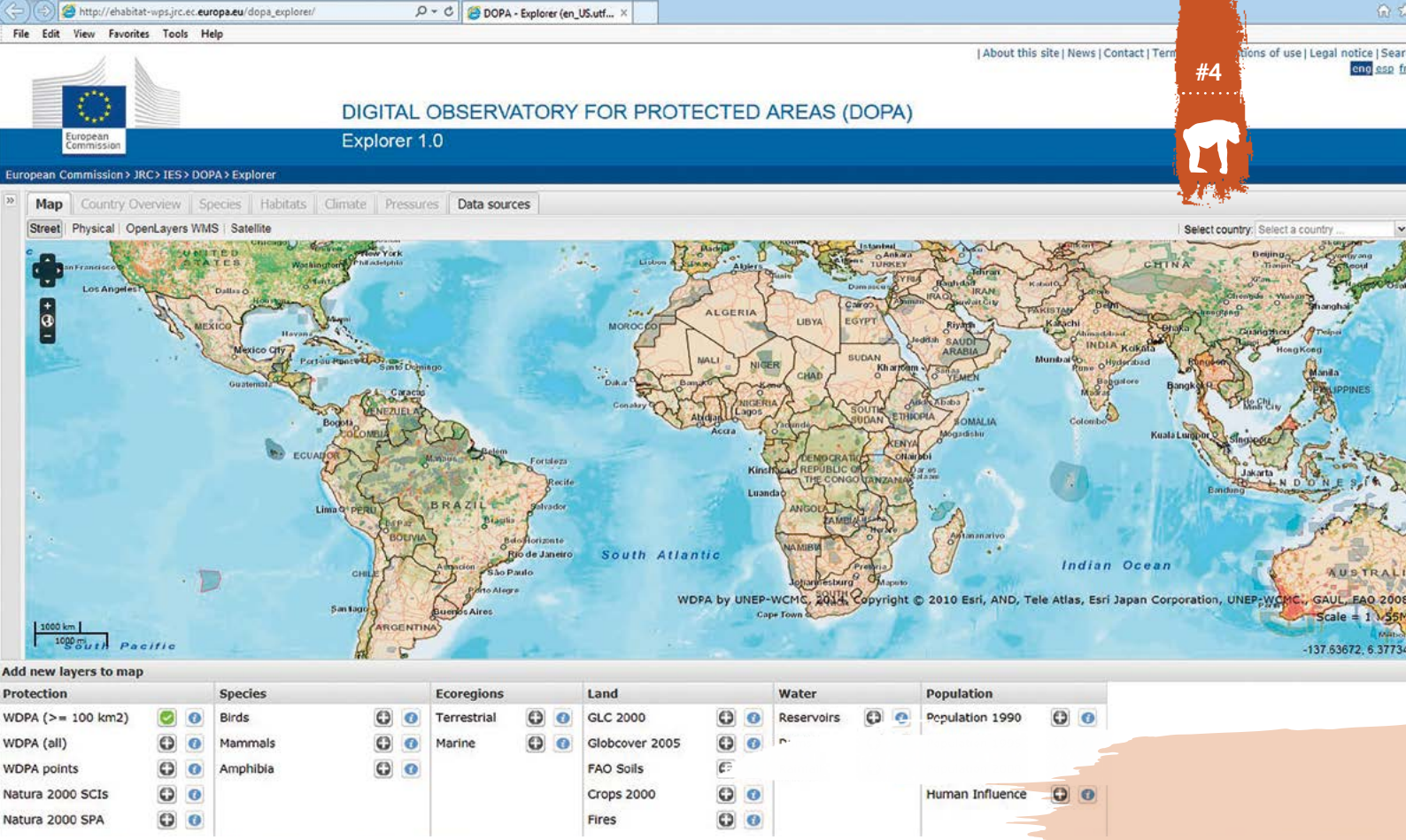
1. provide the best available material (data, indicators, models) agreed on by contributing institutions, which can serve for establishing baselines for research and reporting (e.g. Protected Planet Report, National Biodiversity Strategies and Action Plans);
2. provide free analytical tools to support the discovery, access, exchange and execution of web services (databases and modelling) designed to generate the best available material but also for research purposes, decision-making and capacity building activities for conservation;
3. provide an interoperable and, as much as possible, open source framework to allow institutions to develop their own means to assess, monitor and forecast the state and pressure of protected areas, and help them to further engage with the organisations hosting critical biodiversity informatics infrastructures.

DOPA Explorer (Beta version, 2013: http://ehabitat-wps.jrc.ec.europa.eu/dopa_explorer/) has been developed to provide simple means to explore areas around all marine and terrestrial protected areas that are greater than 150 km^2, identify those with the most unique ecosystems and species, and assess the pressures they are exposed to because of human development. Ecological data derived from near real-time earth observations is also made available, although currently limited to African protected areas.

Two other main interfaces to the web services are planned for the period 2014-16: 1. DOPA Validator (2015) will allow registered users to validate/invalidate the information summarised in DOPA Explorer and provide additional observations about individual protected areas; 2. DOPA Analyst (2016) will be providing end-users with a broad range of modelling tools for forecasting climate change impacts on protected areas, assessing connectivity, computing niche models or to allow end-users to simulate consequences of adding or removing a protected area on regional indicators.

Reference: Dubois, G, M. Schulz, J. Skøien, A. Cottam, W. Temperley, M. Clerici, E. Drakou, J. van't Klooster, B. Verbeeck, I. Palumbo, P. Derycke, J-F. Pekel, J. Martínez-López, S. Peedell and P. Mayaux (2013). An introduction to the Digital Observatory for Protected Areas (DOPA) and the DOPA Explorer (Beta). EUR 26207 EN, EC. Luxembourg: Publications Office of the European Union, Luxembourg. 72 pp.

See more at: http://dopa.jrc.ec.europa.eu/



The Digital Observatory for Protected Areas is a set of web services and interfaces that provides a large variety of end-users including park managers, park agencies, other decision-makers and researchers with means to assess, monitor and possibly forecast the state of and pressure on protected areas at multiple scales.

4.3.3 Shared political and institutional decisions

In West Africa, the severity of conservation problems imposes a strong need for a supranational dialogue. Safeguarding the populations of elephants, the desert ecotype wildlife, the specificities of the rainforests, and the wetlands and mangroves requires greater coordination between the countries of the region and greater collaboration between countries and donors on the subject. This collaboration can be achieved firstly by empowering a special unit at the institutional policy level (i.e. WAEMU) and a strong coordination of activities among donors, which is always to take place through this special unit at institutional level. The creation of a special unit at the institutional level should provide greater awareness in government decision-making; and the creation of a coordinated response by donors ensures greater synergy of interventions in financing long-term, and specific and emergency interventions (see Section 5.2.1 for implementation).

5

Indicative conservation actions

>5 _ Indicative conservation actions

Having reviewed the main conservation issues in West Africa, including the status of wildlife in four major ecotypes and the nature of direct/indirect threats to wildlife, this report now moves on to consider a strategic approach for the conservation of biodiversity in West Africa.

The most important points to remember about conservation in West Africa are the following:

- high biodiversity values in a wide range of ecosystems, but weak funds, management, protection and sustainable development of wildlife and other natural resources;
- strong direct threats such as loss of habitats and fragmentation, unsustainable poaching, and poor institutional governance with weak monitoring and planning;
- strong indirect threats such as human population growth and poverty, a weak policy and sectorial approach with unsustainable land and resource use.

This strategic approach focuses on the following key needs:

A. an active conservation process with more feet on the ground to counter the direct threats and to enhance protection of biodiversity whilst at the same time promoting its high values;
B. a proactive process with more external support for better governance, monitoring and planning, and in support of actions taken to reduce indirect threats on conservation.

A. Active process

The active process has its own goals:

- to balance the interventions between the four major ecotypes;
- to save threatened species from extinction;
- to preserve critical habitats (e.g. wetlands, Mount Nimba, mangroves);
- to improve management effectiveness of national and transborder parks;
- to promote the initiatives of landscape-based conservation, including the maintenance of connections between blocks of PAs;
- to ensure a better awareness and representation of the realities of wildlife in West Africa.

The active process has five main activities:

1. dissemination and analysis of the proposals for site conservation and for other conservation priorities in West Africa;
2. specific strategies and actions for the major ecotypes: deserts, savannahs, forests and mangroves/coastal;
3. dismantling the wildlife trafficking network;
4. special analyses;
5. training in wildlife protection.

The objective of the first activity (dissemination and analysis) is to confirm the conservation strategic approach for West Africa and to refine the details necessary for the implementation of the proposals. The action is only scheduled for the first year.

The second activity (specific strategies and actions) entails prioritising interventions for the most important KLCs and Key Conservation Areas (KCAs); itemising the main objectives of every single KLC and KCA; and preparing proposals to prevent the further decline of wetlands and to create new or larger KLCs and KCAs.

For each major ecotype, the process provides priorities of implementation based on criteria related to species, habitats and typologies of conservation (Table 4). The mangrove ecotype also includes marine and coastal PAs, but a harmonised and more detailed analysis could be undertaken here to incorporate the strategic plan for marine protected areas on the Atlantic coast of Africa as an implementation of the Abidjan Convention.

The third activity is part of the active conservation approach with activities on the ground. It will include dismantling wildlife trafficking networks in four sub-actions:

> political and diplomatic support;
> intelligence and security;
> judiciary and the conviction of illegal activities in PAs;
> security communications.

The fourth activity on special analysis is split into three sub-activities:

> monitor and plan highly threatened species and habitats;
> population and habitat viability assessment (PHVA);
> establish new or larger KLCs and KCAs.

The fifth activity on wildlife protection training will assist in winning back control of the parks and in curbing poaching. It has three steps:

> identify conservation sites with the capacity to deliver basic training for new rangers;
> prepare and implement training programmes that target the specific needs of each PA;
> support the implementation of appropriate anti-poaching programmes for each PA.

^

A rare West African giraffe killed by poachers in south west Niger.

B. Proactive process

The proactive process attempts to support and boost the active process on a long-term basis by creating a unit of 'institutional support and coordination' allocated under the WAEMU with the support of a special task force. The establishment of a regional coordination unit should exclude the creation of a new regional entity, and aim to strengthen an existing regional institution (WAEMU) in the specific field of conservation This proposal recommends that this is achieved by a special unit reinforced by a task force of experts.

A unit under WAEMU will have the mission of coordinating and promoting the following:

- *monitoring and planning* in coordination with the biodiversity and protected area observatory installed by BIOPAMA in West and Central Africa. The information provided by the observatory is intended to feed into decision-support system at local, national and regional levels;
- *communication*, in order to increase the awareness of the region on conservation via a far-reaching communication process;
- *biological research,* which is highly targeted and orientated towards the improvement of management effectiveness on specific aspects of conservation in West Africa;
- *training on management and governance training* in order to raise the capacity of senior-level officers of PAs and central government so that they are equipped to adopt the most advanced and suitable techniques for the long-term management and conservation of biodiversity in West Africa.

5.1 Active process

5.1.1 Dissemination and analysis of the proposals about sites and conservation priorities in West Africa

The implementation of inputs and proposals for intervention in the short and medium term requires the transmission of information through regional channels (ECOWAS – WAEMU) in favour of national institutions, NGOs and representatives of stakeholders in conservation. The information is intended to confirm the general conservation strategic approach and refine the details necessary for the implementation of the proposals. The EU should promote the first initiative, but in the future the regional observatory set up by the BIOPAMA project will support the coordination of the regional and national institutions by its regional reference information system on conservation (see Boxes 2 and 3).

This intervention should be carried-out under the coordination of WAEMU.

A village near the border of W National Park, Niger.

5.1.2 Support for conservation of the major ecotypes: deserts, savannahs, forests and mangroves/coastal

The strategic approach to conservation in West Africa is fundamentally based on the management of the national parks. The highly degraded situation and the strong, persistent threats suggest the need for a more structured intervention on conservation based on:

a) major ecotypes, to extend the interventions of conservation from savannahs and forests to the areas that have received less attention in the past, such as desert PAs, and mangrove and coastal-marine PAs;
b) species, so as to prevent the extinction of rare and charismatic species (desert antelopes, elephant, primates, carnivores, giraffe, eland, pygmy hippopotamus, birds, plants and amphibians);
c) habitats, to defend sensitive areas such as wetlands, water basins, inner deltas and the montane habitats;
d) KLCs, to allow for better management of habitats and species;
e) transborder conservation areas (TFCAs), through better regional coordination and to act as a symbol of a possible peace process between neighbouring countries;
f) KCAs, to guarantee the basic intervention of conservation in support of high threatened specific habitats and species.

The strategic approach organises these interventions according to the four major ecotypes to ensure a balance between the different conservation realities of West Africa and to spread the current strong focus on savannah protected areas. This strategic approach places more attention on key, rare and endangered species, and special and unique habitats in the KLCs, TFCAs and KCAs.

Consequently the strategic approach will carry out conservation actions on the following:

A. KLCs of major desert ecotypes;
B. KLCs, KCAs and endangered wetlands of savannah ecotypes;
C. existing KLCs and KCAs and new or larger KLCs and KCAs (in Liberia, Ghana and Nigeria) of forest ecotypes;
D. KLCs, KCAs and new or larger KLCs and KCAs (in Nigeria, Côte d'Ivoire, Liberia, Sierra Leone, Senegal, Guinea) of mangrove/coastal ecotypes.

Beginning with the desert ecotype, this strategic approach presents specific proposals for the conservation of every site and for each major ecotype.

The elements of each site are presented in table format under the following headings:

- conservation objectives;
- key species;
- key habitats.

The summary elements of each major ecotype are presented in table format under the following headings:

- protecting biodiversity;
- countries;
- biomes/ecotypes;
- main protected areas and priorities;
- analysis;
- objectives and proposed actions.

Figure 10. Map of proposed KLCs and KCAs in the West African region

KLCs and KCAs

Main protected areas

Other protected areas

WAF-01 Desert Niger-Chad-Algeria
WAF-02 Senegal Delta (WL)
WAF-03 Banc d'Arguin-Dakhla
WAF-04 WAPOK (W, Arly, Pendjari, Oti Monduri-Keran)
WAF-05 Comoé-Mole
WAF-06 Niokolo-Badiar-Bafing-Baoulé-Faleme
WAF-07 Gourma-Sahel-Inner Niger (WL)

WAF-08a Lion KCA (Kainji Lake NP)
WAF-08b Lion KCA (Yankari NP)
WAF-09 Volta Transboundary Ecosystem
WAF-10 Tai-Sapo
WAF-11 Gola-Lofa-Foya
WAF-12 Outamba-Kilimi
WAF-13 Ankasa-Bia-Nini Suhien

WAF-14 Rio Cacheu-Bijagos
WAF-15 Saloum
WAF-16 Basse Casamance
WAF-17 Keta-Songor
WAF-18 Lake Chad Basin (WL)
WAF-19 Hadeja-Nguru (WL)
WAF-20 Sherbro and Turtle Islands
WAF-21 Nimba

5.1.3 Specific strategies and actions for the major desert ecotypes

The habitats of the desert ecotype are heavily influenced by drought, so in the most arid zones, degradation is found where water (oases, etc.) is present. Otherwise the Sahara is a vast area of largely undisturbed habitat. The areas of steppe and woodlands in the desert are also heavily influenced by drought and the effects are exacerbated by large numbers of domestic livestock.

The desert areas of the Atlantic coast are severely degraded: overgrazing, cutting of trees for firewood and timber, and soil erosion aggravated by drought are contributing to desertification. The chief faunal values are along the coast where key migratory staging posts for the birds using the Atlantic Coastal Flyway are found. The large mammal species have suffered from uncontrolled hunting but the coast also supports the world's largest population of the critically endangered Mediterranean monk seal (*Monachus monachus*).

It is recommended that the highest priority be given to KLCs and KCAs in the following ecotypes:

- desert with the ecotypes of Sahara Desert; south Saharan steppe and woodlands, and west Saharan montane xeric woodlands;
- Atlantic coast.

The proposal for the West African desert ecotype is to establish one large desert Key Landscape for Conservation.

> Niger-Chad-Algeria Desert KLC (416 750 km² of PAs)

The conservation field activities should focus on the area between Niger, Chad and Algeria where there are probably the only remaining PAs that contain populations of many of the larger ungulates of this ecotype. However, this vast area has long been plagued by political insecurity and civil unrest, and the current situation of the desert wildlife is far from certain.

Many desert species track seasonally variable and patchy resources and require large natural landscapes to persist. Consequently, and if necessary, *in situ* conservation should cover the entire area between the priority PAs. Special habitats to protect are the water sources and riparian habitats, which are critical for the persistence of many desert species. For this reason, agreements between countries should be defined to determine a common intervention strategic approach at the regional level.

The desert KLCs encompass three PAs in Niger: 97 000 km² Termit & Tin Toumma, 78 339 km² Aïr and Ténéré, and 12 754 km² Addax Sanctuary; two PAs in Chad: 83 000 km² Ouadi Rimé-Ouadi and 1 739 km² Fada Archei; and two PAs in Algeria: 98 900 km² Tassili-n-Ajjer and 45 000 km² Ahaggar.

The key threats to be addressed are the reduction of large mammal populations and the Saharan cheetah, and the poorness of the genetic heritage of the desert antelopes. The large spaces and the system resilience, despite climate change, argue for adopting these measures:

(i) species approach, together with
(ii) a combined *in situ* and *ex situ* conservation approach to protect the endangered species in the priority PAs (see below) and to preserve and improve the genetic heritage of desert antelopes with *ex situ* conservation.

To have the greatest probability of conservation success, *in situ* and *ex situ* conservation techniques should be applied synergistically and must:

- be flexible to act in areas and countries as soon as security conditions allow it;
- save the habitat in which the species can live and reproduce (PAs and ecosystem);
- preserve and improve the genetic heritage (DNA [21]), under the responsibility of the World Association of Zoos and Aquariums – WAZA), with a view to the possible reintroduction of species in their natural habitat. Care must be taken to ensure that the natural habitat is preserved until reintroduction can take place (see Table 5).

Table 5.
Key elements of the Niger-Chad-Algeria Desert KLC

Approach	Priority elements
KLC	**KLC in the desert ecotype between Niger, Chad and Algeria**
Conservation objectives	1. Protect the desert and semi-desert habitats and desert antelopes
Key species	- scimitar oryx, Saharan cheetah, Dama Gazelle, addax
Key habitats	- water sources and riparian habitats which are critical for the survival of many species

([21]) Deoxyribonucleic acid (DNA) is a molecule that encodes the genetic instructions used in the development and functioning of all known living organisms and many viruses.

The proposal for the Atlantic coast is to establish two KLCs as follows.

> Senegal-Mauritania – Atlantic Coastal KLC (2 465 km² of PAs)

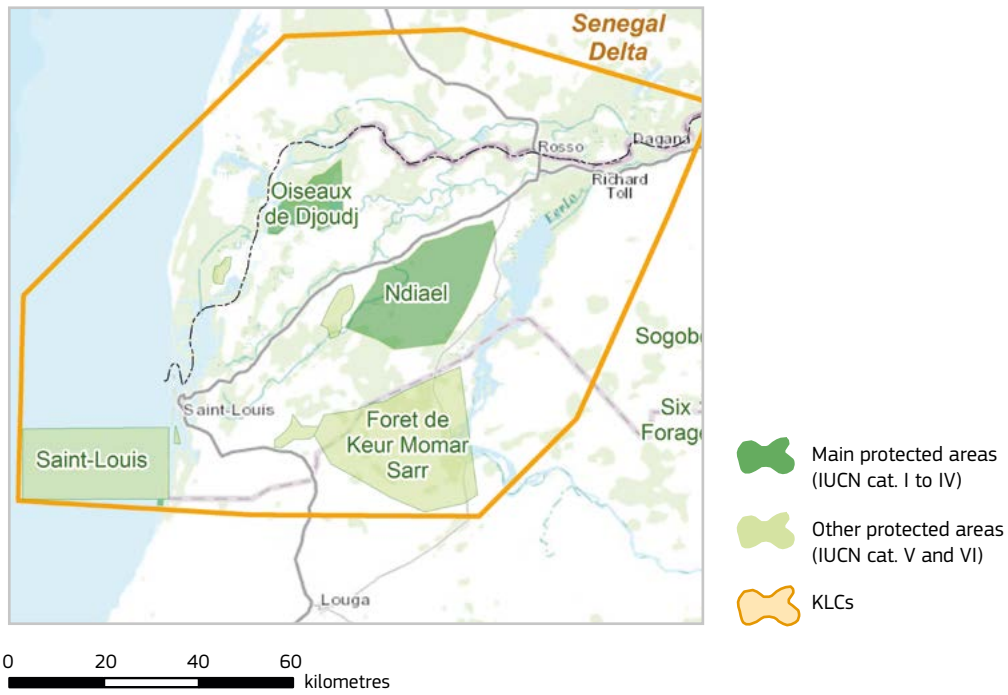
This landscape includes: the contiguous 659 km² Diawling NP in Mauritania; and in Senegal, the 209 km² *Parc national des oiseaux du Djoudj*, the nearby 461 km² Saint-Louis Marine protected area, the 486 km² Ndiael Wildlife Reserve and the 650 km² *Forêt de Keur Momar Sarr*.

This complex contains the most import wetlands in West Africa (WAF-02 in Figures 10-12 and more detailed in Figure 11) and consists of lagoons, saline flats and a small area of mangroves, as well as dunes, alluvial plains and an interconnecting network of rivers, lakes and ponds. There are seasonally inundated and marshy areas with small channels, especially adjacent to the river, and some of these are extremely important for birds in some years or at certain times of year, depending on flood and rainwater levels. The PAs and the buffer areas are incorporated in sites classified as IBAs (Table 6).

Table 6.
Key elements of the Senegal-Mauritania Atlantic Coastal KLC

Approach	Priority elements
KLC	**Atlantic coast KLC between Mauritania and Senegal**
Conservation objectives	1. Conservation: restoring and monitoring the sites and habitats 2. Promote resilient ecological transborder networks 3. Protect the wintering Western Palearctic waders
Key species	- over 2 million wintering Western Palearctic waders, from 15 different species
Key habitats	- inland delta in a shallow depression lying within the floodplain of the Senegal River

Figure 11. The Senegal Delta KLC



Two Fennec Foxes looking out from their burrow, Dilia Achetinamou, Niger. Fennecs are widespread in the sandy deserts and semi-deserts of West Africa.

> Mauritania-Western Sahara Atlantic coastal KLC (33 850 km² of PAs)

This landscape encompasses the 11 876 km² *Banc d'Arguin* National Park and the 3 100 km² *Réserve intégrale de Cap Blanc* in Mauritania; and the 18 888 km² Dakhla National Park (split into two distinct sectors: coastal and inland) in Western Sahara. The *Presqu'île du Cap Blanc*, which supports the world's largest population of the critically endangered Mediterranean monk seal, is protected by the Dakhla National Park (Western Sahara) and the contiguous *Réserve intégrale de Cap Blanc* (Mauritania).

The marine part of the national parks includes shallow open sea and sea grass beds, intertidal flats, channels and creeks, clumps of mangrove, as well as coastal desert habitats. Adjacent to the Mauritanian park lies one of the world's richest fishing grounds. The terrestrial part of the PAs includes areas of Saharan vegetation and a much larger inland desert sector in the Dakhla National Park.

The landscape hosts one of the world's most diversified communities of nesting piscivorous birds in the world[22]. At least 108 bird species have been recorded, representing both Palaearctic and Afrotropical realms. The number of wintering shorebirds is estimated to be over 3 million (Table 7).

Table 7.
Key elements of the Mauritania-Western Sahara Atlantic Coastal KLC

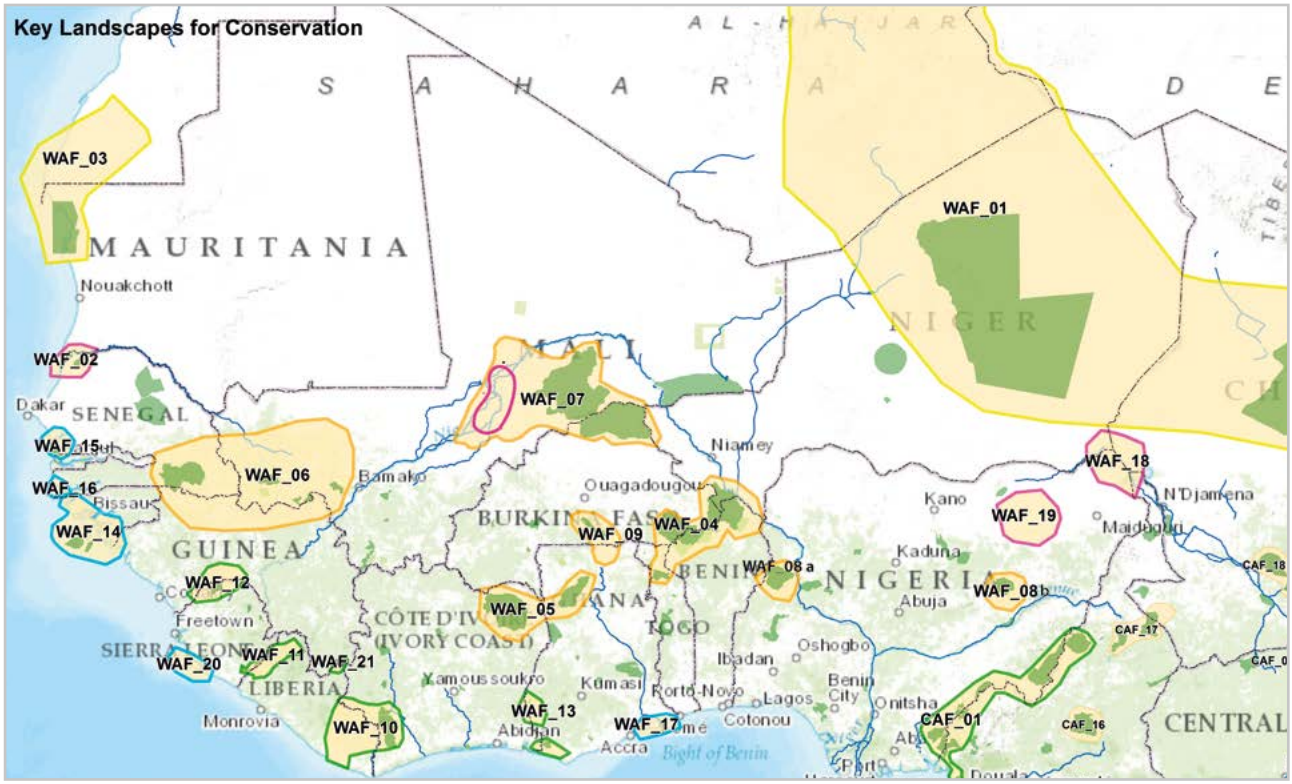
Approach	Priority elements
KLC	**Atlantic coast KLC between Mauritania and Western Sahara**
Conservation objectives	1. Conservation: restoring and monitoring the sites and habitats 2. Protect one of the world's most diversified communities of nesting piscivorous birds in the world 3. Prevent bird and Mediterranean monk seal extinctions 4. Promote resilient ecological transborder networks
Key species	- over 3 million wintering shorebirds - at least 108 bird species of nesting piscivorous birds - the critically endangered Mediterranean monk seal - critically endangered Saharan gazelles and antelopes (*Gazella dorcas neglecta; Nanger dama mhorr; Addax nasomaculatus*)
Key habitats	- shallow open sea, coastal desert habitats, clumps of mangrove

(22) Hoffman L. (1988). The Banc d'Arguin: nature in harmony with man, *WWF News*, June/July, pp. 10-11.

Protecting biodiversity	Countries	Biome/ecotype/ key species	Main KLCs-KCAs and priorities	Analysis	Objectives and proposed actions
- Under-representation of the desert and semi-desert habitats in PAs poses a threat to their long-term stability and conservation - Important Saharan large mammals but globally threatened - Immense importance for over 2 million wintering Western Palearctic waders, from 15 different species (Atlantic coastal desert) - Extraordinarily rich floras despite the very low and variable rainfall - Diversity of reptiles is moderately high (around 100 species) - Small number of endemics, but local endemism may be quite pronounced in some regions - Many species track seasonally variable and patchy resources and require large natural landscapes to persist - Water sources and riparian habitats are critical for the persistence of many species	- Mali - Mauritania - Niger - Senegal	**Biome:** Deserts and xeric shrubland **Ecotype:** - Sahara desert - South Saharan steppe and woodlands - Atlantic coastal desert - West Saharan montane xeric woodlands ***Other ecotypes of the biome:*** - East Saharan montane xeric woodlands - Tibesti-Jebel Uweinat montane xeric woodlands **Key species and status:** Scimitar oryx ▼▼▼ Saharan cheetah ▼▼▼ Dama Gazelle ▼▼ Addax ▼▼ Dorcas Gazelle ▼ Afrotropical-Palaearctic and piscivorous birds ▼	**Key Landscapes for Conservation** **1. Niger-Chad-Algeria (NCA) desert landscape for conservation** (416 750 km² of PAs) Termit & Tin Toumma - Aïr and Ténéré - Addax Sanctuary in Niger; Ouadi Rimé - Ouadi-Fada Archei in Chad; Tassili-n-Ajjer - Ahaggar NP in Algeria **2. Senegal-Mauritania - (SMWL1) Atlantic coastal desert landscape for conservation and wetlands** (2 465 km² of PAs) Diawling NP in Mauritania; *Parc national des oiseaux du Djoudj* - Saint-Louis Marine PA - Ndiael Wildlife Reserve - *Forêt de Keur Momar Sarr* in Senegal **3. Mauritania-Western Sahara (MWS) Atlantic coastal desert landscape for conservation** (33 850 km² of PAs) *Banc d'Arguin* NP - *Réserve intégrale de Cap Blanc* in Mauritania; Dakhla National Park in Western Sahara	**Negative aspects** - degraded habitat: overgrazing, cutting of trees, dry and intensive land use for agriculture - motorised hunting - local poaching - political insecurity and civil unrest - under-representation of the desert and semi-desert habitats of these ecotypes - threat to long-term stability and conservation of PAs - genetic heritage of desert antelopes - insufficient funds - poverty - disadvantaged population **Positive aspects** + surface (about 25% of Africa) + extraordinary ecosystem and fauna + cultural heritage + potential tourism	**Objectives** **1.** Protection of desert and semi-desert habitats and desert antelopes **2.** Conservation: restoring and monitoring the sites and habitats **3.** Protection for the wintering Western Palearctic waders and one of the world's most diversified communities of nesting piscivorous birds in the world **Actions** - promote resilient ecological transborder networks - *in situ* conservation for the entire biome (coordination/responsibility of one or more international organisations specialising in conservation in desert areas or a partnership between them) - prevent extinctions (also birds) and preserve the genetic heritage (DNA) - promote resilient ecological transborder networks - monitor and strengthen national *ex situ* conservation - improve the genetics of desert antelopes *in situ* and *ex situ* conservation (responsibility of WAZA) - ensure constant support from the IUCN/Species Survival Commission (SSC) Antelope Specialist Group (ASG), Northeast African Subgroup IUCN and Birdlife International - ICDP on the principles of good governance (legitimacy and voice, direction, performance, accountability, fairness) - exploit every possibility via land surveys (military) for better protection (and knowledge) of wildlife - possible future reintroduction of species into their natural habitat (while ensuring that the natural habitat remains intact)

Note: Red arrows denote declines in status.

Figure 12. West African ecosystems – KLCs, KCAs and priorities



Deserts

WAF-01 Desert Niger-Chad-Algeria
WAF-03 Banc d'Arguin-Dakhla

Savannahs

WAF-04 WAPOK (W, Arly, Pendjari, Oti Monduri-Keran)
WAF-05 Comoé-Mole
WAF-06 Niokolo-Badiar-Bafing-Baoulé-Faleme
WAF-07 Gourma-Sahel-Inner Niger
WAF-08a Lion KCA (Kainji Lake NP)
WAF-08b Lion KCA (Yankari NP)
WAF-09 Volta Transboundary Ecosystem

Forests

WAF-10 Tai-Sapo
WAF-11 Gola-Lofa-Foya
WAF-12 Outamba-Kilimi
WAF-13 Ankasa-Bia-Nini Suhien
WAF-21 Nimba
CAF-01 Cross River-Takamanda
(shared with Central Africa)

Mangroves

WAF-14 Rio Cacheu-Bijagos
WAF-15 Saloum
WAF-16 Basse Casamance
WAF-17 Keta-Songor
WAF-20 Sherbro and Turtle Islands

Wetlands

WAF-02 Senegal Delta
WAF-07 Inner Niger Delta
WAF-18 Lake Chad Basin
WAF-19 Hadeja-Nguru

5.1.4 Specific strategies and actions for the major savannah ecotypes

The original savannahs of West Africa have been greatly reduced, degraded and fragmented by farming, grazing, and the cutting and burning of trees and bushes for wood and charcoal. The degradation is exacerbated in areas of high human population density such as Nigeria (up to 300 persons/km^2). Also the interlacing forests and savannah areas, with their critical habitat for a number of large charismatic mammals, are highly degraded and the PAs preserve only 2% of the forest-savannah mosaic. The periodic droughts are further threats, exacerbating human pressures on biodiversity. The remaining blocks of intact habitat are found mainly in the protected areas, but most are under-resourced; even within the better-managed protected areas poaching is still rife and predators are systematically poisoned by transhumant herders. Over-hunting has decimated most of the populations of larger mammal species. West African populations of elephant are small, but of great conservation interest and draw attention to the value of the protected areas. Roan antelope and West African savannah buffalo are relatively more numerous but restricted to protected areas. Species that are at risk of extinction include giant eland, waterbuck, West African giraffe, wild dog, lion, leopard and cheetah.

The lions of West Africa are a particular concern. Dr Philipp Henschel of the NGO Panthera explained:
'When we set out in 2006 to survey all the lions of West Africa, the best reports suggested they still survived in 21 protected areas. [In 2013] we] surveyed all of them, representing the best remaining lion habitat in West Africa. Our results came as a complete shock: all but a few of the areas we surveyed were basically paper parks, having neither management budgets nor patrol staff, and had lost all their lions and other iconic large mammals.'

Bird species are also declining. The annual passage in the area of the huge numbers of migrant birds (Afrotropical-Palaearctic and intra-African migration) is particularly threatened by drought, overgrazing in the Sahel, and by the drainage and pollution of West African wetlands (Box 4).

The most important PAs in the West African savannahs include: the W transborder park between Benin, Burkina Faso and Niger, Pendjari NP in Benin, Arly NP in Burkina Faso, Comoé NP in Côte d'Ivoire, River Gambia in Gambia, Mole NP in Ghana, Boucle du Baoulé NP and Gourma Elephants in Mali, Kainji Lake and Yankari NP in Nigeria, and Niokolo-Koba NP in Senegal.

Finally, threats to the conservation of biodiversity on West African savannahs are the degraded and fragmented ecosystems; the high poaching levels and high extinction risk for large mammals species; and the high vulnerability of the area to climate change, exacerbating desertification and degradation of agricultural systems, with knock-on effects for PAs. The intervention's strategic approach requires:

1. concentrating conservation actions on the WAP[23] transborder area, the only functional ecological complex to maintain biodiversity in West African savannahs;
2. preserving the most important ecological blocks of PAs (even if faunal densities are low) and the corridors between them for possible future rehabilitation;
3. determining the most appropriate conservation actions for threatened species (*in situ* and *ex situ* conservation, special conservation, translocation, etc.) by the establishment of population and habitat viability assessment (PHVA) analysis if necessary, and the preservation of specific habitats, especially wetland areas for birds.

The West Africa Economic and Monetary Union (WAEMU), with the support of experts in West African savannah management, has proposed interventions which are summarised and integrated with other proposals in the following key points:

- establish a convergence plan of interventions on conservation in the ecotypes;
- save the WAP ecosystem (W, Arly, Pendjari), the only functional ecological complex to have the potential to serve as a site for the regeneration and reintroduction of species back into the other degraded PAs in the savannah ecotype;
- preserve the most important ecological blocks of protected areas: 1. W-Arly-Pendjari-Oti Monduri (Benin, Burkina Faso, Niger and Togo); 2. Comoé-Mole (Côte d'Ivoire and Ghana); 3. Niokolo-Badiar-Bafing-Faleme-Fouta Djalon (Guinea, Mali and Senegal) and 4. Gourma Elephant and Sahel Faunal Reserve (Mali and Burkina Faso), even though faunal densities may be low;
- support transborder complexes of protected areas and special conservation measures (cross-border activities) in the major savannah ecotypes in West Africa, such as the WAPOK;
- implement new management initiatives such as the proposal to establish transborder corridors between major ecological blocks, like the Volta Transboundary Ecosystem Wildlife Corridors between Burkina Faso and Ghana.

Summarised global data is presented in Table 15.

(23) The strategy must prioritise the intervention in the WAP complex (W, Arly and Pendjari) and less so in the Togo complex of Keran-Oti-Monduri due to the high level of degradation and the resources needed to restore the protected areas of Togo.

Box 4. The decline of wetlands

(From Zwarts L. et al (2009). Summary of Living on the Edge: Wetlands and Birds in a Changing Sahel. KNNV Publishing, Zeist, The Netherlands.)

The Palearctic-African bird migration draws birds from the geographical range between 10° W (Ireland) and 164° E (Kolyma Basin, north-eastern Siberia). Long-distant migrants from this vast region pour into sub-Saharan Africa, amassing mainly in the northern savannahs of the Sahel and Sudan-Guinea zone. Although the region is close to the Sahara, it has four huge Sahelian wetlands: the Senegal Delta, the Inner Niger Delta, Lake Chad and the Hadejia-Nguru wetlands. These wetlands are of critical importance to the migrating waterbirds.

Senegal Delta (WAF-02 in Figures 11 and 12) (Desert)
The Senegal Delta has a unique ecosystem because seawater can enter the floodplains, hence the change from marine to freshwater. **In the past, the water level varied by 3.5 m in an area of 3400 km²**. Currently the floodplains are irrigated farmland, the permanent water body has invasive plant species (water lettuce, Kariba weed), the level is reduced to 0.5 m and the bird life has reduced dramatically. **No wetland in West Africa has changed as much as the Senegal Delta**. The creation of Djoudj NP (Senegal) and Diawling NP (Mauritania) has offset some of the ecological disasters associated with the loss of the floodplains and both sites are now important wetlands for migratory bird species. (For conservation measures, see Section 5.1.3.)

Inner Niger Delta (WAF-07 in Figures 12 and 16) (Savannah)
The Inner Niger Delta in Mali is huge. The area covered by water at any **one time could amount to 25000 km² but in most years the areas of floodplain are smaller**. The Inner Niger Delta also stands out for its hydrological dynamics. The water could rise by more than 6 m in wet years, but in extremely dry years the flood level rises only by 3 m. For waterbirds the large annual differences in flood extent are a matter of life and death (starvation or preying). Dams in the Niger upstream of the Delta and large irrigation works and breeding (as in the Senegal Delta) take so much water that the floodplains are now reduced to an estimated 15-20% of the total. The drier the Inner Niger Delta, the fewer migrants survive the northern winter. For a few species, the population in the Inner Niger Delta constitute a substantial part of their entire population. The significance of this area for European and Asian migrants can hardly be overestimated. (For conservation measures, see Section 5.1.4.)

Lake Chad Basin (WAF-18 in Figure 12) (Savannah)
In the past, Lake Chad was very large, **varying in size between 15000 and 25000 km²**. Currently the decline in the water level is due to irrigation along the Logone and Chari Rivers and climate change. All in all, birdlife on Lake Chad must have changed a great deal, but hard data is lacking. However, although Lake Chad was reduced in size, the floodplains have increased in size, which is good news for foraging birds. The complete bird count reveals the significance of Lake Chad for not only local species, but also for migrants. (This area is not covered by a direct conservation measure, but should be supported by the special fund for new or larger KLCs and KCAs in savannah areas.)

Hadejia-Nguru wetlands (WAF-19 in Figure 12) (Savannah)
The Hadejia-Nguru wetlands lie on the southern edge of the Sahel savannah in north-eastern Nigeria. The area is a flood-plain complex, comprised of a mixture of seasonally flooded land and dry upland. There are 20 dams upstream of the Hadejia-Nguru and **the size of the floodplain varies annually, depending on the size of the river's discharge, between 300 and 3600 km²**. Large parts of the wetland are under rice cultivation during the rainy season and, during the dry season, are usually utilised for growing other crops as water levels drop. Livestock graze uncultivated areas. The bird counts, performed between 1988 and 1998, show that numbers are related to the size of the floodplains: 300000 waterbirds were counted in wet years, but only 50000 in dry years. (This area has not been covered by a direct conservation measure, but it should be supported by the special fund for new or larger KLCs and KCAs in savannah areas.)

It is recommended that the highest priority be given to the following KLCs and KCAs.

> WAPOK Savannah KLC (38 000 km² of PAs)

This large complex of contiguous conservation areas is located near to the international frontiers with Burkina Faso, Benin, Niger and Togo. The landscape encompasses the 10 400 km² W transborder park between Benin, Burkina Faso and Niger; the 1 823 km² Pendjari NP in Benin; the 839 km² Arly Faunal Reserve (renamed Park) in Burkina Faso; the 1 450 km² Oti Monduri Faunal Reserve; and the 1 196 km² Keran NP in Togo. The WAPOK complex includes one giraffe area not classified in Niger, ten hunting concessions and many adjacent village hunting zones.

The WAPOK complex is a large area of about 38 000 km² of intact habitat (with the exclusion of Togo's PAs) with great importance for the survival of large mammals, including lion and other species that are at high risk of extinction in West Africa. These different blocks constitute the largest remaining wilderness; they make up the only functional ecological complex in West Africa that has the potential to serve as a site for regeneration and reintroduction of species back into other degraded PAs in the savannah ecotype. The survival of the WAP complex is the highest priority in West Africa.

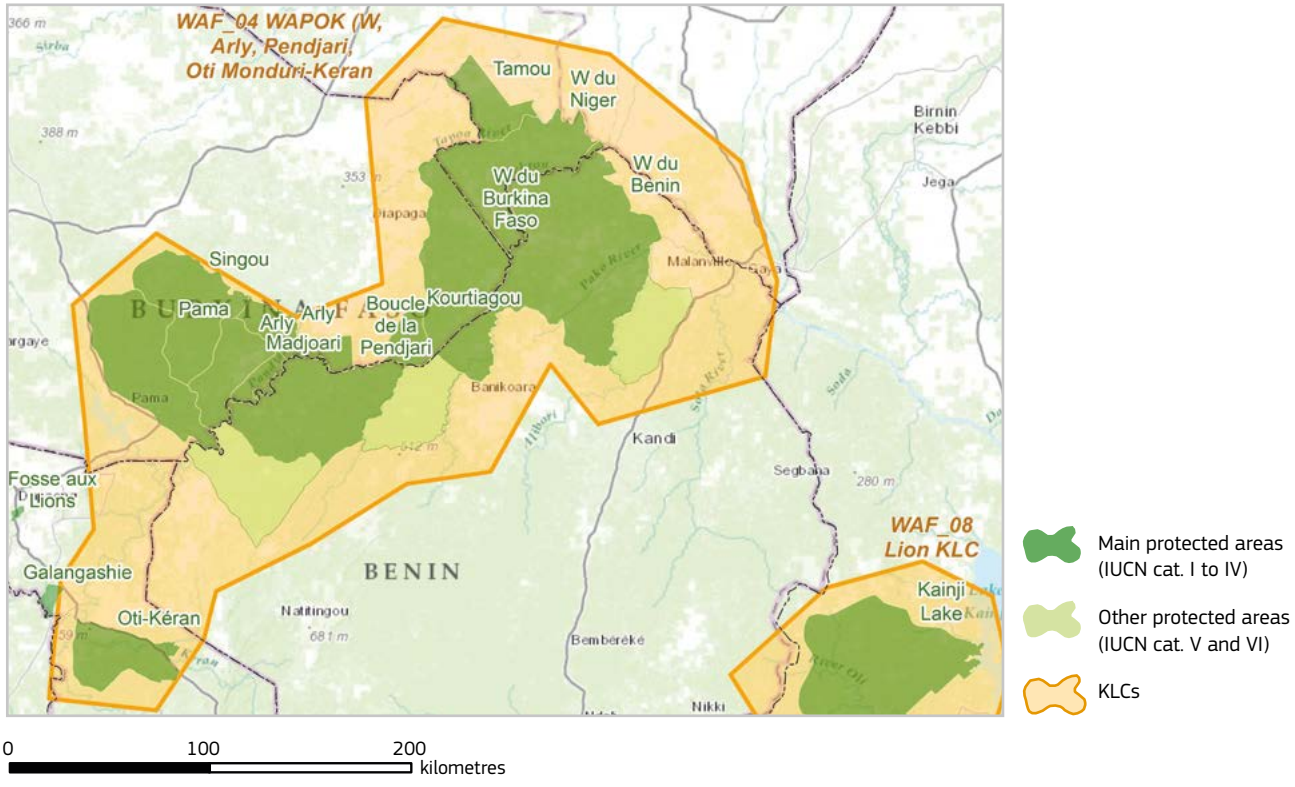
This strategic approach prioritises and stresses the intervention in the WAP complex (W, Arly and Pendjari and their faunal reserves).

It also emphasises the Togo complex of Keran-Oti-Monduri but recognises the high level of degradation of the PAs of Togo and the greater resources needed for their restoration (Table 9).

Table 9.
Key elements of the WAPOK Savannah KLC

Approach	Priority elements
KLC	**Priority savannah KLC located close to the frontiers between Burkina Faso, Benin, Niger and Togo**
Conservation objectives	1. Preserve the only functional savannah ecological complex in West Africa 2. Save the potential for regeneration and reintroduction of species into other degraded PAs in the savannah ecotype 3. Determine the most appropriate conservation actions for threatened species 4. Preserve specific habitats, especially wetland areas for birds
Key species	– lion, cheetah, elephant, giraffe, leopard, manatee, roan antelope, buffalo, Defassa waterbuck – fishes in refuge area of the Niger and Volta Basins
Key habitats	– savannah and dry forest areas – extensive network of rivers, drainage lines and floodplains (the rivers and many of the smaller rivers and ponds are completely parched by the end of the dry season) – floodplains and gallery forest – the geological formation of *La Falaise de Gobnangou* and also a number of isolated inselbergs

Figure 13. The WAPOK KLC



> Comoé-Mole (CM) Savannah KLC (16 571 km² of PAs)

This large ecosystem is located on the frontier between the Côte d'Ivoire and Ghana. The two PAs are situated near the borders between the two countries, but they are not contiguous. The landscape encompasses the 11 671 km² Comoé NP (the largest PA in the savannahs of West Africa) and the 4 900 km² Mole NP in Ghana.

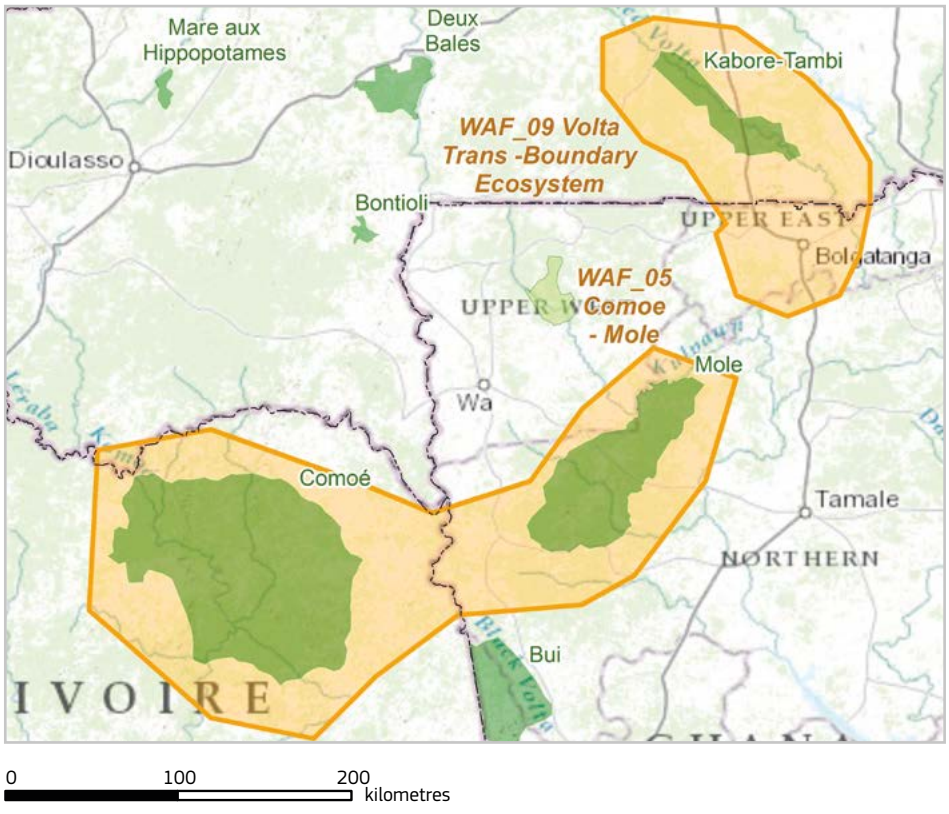
The CM savannah KLC is characterised by savannah woodlands, which cover almost the totality of the parks, and the riparian forests that fringe the rivers. Isolated forest patches of varying size occur throughout the savannah. Other habitat-types include alluvial plains and flat seasonal marsh.

The Comoé NP is highly degraded but it must be preserved, even though faunal densities are low, in the expectation and hope of a better future for conservation in Côte d'Ivoire after the recent civil wars and violence. The initiative will also serve to support cross-border activities and establish transborder corridors between major ecological blocks in order to save the large populations of mammals and the threatened species in West Africa (Table 10).

Table 10.
Key elements of the Comoé-Mole (CM) Savannah KLC

Approach	Priority elements
KLC	**Savannah KLC located close to the frontiers between Côte d'Ivoire and Ghana**
Conservation objectives	1. Preserve the savannah ecological blocks and the corridors between them for possible future rehabilitation 2. Adopt the most appropriate conservation actions for threatened species 3. Preserve specific habitats, especially wetland areas for birds
Key species	– elephant, leopard, roan antelope, buffalo
Key habitats	– extensive network of rivers – savannah woodlands – forest patches and gallery forest – alluvial plains and flat seasonal marsh

Figure 14. The Comoé-Mole KLC and the Volta Transboundary Ecosystem KLC



> Niokolo-Badiar-Bafin-Baoulé-Falémé-Fouta (NBBBFF) Savannah KLC (about 25 000 km² of PAs)

This large complex of non-contiguous conservation areas is located between Guinea, Senegal and Mali. The landscape encompasses the 8 423 km² Niokolo NP in Senegal; the contiguous 278 km² Badiar NP in Guinea; the 1 600 km² Bafing NP; and the 3 935 km² Boucle du Baoulé NP in Mali. The complex includes the Faleme area (Mali and Guinea) and two chimpanzee areas, one in Mali (Bafing) and the other in Guinea (Fouta Djalon,) and more than nine hunting zones.

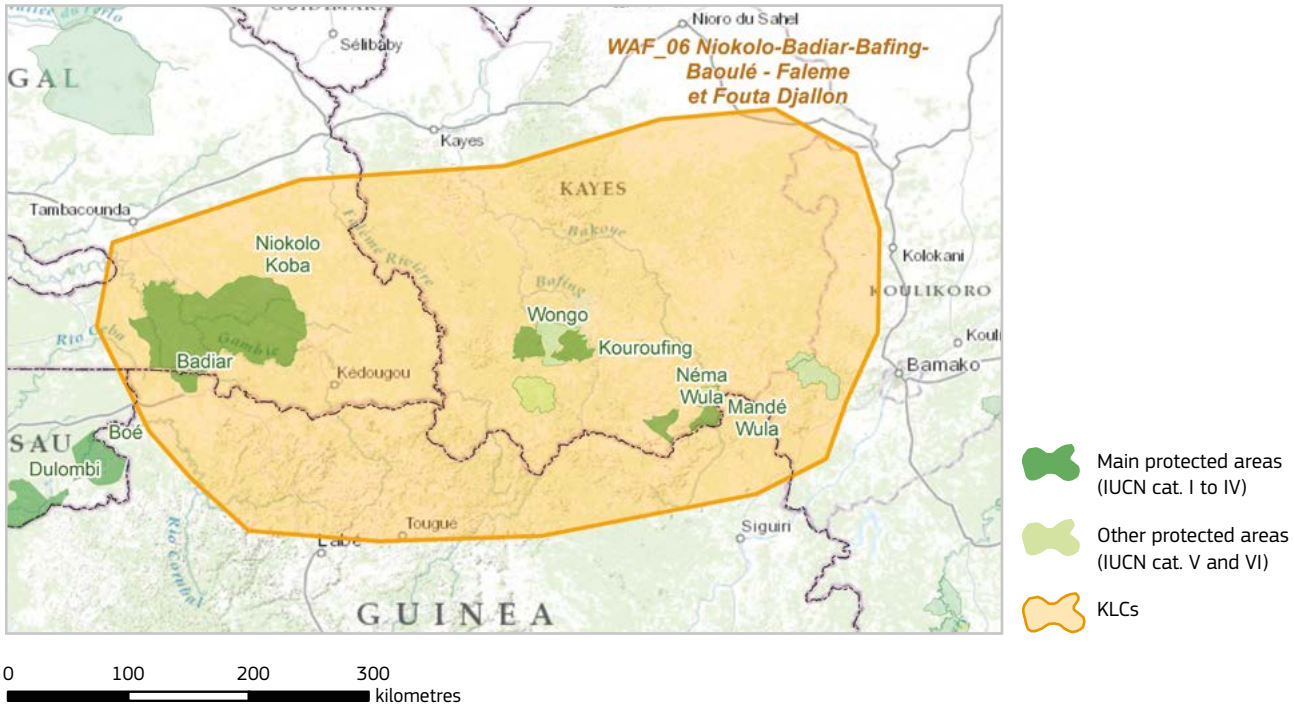
The complex is mostly flat with large areas of floodplain and marsh, which are inundated during the seasonal rains (June to October). The area includes low hills and rugged and broken terrain, especially in the west where there are spectacular escarpments. The area is crossed by large rivers that dry up during the dry season, but the waters of the artificial lake form the eastern boundary of the Bafing NP for much of its length. The vegetation includes herbaceous savannah dominated by *Andropogon gayanus* in the valleys and plains, and dry forest, gallery forest and more luxuriant vegetation along the watercourses.

There is a proposal for the creation of a 38 000 km² Bafing-Falémé transborder protected area (BFTPA), which will be very important, both in terms of biodiversity and regional water security. With a mean population density of just ten people/km², one of the lowest in the region south of the Sahel, the BFTPA is considered one of West Africa's last wild places. The stability of its unique ecosystems is now threatened by road construction and mining, and a growing demand for arable land, energy, wildlife products and other scarce resources (Table 11).

Table 11.
Key elements of the Niokolo-Badiar-Bafing-Baoulé-Falémé-Fouta (NBBBFF) Savannah KLC

Approach	Priority elements
KLC	**Savannah KLC located close to the frontiers between Guinea, Mali and Senegal**
Conservation objectives	1. Preserve the savannah's ecological blocks and the corridors between them for possible future rehabilitation 2. Adopt the most appropriate conservation actions for threatened species 3. Preserve specific habitats, especially wetland areas for birds
Key species	– lion, wild dog (*Niokolo Koba*), eland (the last population in West Africa), chimpanzee (the most northerly population in Africa), leopard, roan antelope, buffalo
Key habitats	– mostly flat with large areas of floodplain and marsh, inundated during the seasonal rains – low hills and spectacular escarpments in the west – large rivers; an artificial lake forms the eastern boundary of the Bafing NP

Figure 15. The Niokolo-Badiar-Bafing-Baoulé-Falémé-Fouta KLC



> Gourma Elephant, Sahel Faunal Reserve and Inner Niger Delta (WAF-07) Savannah KLC (26 500 km² of PAs)

This large complex of conservation areas is located between the frontier of Mali and Burkina Faso and the Inner Niger Delta, but these are not contiguous PAs. The landscape encompasses the 5 715 km² Gourma Elephant in Mali; the 18 150 km² Sahel Faunal Reserve in Burkina Faso; and the 2 560 km² of five Important Bird and Biodiversity Areas (IBAs) in the Inner Niger Delta (see Figure 16). Tombouctou is the biggest IBA, immediately north of the town.

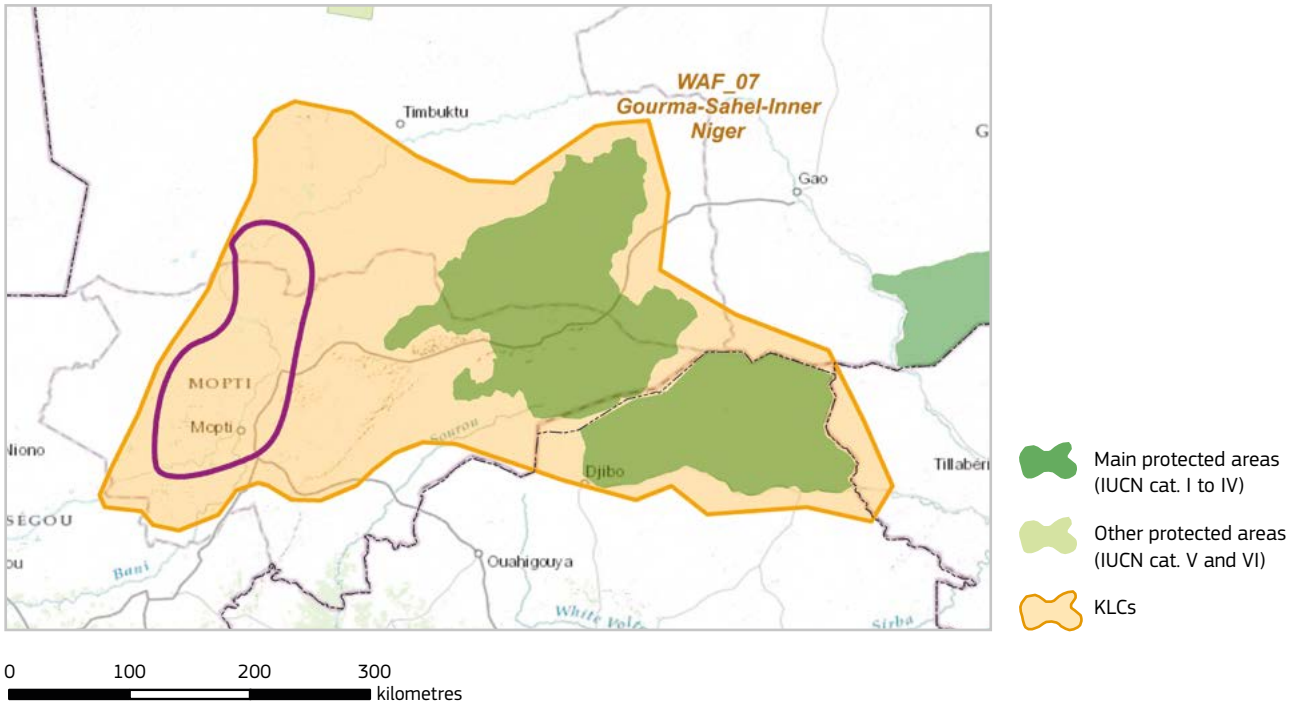
The savannah ecosystem, which also includes the seasonal lakes and wetlands of the Sahel Faunal Reserve in Burkina Faso, is home to the most northerly elephant population in Africa. The complex houses a large number of birds including hundreds of thousands of wintering birds and breeding colonies of cormorant, heron, spoonbill, ibis and other waterbirds (Table 12).

The habitats are characterised by wetlands, sand dunes, semi-desert grasslands, open eroded shields, drainage lines, inselbergs rising out of the plains and a series of hills. On the seasonal floodplain there is a rich plant community providing important dry season grazing. The IBAs in the Inner Niger Delta consist of permanent and semi-permanent wetlands, which are sometimes connected. Depending entirely upon the annual run-off from the rains of July to September, the lake levels vary considerably from year to year. Some lakes are ringed by important stands of trees. Under natural conditions, the wetlands retain floodwater from the Niger throughout the dry season in years of good rainfall, but otherwise have dried out completely by April. The sites include cultivation and scrub woodland along the course of the Niger and its tributaries, fixed dunes and ephemeral interdunal slacks. The most important areas for waterbirds are thought to be the clusters of dry season shallow ponds.

Table 12.
Key elements of the Gourma Elephant, Sahel Faunal Reserve and Inner Niger Delta Savannah KLC

Approach	Priority elements
KLC	**KLC with savannah and wetland areas for birds located at the frontiers between Mali and Burkina Faso**
Conservation objectives	1. Preserve the savannah ecological blocks and the corridors between them for possible future rehabilitation 2. Preserve other specific habitats, especially wetland areas for birds 3. Adopt the most appropriate conservation actions for threatened species (elephant, manatee, wetland birds)
Key species	– elephant (most northerly population in Africa), manatee, migrant birds (Afrotropical resident species and migrants)
Key habitats	– extensive network of rivers, seasonal lakes and wetlands – seasonal floodplains – clusters of dry season shallow ponds

Figure 16. The Gourma Elephant, Sahel Faunal Reserve and Inner Niger Delta Savannah KLC



> Lion Key Conservation Areas (8 200 km² of PAs)

Recent surveys (8 January 2014) have suggested that the African lion population is facing extinction across the entire West African region [24].

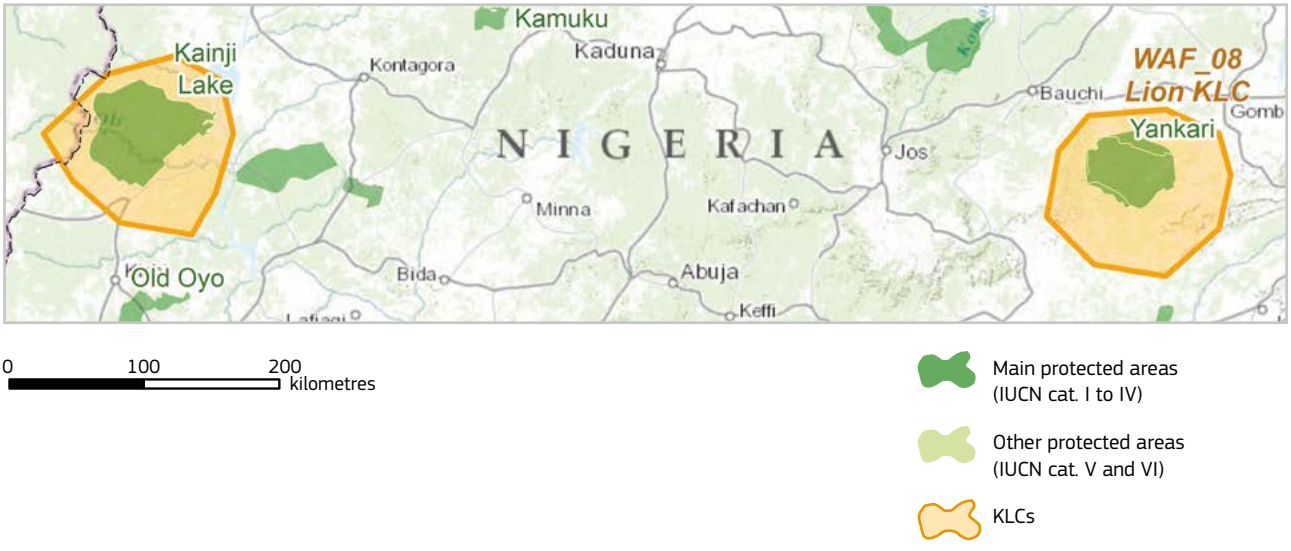
The team discovered that West African lions now survive only in the transborder WAP complex (fewer than 200 lions) and in three national parks: Niokolo Koba NP in Senegal (fewer than ten lions), Kainji Lake NP (fewer than 20 lions) and Yankari NP (fewer than five lions) in Nigeria. Counting lions is extremely difficult, and we may never know precisely how many lions there are in West Africa, especially if, as few specialists suppose, that we can find lions outside the PAs.

The strategic approach for the protection of the savannah fauna of West Africa includes the 5 824 km² Kainii Lake NP (and the Wari-Maro-Mont Kouffe-Agoua Forest in central Benin, to be explored), and the 2 387 km² Yankari NP with the main objective of contributing towards saving the last lions and wild dogs (in Kainii Lake NP) of West Africa (Table 13).

Table 13.
Key elements of the Lion KCAs

Approach	Priority elements
KCAs	**Protected areas with the last lions of West Africa**
Conservation objectives	1. Adopt the most appropriate conservation actions for lion and other threatened species 2. Preserve wetland areas for birds
Key species	– lion, wild dog (Kainii Lake NP) and populations of IBA trigger species
Key habitats	– dry savannah woodlands – riparian vegetation – the only place in Nigeria with mono-dominant stands of *Pteleopsis habeensis*

Figure 17. The Lion KCAs with two national parks in Nigeria: Kainji Lake NP and Yankari NP



(24) The lion in West Africa is critically endangered, Panthera's Lion Program Survey, Dr Philipp Henschel, *PLOS ONE*, 2014.

Footprint of a lion. A recent report by the ONG Panthera suggests that lions are facing extinction over their entire range in West Africa. They now only occur in five countries, in the WAP (W-Arly-Pendjari) transfrontier complex and three other national parks.

> Volta Transboundary Ecosystem Wildlife Corridors KLC (3 700 km² of PAs)

The Volta Transboundary Ecosystem Wildlife Corridors is a new management initiative for the boundary ecosystem between Burkina Faso and Ghana. The complex is centred on the *Forêt classée* and *Ranch de Gibier de Nazinga*. The Volta Transboundary Wildlife Ecosystem could represent a continuum between the WAPOK complex and the Comoé-Mole complex. The corridor encompasses the 913 km² Ranch Nazinga and 2 760 km² of other PAs and hunting zones surrounding Nazinga, a total area of about 3 700 km². All the most important PAs and the Ranch Nazinga are classified as IBAs (see Table 14 and Figure 14).

Table 14.
Key elements of the Volta Transboundary Ecosystem Wildlife Corridors KLC

Approach	Priority elements
KLC	**Savannah KLC located close to the frontiers between Burkina Faso and Ghana**
Conservation objectives	1. Preserve the most important corridors between ecological blocks of the savannah of West Africa 2. Determine the most appropriate conservation actions for threatened species and particularly for elephant 3. Preserve specific habitats, especially wetland areas for birds
Key species	– elephant, populations of IBA trigger species
Key habitats	– typical southern Sudan/Guinea savannah with shrub savannah, tree-savannah and gallery forests

> New or larger national protected areas should also be created to stop the decline of wetlands

The evaluation of about 1 000-3 000 km² of savannah wetlands needs to be carried out to achieve new or larger PAs that can serve to avoid the decline of wetlands (an addition of 1-2 %, as considered by the strategic approach for the specific savannah ecotype).

Protecting biodiversity	Countries	Biome/ecotype/ key species	Main KLCs-KCAs and priorities	Analysis	Objectives and proposed actions
- Under-representation of the savannah areas and particularly of interlacing forests and savannah areas in PAs - Large mammal species threatened with extinction: giant eland, wild dog, lion, cheetah and leopard - West Africa lion population estimated at only 250 adults restricted to four isolated PAs. The WAP alone has fewer than 200 lions - Highly fragmented elephant population with the only large group being in the WAP complex - Last population of western giraffe (340 animals) - Huge numbers of migrant birds: Afrotropical-Palaearctic and intra-African migration - Roan antelope and West African savannah buffalo occur in relatively large numbers - High level of plant endemism - Large mammals are amongst the most beautiful in Africa, such as the giant eland, roan antelope and major hartebeest - West African lions have unique genetic sequences not found in any other lions, including in zoos or other forms of captivity	- Benin - Burkina - Gambia - Ghana - Guinea - Guinea-Bissau - Côte d'Ivoire - Liberia - Mali - Mauritania - Niger - Nigeria - Senegal - Sierra Leone - Togo	**Biome:** - tropical and subtropical grasslands, savannahs and shrublands - montane grasslands and shrublands **Ecotype:** - Sahelian acacia savannah - West Sudanian savannah - Guinean forest-savannah mosaic - Jos Plateau forest-grassland mosaic (without PAs) **Key species and status:** Lion ▼▼▼ Wild dog ▼▼▼ Cheetah ▼▼▼ Leopard ▼▼▼ Giant eland ▼▼▼ Manatee ▼▼ Elephant ▼ Afrotropical-Palaearctic and intra-African migratory birds ▼ Chimpanzee = Giraffe ▲ Roan antelope ▲ Buffalo ▲▲	**Key Landscapes for Conservation** 1. **WAPOK savannah landscape for conservation** (38000 km² of PAs) W transborder park, Pendjari NP, Arly FR, Oti Monduri FR and Keran NP 2. **Comoé-Mole (CM) savannah landscape for conservation** (16571 km² of PAs) Comoé NP and Mole NP 3. **Niokolo-Badiar-Bafing-Baoulé-Falémé-Fouta (NBB-BFF) savannah landscape for conservation** (25 000 km² of PAs) Niokolo NP, Badiar NP, Bafing NP, Boucle du Baoulé NP, complex Faleme and chimpanzee areas Bafing and Fouta Djalon 4. **Gourma Elephant, Sahel Faunal Reserve and Inner Niger Delta savannah landscape for conservation** (26 500 km² of PAs) Gourma Elephant FR, Sahel FR and five IBAs in the Inner Niger Delta **Key Conservation Areas** 5. **Lion KCAs** (8200 km² of PAs) Kainji Lake NP and Yankari NP **Key Landscape for Conservation** 6. **Volta Transboundary Ecosystem Wildlife Corridors (VC)** (3700 km² of PAs) Ranch Nazinga and other PAs, and hunting zones surrounding Nazinga **New or larger KLC and KCA** 7. **KLC and KCA to stop the decline of wetlands** (1000-3000 km² of potential wetlands)	**Negative aspects** - habitats degraded and fragmented, exacerbated by high human population density and the new conflicts, civil/religious fundamentalism, unrest and refugee movements (Côte d'Ivoire/Nigeria) - periodic droughts - over-hunting - criminal activities in PAs (fire, hunting, poisoning predators, illegal grazing) - PAs under-resourced and low effectiveness of management - many 'paper parks' – not active on the ground - threat to short-term stability and conservation of PAs - poverty and disadvantaged populations - climate change **Positive aspects** + biodiversity potential (elephant, western giraffe, lion, cheetah, leopard, wild dog) and high restoration potential + cultural heritage in water conservation techniques + potential ecotourism from private funds through international tenders	**Objectives** 1. Preserve the only functional ecological savannah complex in West Africa 2. Save the potential for regeneration and reintroduction of species into other degraded PAs 3. Determine the most appropriate conservation actions for threatened species 4. Preserve specific habitats, especially wetland areas for birds 5. Preserve the ecological savannah blocks and the corridors between them for possible future rehabilitation **Actions** - highest priority for major support to save the WAPOK ecosystem - ecosystem-landscape interventions, together with corridors between major ecological blocks - ensure continuous support by the IUCN/SSC Cat Specialist Group to preserve predators through the implementation of PHVA strategies (also for game hunting) - preserve the genetic heritage (DNA) of the West African lions by *in situ* and *ex situ* conservation (responsibility of WAZA) - control and manage pastoralism to reduce the human-lion conflict (which leads to the killing of lions) - ensure continuous support by the IUCN/SSC Antelope Specialist Group (ASG) for the giant eland and western giraffe and implementation of the PHVA strategic approach - specific protection for threatened species in PAs such as Yankari and Kainji Lake for lions - ICDP on the principles of good governance (legitimacy and voice, direction, performance, accountability, fairness) in the buffer zones - strong inter-sectorial policy coordination and action between agriculture, pastoralism and conservation - strengthen the management of human-elephant conflict caused by habitat fragmentation in order to save/ translocate small isolated groups of elephants

Note: Red arrows denote declines in status; green arrows denote species recoveries.

Chimpanzees cracking nuts in a clearing in the rainforest of Tai National Park, Ivory Coast. An extraordinary array tools are used by this community of chimpanzees including stone 'hammers' to crack open nuts that have particularly hard shells.

Workers carry charcoal through an area recently cleared for slash and burn agriculture in eastern Sierra Leone.

5.1.5 Specific strategies and actions for the major forest ecotypes

The forest ecotype of West Africa consists of scattered mountains, high plateau areas, gently undulating landscape but also lowland and coastal forests. These forests contain some of the highest levels of faunal species richness of any African forest, especially in terms of forest-restricted mammals, birds and butterflies; but many areas are essentially unstudied. The diversity of life inhabiting these forests is astonishing (Mt Nimba has more than 2 000 species of vascular plants recorded, more than 500 are new species and many of them are endemic; Taï Forest, the largest area of protected lowland forest in the region has 1 300 vascular plant species recorded). Discoveries of new species of plants and insects are frequent. The global demand for valuable hardwoods continues to spur logging in this region so most of the high forest areas that remain are late secondary stands and isolated from each other by slash-and-burn farming. Some of the mountain zones remain largely untouched (Loma Mountains), while others have been severely degraded and fragmented (Mt Nimba, Fouta Djalon, etc.). Only in a few areas are there sufficiently large and interconnected forests to allow migrations of animals to continue occurring. The forest blocks of Cross-Sanaga-Bioko coastal forest between Nigeria and Cameroon are still connected.

The forests in West Africa have been degraded by high human population density resulting from natural population growth, immigration from the northern countries and refugees from civil war in the coastal countries (Liberia, Sierra Leone and Côte d'Ivoire). High anthropogenic pressures for farmland, bushmeat hunting for local consumption, large rubber and oil palm plantations (including 'land grabs' that involve foreign companies), timber, fuelwood and mineral resources have all contributed to reducing the size and biotic potential of the West African forest habitats, especially the lowland forests. Outside the few rainforest national parks and some of the forest reserves, the rate of forest loss has accelerated recently. The loss of forests has been severe in Nigeria (3.7 %, in 2000-2010, the highest in the world[25], Guinea and Côte d'Ivoire. Subsistence agriculture in the wake of commercial logging together with hevea and palm oil plantations have reduced the area of primary forest to just fragments. Siltation from mining for diamonds and gold is threatening freshwater fish populations, while hunters have increased poaching to supply bushmeat to the mining settlements. Organised crime networks involved in cannabis cultivation (which means forest clearance) and cross-border wildlife trade also contribute to the disappearance of forests. Habitat loss for farming and plantations, coupled with an intensive bushmeat trade, are pushing some mammal species, particularly rain-forest primates, towards extinction.

The largest stands of forest in West Africa are found within protected areas and forest reserves. The management of protected areas and reserves is currently poor or non-existent, especially in Guinea, Sierra Leone and Liberia. The total area of protected forest in West Africa is just under 3 % for all national parks and other reserves. However there are still important forest blocks that could complement the overall biodiversity of this ecotype, but these have not been elevated to the status of conservation areas. A recent study on the pattern of mammal extinctions in the PAs of West and Central Africa shows that there is no significant correlation between the size of PA, the high demographic pressure, and the size and number of functional mammal extinctions[26]. However,

([25]) Food and Agriculture Organisation of the United Nations (2010). Global Forest Resources Assessment 2010, FAO, Rome, Italy.
([26]) Brugiere D., B. Chardonnet and P. Scholte (2014). Pattern and correlates of mammal extinction as a measurement of conservation effectiveness of protected areas in west and central Africa, Preliminary results V1.2.

Land cleared for a palm oil plantation in Pujehun district in southern Sierra Leone. 'Land grabs' for such projects lead to irreversible loss of biodiversity.

the extinction of mammals increases if following a south-north gradient: it is lower for the PAs of rainforests and higher for the PAs of the Sahelio-Saharan savannah and steppes. So despite the small size of the forest PAs and the high anthropogenic pressures, biodiversity values in West African rainforests could be maintained if habitats are preserved and poaching curbed.

The threats to biodiversity are habitat degradation by farming and woodcutting, and high levels of poaching. Endemic plants, insect, birds, amphibians and small and large mammals are all at risk of extinction. Furthermore, the low representation of PAs across the whole forest area means that there is a danger of losing hitherto unknown biodiversity. For example, there are no protected areas in the Niger Delta swamp forests. Deforestation and degrading agricultural systems also makes the area more vulnerable to climate change (which will lead to further pressure on PAs).

Selecting key sites in the West African forest zone on which to concentrate resources should be an important part of any conservation strategic approach. Choosing appropriate sites in West Africa is not difficult, because so few protected areas of reasonable size exist in the forest zone. **Among the most important sites are Gola Forest and (the newly created) Loma Mountains in Sierra Leone, Sapo in Liberia, Taï in Côte d'Ivoire, and Cross River in Nigeria, along with the Ankasa and Bia Conservation Areas in Ghana.** These protected areas contain some of the most important populations of forest elephant, pygmy hippopotamus and great apes in the region.

The intervention strategic approach requires:

(i) concentrating actions in principal KLCs and KCAs (see below) – they are all equally important in terms of species richness and diversity;

(ii) reducing threats on PAs by adopting a holistic approach to ensure inter-sectorial policy development, analysis of environmental impacts, the valuing of ecosystem services and the respect of conservation principles;

(iii) determining the most appropriate conservation actions for threatened species, by the establishment of PHVA analysis if necessary, the preservation of specific habitats inside or outside the PAs, and the combination of *in situ* and *ex situ* conservation if necessary.

For a summary of global data, see Table 22.

^

An adult male Drill in the Pandrillus Sanctuary, Nigeria. Classified as an Endangered species by the IUCN Red List of Threatened Species, the Drill has a very restricted range in south-western Cameroon and south-eastern Nigeria.

It is recommended that the highest priority be given to transborder KLCs and KCAs.

> Cross River-Korup-Mount Cameroon-Tamakanda-Gashaka-Tchabel-Faro (CKMCTGTF) Forests KLC (19 110 km² of PAs)

This complex encompasses the 3 643 km² Cross River NP in Nigeria; and the 1 295 km² Korup National Park, the 620 km² Tamakanda NP, the 581 km² Mont Cameroon, 6 670 km² Gashaka-Gumti NP, the 3 000 km² Tchabel Mbabo Wildlife Reserve and the 3 300 km² Faro NP in Cameroon. The landscape is located along the Cameroon-Nigeria border (Figure 18).

The forest blocks of Cross-Korup are still connected. The Cross River NP is divided into two sections that are separated by about 50 km of disturbed forest. The (1.a) Oban Division (IBA – NG007), the largest sector of the park, is contiguous with Korup National Park in Cameroon (IBA – CM019). The (1.b) Okwangwo Division (IBA – NG010), the smaller part of the park, is connected with the Tamakanda NP. The complex is a large area of lowland and sub-montane rainforest. In the less accessible areas, the forest has had little interference, but elsewhere the exploitation has resulted in secondary regrowth and the establishment of plantations of oil palm and rubber. The terrain is rough and generally flat with hills and escarpments but rises from the river valleys to over 1 000 m in mountainous areas.

The Mount Cameroon NP is one of Africa's largest volcanoes, rising to 4 040 metres. It has a wide range of habitats including lowland, evergreen rainforest, mangrove, coastal vegetation, swamp forest, sub-montane forest, montane forest and grassland. Mont Cameroon is home to 49 strictly endemic and 50 near-endemic plant species, 20 of the 28 restricted-range bird species of the EBA, including two strictly endemic species, three endemic species of butterfly and large mammals, including the forest elephant. The Gashaka-Gumti NP (IBA – NG001), the largest of Nigeria's national parks, is contiguous with Tchabel Mbabo in Cameroon (IBA – CM009), both far from the isolated Faro NP (IBA – CM008). The area is situated on mountains rising to 2 400 m but there are also extensive lowland areas. The area is a heterogeneous mix of habitats comprising montane forests and grasslands, derived savannah with relict lowland forest, riparian forest and Sudan-Guinea savannah woodlands. The Faro NP is a large block of Sudanian savannah on gently undulating terrain at 250-500 m (Table 16).

Table 16.
Key elements of the Cross River-Korup-Mount Cameroon-Tamakanda-Gashaka-Tchabel-Faro (CKTGTF) Forest KLC

Approach	Priority elements
KLC	**Forests with some of the highest rates of animal species richness of any African forest, especially in terms of forest-restricted mammals, birds and butterflies**
Conservation objectives	1. Preserve one of the forest biodiversity hotspots of global significance 2. Protect forest fauna and habitats with priority given to a landscape approach with corridor protection 3. Establish an ecosystem-landscape governance and save corridors between the major ecological blocks 4. Adopt the most appropriate conservation actions for threatened species (primates)
Key species	– threatened primates: Cross River gorilla, the Nigeria-Cameroon chimpanzee, the drill – elephant, pygmy hippo Jentink's duiker, water chevrotain, leopard – forest-dependent birds; more than 25 are threatened or restricted-range species
Key habitats	– lowland, sub-montane and montane rainforest – savannah with relict lowland forest, riparian forest and Sudan-Guinea savannah woodland – Sudanian savannah (Faro NP)

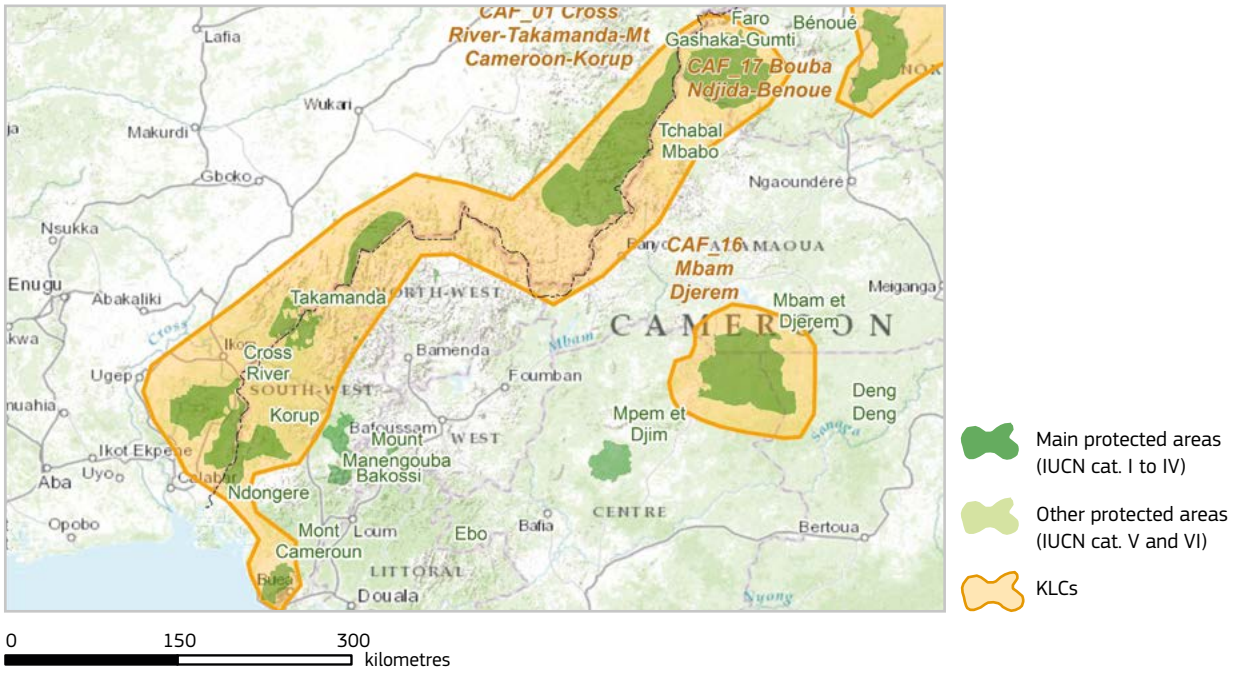
Box 5. Importance of Cameroon-Nigeria border and transborder conservation measures

The Cameroon-Nigeria border region, where the Cross River gorilla occurs, is a biodiversity hotspot of global significance that supports a high diversity of animal and plant species that can occur in large numbers in restricted ranges. Many of them are threatened. These forests contain some of the highest rates of animal species richness of any African forest, especially in terms of forest-restricted mammals, birds and butterflies. Many of these animals are endemic. The ecotype is heavily impacted by human use, including logging and plantation agriculture. Threatened primates share parts of the same habitat, including the Cross River gorilla, the Nigeria-Cameroon chimpanzee and the drill (*Mandrillus leucophaeus*).

Given the small and highly fragmented populations of the Cross River gorilla, it is important to protect the corridors connecting the sub-populations and to increase the effectiveness of existing and proposed protected areas within their range. Taken together, these findings serve to emphasise the need to expand our knowledge of the gorilla's range.

Transborder conservation measures have already been developed or proposed for a number of other protected areas that lie on either side of the Nigeria-Cameroon border. These are the Oban Division of Cross River NP in Nigeria and the connected Korup NP and Tamakanda NP; and the block Gashaka Gumti NP in Nigeria, Faro NP and a proposed protected area at Tchabal Mbabo in Cameroon.

Figure 18. The Cross River-Korup-Mount Cameroon-Tamakanda-Gashaka-Tchabel-Faro Forests



> Taï-Grebo-Sapo (TGS) Forest KLC (7 700 km² of PAs)

The complex encompasses the 3 300 km² of the Taï NP (IBA – CI011) and its buffer area (960 km²), and Nzo Faunal Reserve (930 km²) in Côte d'Ivoire; and the 971 km² Grebo National Forest (IBA – LR009) and the 1 550 km² Sapo NP (IBA – LR008) in Liberia.

Taï NP is the largest and best-preserved remnant of Upper Guinean rainforest in West Africa. This humid tropical forest has a high level of endemism. The park contains some 1 300 species of taller plants; much of the forest in the park is unlogged, mature, old growth with emergents rising to 60 m. The fauna is fairly typical of West African forests and the park contains 47 of the 54 species of large mammals known to occur in Guinean rainforest, including five threatened species. Mammals include the mona monkey, white-nosed monkey and Diana monkey, black and white colobus, red colobus and green colobus, sooty mangabey, chimpanzee, giant pangolin, tree pangolin and long-tailed pangolin, golden cat, leopard, elephant, bushpig, giant forest hog, pygmy hippopotamus, water chevrotain, bongo, buffalo and an exceptional variety of forest duikers. Over 230 bird species have been recorded, 143 of which are typical of primary forest.

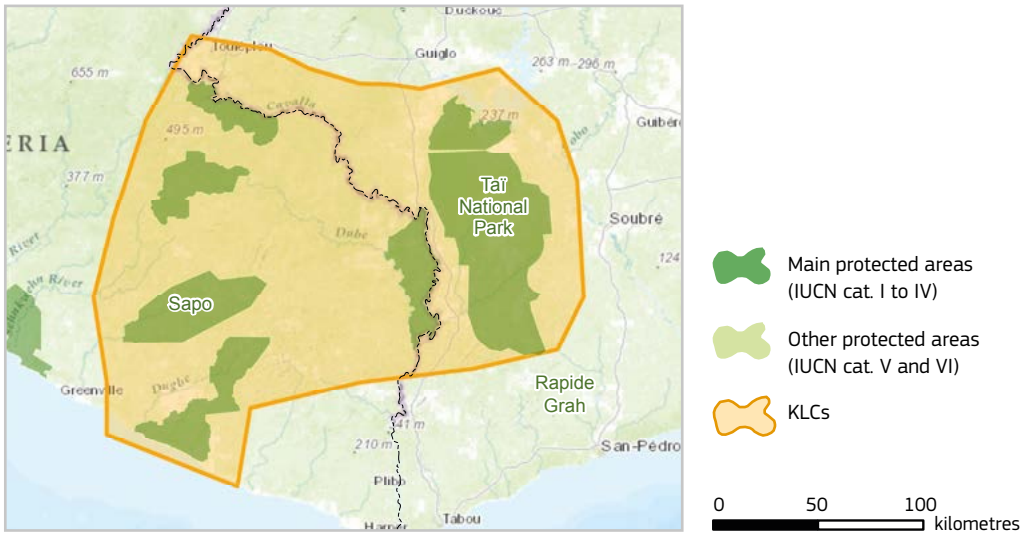
The Grebo National Forest is an area of evergreen lowland rainforest enclosed on three sides by a large, easterly projecting meander of the Cavalla River, on the international frontier with Côte d'Ivoire in the extreme east of the country.

The Sapo NP contains the second-largest area of primary tropical rainforest in West Africa after Taï National Park in neighbouring Côte d'Ivoire. The park is a biodiversity hotspot that has 'the highest mammal species diversity of any region in the world and one of the richest variety of floral species in the country, with many endemic species. The Sapo NP is hosting around 125 mammal species and 590 types of bird, including a number of threatened species. The park is home to the pygmy hippopotamus. Note that the IUCN Species Survival Commission reports: 'Sapo NP is the only realistic choice of a suitable conservation area for the Pygmy Hippopotamus' [27]. Other important species are forest elephant, seven species of monkey (including chimpanzee and the endangered Diana monkey), crocodile, leopard, three species of pangolin and seven species of duiker antelope (including the vulnerable Jentink's duiker and zebra duiker). Sapo National Park remains relatively inaccessible, and this significant and environmentally rich area remains somewhat undeveloped for management, research and tourism (Table 17).

Table 17.
Key elements of the Taï-Grebo-Sapo (TGS) Forest KLC

Approach	Priority elements
KLC	**The largest and best-preserved remnant of Upper Guinean rainforest between Côte d'Ivoire and Liberia**
Conservation objectives	1. Preserve the last remnant of Upper Guinean rainforest with priority for landscape conservation with protected corridors 2. Establish an ecosystem-landscape governance system 3. Adopt the most appropriate conservation actions for threatened species (mammals and birds)
Key species	– endemic species: pygmy hippo, chimpanzee, Jentink's and zebra duikers – 12 endemic birds and bird species of primary forest
Key habitats	– tropical and subtropical moist broadleaf forest

Figure 19. The Taï-Grebo-Sapo Forest KLC



(27) Oliver W.L.R. (Ed.) (1993). Pigs, peccaries and hippos: status survey and conservation action plan, IUCN, Gland, Switzerland.

> Mount Nimba (MN) Forest KLC (415 km² of PAs)

The complex covers the 175 km² of the Nimba Mountains Strict Nature Reserve (1944), made up of 85 km² in Guinea, 65 km² in Côte d'Ivoire and 240 km² of the East and West Nimba Nature Reserve in Liberia. This area was designated as a Biosphere Reserve in 1980 and a World Heritage Site in 1981.

Rising above the surrounding savannahs and covered in dense forests, Mount Nimba (and its surrounding mountains) is an area with some of the highest biodiversity in West Africa due to its unique geographical and climatic location. The complex is home to a large number of plant species, more than 317 vertebrate species (107 of which are mammals, including a significant population of West African chimpanzees) and more than 2 500 invertebrate species, many of which are only found in this region. More than 2 000 species of vascular plants, including several endemic or quasi-endemic plants, have been recorded. This site has been identified as an Alliance for Zero Extinction (AZE) species/site profile due to it containing a critically endangered or endangered species with a limited range.

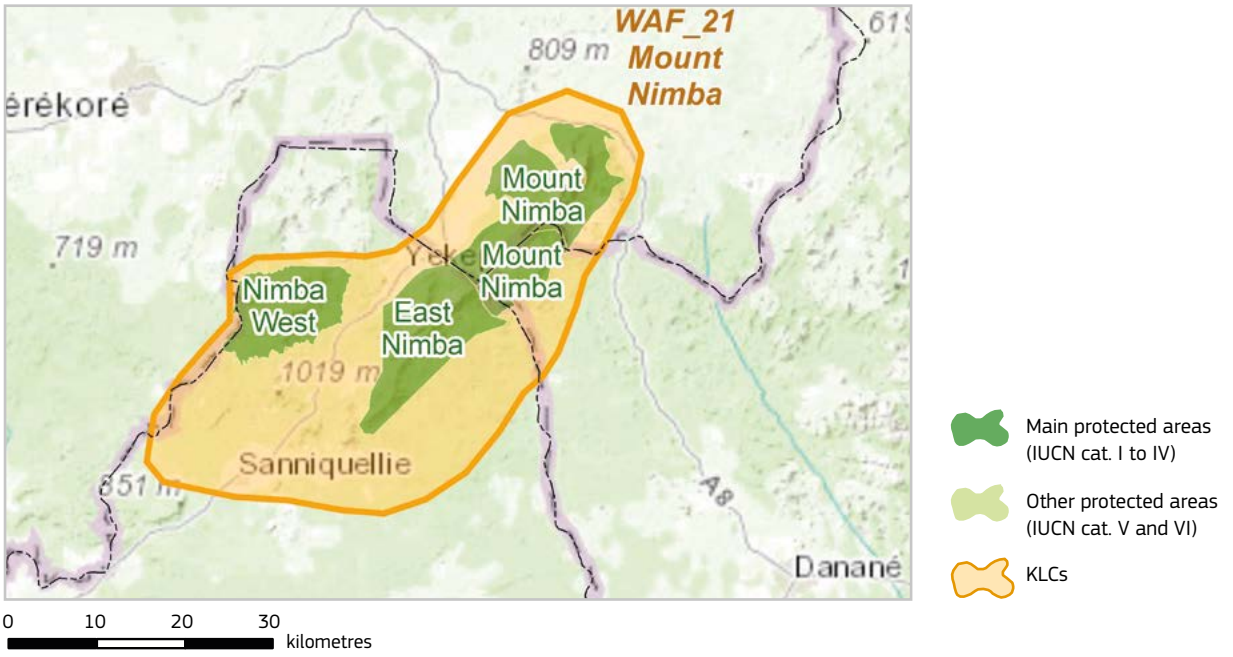
Mount Nimba has received legal protection from both Guinea and the Côte d'Ivoire, but the habitat is still threatened by activities occurring adjacent to the site boundaries and spreading into the protected area. While a large portion of the forests are still present inside the Biosphere's reserve core, much of the fauna have suffered because of human practices, such as poaching, agriculture, bush fires, and mining.

The project 'Steward' of the United States Agency for International Development's (USAID) regional programme for conserving the biodiversity of the Upper Guinean Forest of West Africa is the promoter of the Nimba transborder initiative and it is still working in the area. 'Steward' was conceptualised in 2005-2006 and is currently (2011-2015) in its implementation phase (see Table 18).

Table 18.
Key elements of the Mount Nimba (MN) Forest KLC

Approach	Priority elements
KLC	**– Conservation of unique forest and mountain landscape and important birdlife areas between Guinea, Côte d'Ivoire and Liberia** **– Protection of the World Heritage Site**
Conservation objectives	1. Preserve the unique ecological blocks of the Mount Nimba World Heritage Site 2. Establish ecosystem governance 3. Adopt the most appropriate conservation actions for threatened species
Key species	– unique and endemic species – West African chimpanzees – endemic or quasi-endemic plants – forest-dependent birds; three species of global conservation concern
Key habitats	– dense montane forest

Figure 20. The Mount Nimba KLC



^

The endangered Pygmy hippopotamus is endemic the Upper Guinea Forests of Ivory Coast, Guinea, Liberia and Sierra Leone. Recent estimates published in the IUCN Red List of Threatened Species put the remaining number of mature individuals in the wild at less than 2 500.

> Gola-Lofa-Foya (Sierra Leone-Liberia Transborder Peace Park) and Mano-Wologizi-Wonegizi-Ziama (GLF-MWWZ) Forests KLC (2 550 + 914 km² of PAs)

This large complex hosting only partially contiguous conservation areas is located between Sierra Leone, Liberia and Guinea. The complex encompasses a first block of the 750 km² Gola Forest Reserve in Sierra Leone, and the 800 km² Lofa and 1 000 km² Foya Forest Reserves in Liberia; and a second block of the c. 550 km² Mano, the 995 km² Wologizi and the 380 km² Wonegizi in Liberia, and the 914 km² Ziama in Guinea.

The complex encompasses the Gola-Lofa-Foya Transborder Peace Park between Sierra Leone and Liberia, and the forest and mountain complex of Mano-Wologizi-Wonegizi-Ziama between Liberia and Guinea. The Transborder Peace Park unites the Gola Forest Reserve in Sierra Leone and the Lofa and Foya Forest Reserves in Liberia.

The proposed Sierra Leone-Liberia Transborder Peace Park (Figure 21) covers a large area of rainforest, which is evergreen in the south, becoming progressively more semi-deciduous to the north. The rivers in the parks are characterised by spectacular rapids and waterfalls and are usually unfordable. The human population within the parks is very low and the vegetation remains largely unmodified. Both areas in Sierra Leone and Liberia are IBAs.

The Wologizi Mountains are an isolated area of upland located in northwest Liberia that includes Liberia's highest mountain (Mount Wuteve at 1 447 m) and other peaks. Lower parts are covered with relatively open forest. Large areas of savannah woodland surround the foothills and lower valleys.

The Wonegizi Mountains (IBA – LR002) is contiguous with the Massif du Ziama Biosphere Reserve (IBA – GN016) in Guinea. The vegetation consists mainly of semi-deciduous forest, similar in composition to that found on the Wologizi Mountains (IBA – LR001). The site spans a still largely intact transition from lowland rainforest to semi-montane Parinari-dominated forest at altitude.

The *Massif du Ziama* Biosphere Reserve forms part of the Guinea Highlands; part of its western boundary is contiguous with the Wonegizi Mountains in Liberia. Much of the terrain is extremely rugged. The whole area was forested originally, but primary forest only now remains in the remote upland parts of the southwest, next to the Liberian border. There are also areas of swamp and of wooded savannah on lateritic outcrops of the high plateaux. The core zone of the reserve covers 600 km² (Table 19).

Table 19.
Key elements of the Gola-Lofa-Foya (Sierra Leone-Liberia Transborder Peace Park) and Mano-Wologizi-Wonegizi-Ziama (GLF-MWWZ) Forests KLC

Approach	Priority elements
KLC	**The forest and mountain landscapes and important birdlife areas between Sierra Leone, Liberia and Guinea**
Conservation objectives	1. Preserve the most important ecological blocks of PAs in the forests of West Africa 2. Protect forest fauna and habitats 3. Establish ecosystem-landscape governance and save corridors between the major ecological blocks 4. Adopt the most appropriate conservation actions for threatened species
Key species	– forest elephant, pygmy hippo Jentink's duiker, water chevrotain, leopard and 13 species of primate, with one of the highest densities of chimpanzees in West and Central Africa (Loma Mountains) – more than 300 forest-dependent birds; more than 25 are threatened or restricted-range species – more than 43 species of amphibians
Key habitats	– rainforest, evergreen and semi-deciduous – lowland forest – mixed moist evergreen and semi-evergreen – mountain forest with spectacular rapids and waterfalls – high plateaux – river valleys

Box 6. The Gola-Lofa-Foya and Mano-Wologizi-Wonegizi-Ziama forests – An example of long-term international and local partnerships for landscape and transfrontier conservation

Covering an area of 71 070 ha, the Gola Rainforest National Park (GRNP) in Sierra Leone is characterised by extensive rolling hills cloaked in evergreen and semi-deciduous forest divided into three blocks: Gola North, Central and South. The park comprises the largest remaining area of intact, lowland rainforest in Sierra Leone and is a significant remnant of the once vast Upper Guinea Forest belt of West Africa, a global biodiversity 'hotspot' and a priority for international conservation efforts. The Government of Sierra Leone, the Conservation Society of Sierra Leone (BirdLife in Sierra Leone) and the Royal Society for the Protection of Birds (BirdLife in the UK) have partnered for the past 25 years to conserve and sustainably manage GRNP.

Botanical assessments have identified close to 1 000 plant species, half of which are endemic to the Upper Guinea Forest ecosystem. The forests of the GRNP have largely remained intact in spite of sporadic logging and a decade of civil war during the 1990s. Regenerating secondary forest (in old logging areas) is largely confined to the edges of the park with the core interior zone supporting high primary forest and abundant wildlife. Current satellite imagery shows the park as an 'island of green' in a largely agricultural landscape, confirming that the park's forests are continuing to be effectively protected.

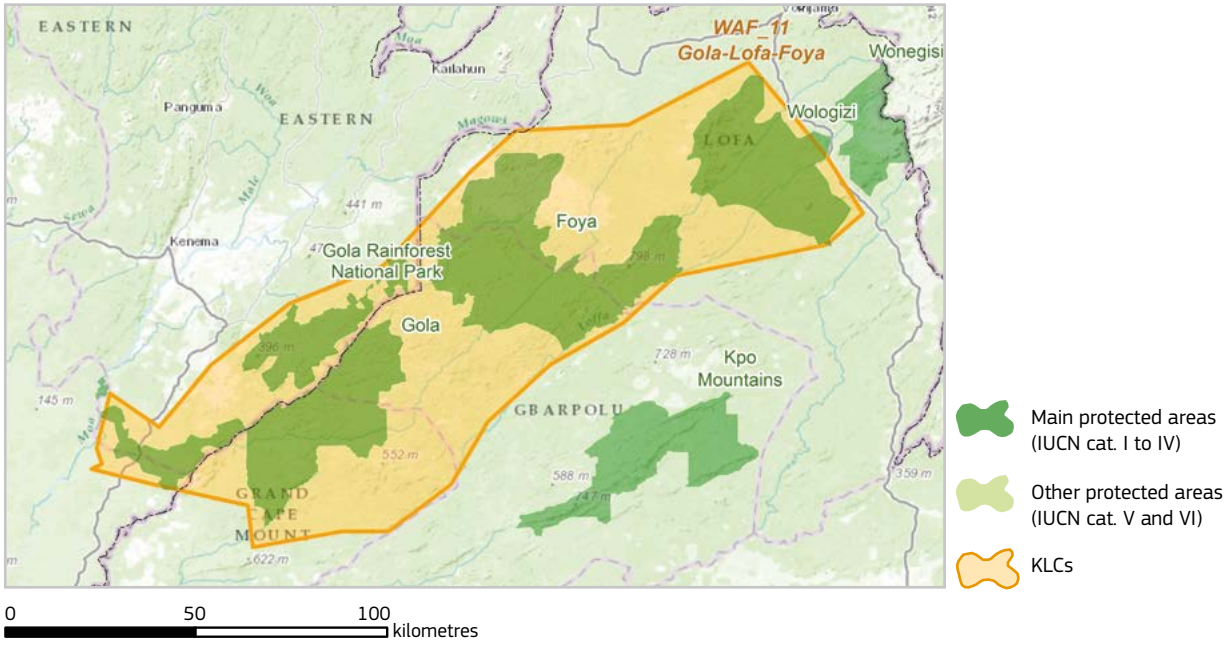
GRNP is home to 60 globally threatened species, including chimpanzee, forest elephant, pygmy hippo and the endemic Gola malimbe. So far, 327 bird species, 49 large mammals, 43 amphibians and over 600 species of butterflies have been recorded there.

The partners are finalising the first Reducing Emissions from Deforestation and Degradation (REDD) project, which has already been validated to the two leading international standards on the voluntary market, being awarded double gold in Biodiversity and Climate Change Adaptation. The Gola REDD project is covering the national park (71 070 ha) as well as a leakage belt (~70 000 ha), providing direct benefits to over 120 forest-edge communities.

Finally, GRNP is part of what is commonly referred to as the Greater Gola Landscape/Transboundary Peace Park that covers over 300 000 ha across Liberia and Sierra Leone, which BirdLife and its partners are committed to conserve and sustainably manage. The vision is for this to be a matrix of protected areas and community forest areas, representing the largest remnant of the Upper Guinea forest.

Source: BirdLife International

Figure 21. The Gola-Lofa-Foya KLC



A White-necked Picathartes in the Kambui Hills, Sierra Leone. This forest species now has a highly fragmented distribution because of forest loss throughout its range. The majority of breeding colonies are extremely small and isolated.

> Outamba-Kilimi-Kuru-Pinselli-Soya (OKKPS) Forest KLC (1 110 km² of PAs)

This complex is in the transborder area between Sierra Leone and Guinea. The complex encompasses the 1 110 km² Outamba-Kilimi NP and forest reserves in Sierra Leone (Kuru Hill) and Pinselli and Soya in Guinea. The park is split into two areas, Outamba and Kilimi, between which lies an unprotected strip of land. Guinea's protected forests are in the Madina Oula, Soya and Oure Kaba sub-prefectures. The complex has varying landscapes of savannah and forest. With a diverse landscape, the areas are home to large numbers of fauna and flora. Some 256 bird species have been recorded in the park, including three species of global conservation concern. The site is an important refuge for at least nine species of primate and also several large mammals, such as the leopard, pygmy hippopotamus and forest elephant.

The project 'Steward' of the USAID's regional programme for conserving the biodiversity of the Upper Guinean Forest of West Africa is the promoter of the transborder initiative and it is still working in the area. Steward was conceptualised in 2005-2006 and it is currently (2011-2015) in its implementation phase (Table 20).

Table 20.
Key elements of the Outamba-Kilimi-Kuru-Pinselli-Soya (OKKPS) Forest KLC

Approach	Priority elements
KLC	**The forest and mountain landscapes and important birdlife areas between Sierra Leone and Guinea**
Conservation objectives	1. Protect mountain landscapes and important birdlife areas 2. Establish ecosystem-landscape governance and save corridors between the major ecological blocks 3. Adopt the most appropriate conservation actions for threatened species (primates) 4. Preserve specific habitats for birds
Key species	– West African chimpanzee, forest elephant, pygmy hippo Jentink's duiker, water chevrotain, leopard – forest-dependent birds (three species of global conservation concern)
Key habitats	– landscape of savannah and forest

The Roloway monkey, a critically endangered subspecies of the Diana monkey, which is now very rarely observed in the wild. It is now confined to a few small patches of peat swamp forest in the extreme corners of southwestern Ghana and southeastern Ivory Coast.

> National level: West African forest KCAs requiring high priority direct support (680 km² of PAs)

Ankasa NP in Ghana

The park is a virgin evergreen rainforest with exceptional botanical species and extends to 490 km² in area. The forest has the greatest biological diversity of any PA in Ghana, with over 300 different plant species having been recorded in a single hectare of forest. Animal life includes the elephant, bongo, ten types of primate including chimpanzee (although these have not been seen for some time) and Diana monkey, leopard, more than 260 species of birds (IBA – GH001) and hundreds of varieties of butterfly. The park incorporates the former Nini-Suhien National Park and has benefited from recent EU conservation funding.

Bia NP in Ghana

The 190 km² park and the 563 km² of the connected resource reserve are characterised by a transitional forest between moist evergreen and moist semi-deciduous trees. The core area is untouched rainforest with the distinction of having some of the tallest trees in West Africa, but the site is isolated, being surrounded by mixed farms and secondary forest. Bia NP has forest elephant, chimpanzee, Colobus monkey, Diana monkey, leopard, buffalo, giant hog and a variety of antelopes. The park is the only known natural home of the newly discovered lizard, *Agama Sylvanus*, and the variety of animal life is outstanding. Bird species number about 200 including a few endangered birds (IBA – GH003) (Table 21). This park has also benefited from recent EU conservation funding.

Table 21.
Key elements of forest KCAs

Approach	Priority elements
KCA	**Untouched rainforests with exceptional biodiversity**
Conservation objectives	1. Protect untouched rainforests and habitats 2. Establish ecosystem-landscape governance 3. Adopt the most appropriate conservation actions for threatened species 4. Further develop eco-tourism potential 5. Further develop community conservation and livelihood initiatives
Key species	– forest elephant, chimpanzee, Colobus monkey, Diana monkey, leopard – endemic and endangered birds – endemic lizard, *Agama Sylvanus*
Key habitats	– evergreen rainforest – transitional forest between moist evergreen and moist semi-deciduous

New or larger national protected areas should be created in Liberia, Ghana and Nigeria

An evaluation needs to be carried out of about 3 000-5 000 km² of forests for new or larger PAs (an addition of 7-11 %, as considered by the strategic approach for the specific forest ecotype).

Protecting biodiversity	Countries	Biome/ecotype/ key species	Main KLCs-KCAs and priorities	Analysis	Objectives and proposed actions
- Highest rates of plant and animal species richness of any African forest - Large mammals, especially primates, in the forest zone are threatened by both hunting and habitat destruction - Relatively poor knowledge of the biology and threats to West African forest wildlife (e.g. a necessity to understand the possible distinctiveness of the rare and threatened West African elephant as a third species) - Highly fragmented populations of elephants with only small groups in the forest ecotypes - Outside PAs and forest reserves, the loss of forest is severe - Special habitats are extremely degraded - Very high numbers of endemics in plants, mammals, birds, amphibians, insects but also high extinction risk of endemic species of plants, insects, birds, amphibians, and small and large mammals - Deforestation for cannabis cultivation with poaching and illegal transborder wildlife trade - Important forest blocks that could be elevated to the status of conservation areas - Low correlation between the size of PAs, the high demographic pressure and the extinction of mammals - Protection of threatened trees: Afromosia or African teak, Meliacaea family (Khaya species), the Vène (*Pterocarpus erinaceus*), and African blackwood (*Dalbergia melanoxylon*), etc.	- Benin - Gambia - Ghana - Guinea - Guinea-Bissau - Côte d'Ivoire - Liberia - Mauritania - Nigeria - Senegal - Sierra Leone - Togo	**Biome:** - tropical and subtropical moist broadleaf forest **Ecotype:** - Guinean montane forest - Western Guinean lowland forest - Eastern Guinean forest - Nigerian lowland forest - Cameroonian Highlands forest - Cross-Sanaga-Bioko coastal forest - Niger Delta swamp forest - Cross-Niger transition forest **Key species and status:** Niger Delta red colobus ▼▼▼ Preuss's red colobus ▼▼▼ Cross River gorilla ▼▼▼ Roloway monkey ▼▼▼ Drill ▼▼▼ Nigeria-Cameroon chimpanzee ▼▼▼ Pygmy hippopotamus ▼▼▼ Jentink's duiker ▼▼▼ Forest elephant ▼▼▼ Procolobus badius ▼▼▼ Leopard ▼	**Key Landscapes for Conservation** **1. Cross River-Korup-Tamakanda-Gashaka-Tchabel-Faro (CKTGTF) forest landscape for conservation** (19100 km² of PAs) **2. Taï-Grebo-Sapo (TGS) forest landscape for conservation** (7700 km² of PAs) **3. Mount Nimba (MN) forest landscape for conservation** (415km² of PAs) **4. Gola-Lofa-Foya and Mano-Wologizi-Wonegizi-Ziama (GLF-MWWZ) forest landscape for conservation** (3500 + 1900 km² of PAs) **5. Outamba/Kilimi-Kuru-Pinselli-Soya (OKKPS) forest landscape for conservation** (1110 km² of PAs) **Key Conservation Areas** **6. National level: West African forest Key Conservation Areas requiring high priority direct support** (680 km² of PAs) **7. New or larger KLCs and KCAs should be created** (Liberia, Ghana, Nigeria) (3000 - 5000 km² of PAs)	**Negative aspects** - highly degraded and fragmented habitats - over-hunting - PAs as a refuge for illegal activities (organised crime for drugs cultivation, illegal trade, etc.) - PAs: low number, small size and under-representation of forest ecotypes - valuable hardwoods continue to spur logging in the high canopy forests - migrations of animals severely reduced - acceleration of forest loss (civil wars) - effects of mining on sustainable natural resource management - PAs under-resourced and poorly managed - some countries have non-existent PA management, others with very poor management (paper parks) - high density of poor and disadvantaged populations - danger from loss of unknown biodiversity - climate change and degradation of agricultural systems and more threats on PAs - relatively superficial knowledge about the biology and threats to West African rainforest wildlife (e.g. elephant) **Positive aspects** - existing forest blocks to complement the overall biodiversity could still be integrated into the PA system - astonishing diversity of life inhabiting the rainforests of West Africa - rainforest PAs of small size can ensure the conservation of biodiversity - first transborder parks (peace parks and systemic management) - cultural heritage in sustainable management of natural resources - potential discoveries of new species	**Objectives** **1.** Preserve the forest biodiversity hotspots of global significance **2.** Establish ecosystem-landscape governance and save corridors between the major ecological blocks **3.** Adopt the most appropriate conservation actions for threatened species **Actions** - provide greater control over hunting using anti-poaching activities and law enforcement - adopt a holistic approach that ensures the mainstreaming of PAs in the development context and respects the principles of conservation at local, national and international level - promote strong inter-sectorial policy development and action between agriculture, mining, infrastructures, etc. and conservation - strengthen the management of the environmental impact of mining, agro-industry, hydroelectric and other infrastructure projects - raise the populations' awareness of sustainable natural resource conservation techniques, and restore and legalise their traditional rules on resource use where appropriate - focus on *in situ* conservation but do not exclude the contribution of the ex situ conservation, if necessary to preserve the genetic heritage (responsibility of WAZA) - ensure continuous support by the IUCN/SSC Specialist Group, and implementation of the PHVA strategic approach for threatened species - establish a regional strategic approach that focuses on conservation principles, integrates conservation in development processes (i.e. the valuation of sustainable ecosystem services) and promotes ICDP and good governance in the buffer zones

Protecting biodiversity	Countries	Biome/ecotype/ key species	Main KLCs-KCAs and priorities	Analysis	Objectives and proposed actions
- The first-ever forest elephant translocation in West Africa of six elephants from small patches of forest outside the town of Daloa to Azagny National Park, although with some mortalities					- support and sustain the political will to tackle conservation problems, to fulfil the gaps in scientific knowledge and to establish objectives, indicators and benchmarks for conservation - support civil society on issues of wildlife management and protection, and support the growth of a network of local NGOs in West Africa - operate at the national level and not just locally in raising awareness for nature conservation

Note: Red arrows denote declines in status.

The thorny trunk of a Kapok tree, one of the tallest trees of the African rainforest.

5.1.6 Specific strategies and actions for the major mangrove/ coastal ecotypes

In West Africa, mangroves are found discontinuously from Senegal to the Niger Delta. Some 14% of identified mangrove areas in West Africa fall within nationally and internationally designated protected areas. However, there are strong concerns about the management coordination and effectiveness of the coastal and marine protected areas that encompass the mangroves, predominantly due to financial and administrative constraints in the region.

West African mangroves are in moderate decline, with an estimated average decline of 25% between 1980 and 2006. The Atlantic coast of Africa has some of the highest human population densities on the continent. The majority of industry in West Africa is located in the coastal zone (Nigeria and Côte d'Ivoire). In West and Central Africa, some 20-30% of mangroves have been lost in the past 25 years (Côte d'Ivoire shows a particularly severe decline in mangrove habitat). This, together with rapid growth, high poverty, low development indices, poor governance in rural regions and open access of coastal resources, has depleted the mangrove forests. Threats include urbanisation, industrialisation (such as the oil refineries in the Niger Delta), agriculture, timber and petroleum exploitation, fishing with dynamite and poison, canalisation, discharge of sewage, and other pollutants and siltation.

The West African mangroves are allocated different ecotypes. The Guinean mangroves, influenced by a large tidal range and high inputs of freshwater, contain the best-developed mangroves in West Africa. This ecotype provides important habitat for migratory birds and endangered species such as the West African manatee. However, the mangrove habitat has been affected by poor rainfall over the entire region during the past three decades. The most extensive blocks of Central African mangroves are found in the Niger Delta, which supports the single most extensive mangrove system in Africa, and the third most extensive worldwide after India and Indonesia. Despite its size, it is extremely threatened because none of it falls within a PA. These mangroves occur in suitable low-energy marine environments and they trap large amounts of sediment. The mangroves of this region have no endemic species but support some endangered species, such as manatees and, it seems, also the pygmy hippopotamus in the Niger Delta. Mangroves here, as elsewhere, are important as nursery and feeding areas for marine fish.

The conservation of mangroves depends upon coastal and marine protected areas and both of these are highly dependent on their environment, in particular on the context and dynamics of development, including development taking place far from the mangrove sites. The extension of coastal and marine protected areas to new sites and the prioritising of mangrove areas for conservation intervention requires accurate forecasting about human developments as the latter are moving much faster than conservation efforts. Careful examination of different development scenarios is essential in order to guarantee the viability of conservation investments in coastal and marine protected areas.

Recent data identified by the Master Plan for Coastal West Africa[28], produced by IUCN between 2009 and 2011, confirm the importance of the dynamics of human developments that occupy the coastal strip at the expense of mangroves. This is often overlooked by conservation organisations.

A further problem is that some coastal and marine protected areas do benefit from long-term funding whereas others are almost forgotten.

Table 23.
Mangrove areas falling within protected areas

Country	Mangrove area falling within protected areas (%)
Benin	0
Burkina Faso	0
Gambia	3.5
Ghana	1.5
Guinea	0.2
Guinea-Bissau	35.5
Côte d'Ivoire	26.9
Liberia	26.1
Mali	0
Mauritania	62.5
Niger	0
Nigeria	3.4
Senegal	42.5
Sierra Leone	14.5
Togo	0

Source: Emily Corcoran, Corinna Ravilious, Mike Skuja, UNEP-Regional – Seas Programme/UNEP-WCMC, 2007: Mangroves of Western and Central Africa

([28]) Schéma directeur du littoral de l'Afrique de l'Ouest or SDLAO.

The African Darter, an aquatic species ranging widely across sub-Saharan Africa.

A young mangrove tree on Orango Island, Guinea-Bissau.

The need to improve the consistency and effectiveness of the ecotype networks of coastal and marine areas led the authors to consider the following conservation measures as a priority:

- implementation of conservation actions in some key areas which have not benefited from conservation (e.g. Sherbro, Sierra Leone);
- conservation of the river-sea connections (a complex of small estuaries) in the Gulf of Guinea;
- strengthening inter-sectorial management of some border areas of high biological value and heritage;
- address strategies and practices of the fishing and processing industries and enterprises that have significant impacts on mangroves;
- integrate conservation with extractive activities, especially those related to oil and oil storage devices by strengthening marine spatial planning;
- search for synergies between mangrove conservation activities and the need for reducing coastal risks of flooding, especially in areas where the coastline is particularly dynamic.

At present, the Abidjan Convention is implementing a strategic plan for marine protected areas on the Atlantic coast of Africa from Mauritania to South Africa. The implementation phase is working in detail on three connected geographical areas: from Mauritania to Sierra Leone, from Liberia to Nigeria, and from Cameroon to Democratic Republic of Congo.

Threats to conserving the biodiversity of mangrove forests are as follows: clearing, overharvesting mangrove trees, mining, river changes, poaching, pollution and exotic/invasive plants. Climate change is another major threat because mangrove forests require stable sea levels for long-term survival. The interventions of this strategic approach require:

(i) adopting legislation and international conventions relating to mangroves, and developing adequate policies and inter-sectorial approaches to implement actions;
(ii) concentrated actions in the priority PAs (see below) and the community mangrove forests;
(iii) collaborating with national and international NGOs, and empowering local communities to maintain and monitor the community mangrove areas;
(iv) developing an integrated PA and reserve network of coastal and marine areas encompassing mangroves and other coastal habitats;
(v) establishing a fund to maintain a sustainable economy and the management of mangroves and coastal habitats;
(vi) determining the most appropriate conservation actions and studies to ensure management effectiveness of PAs and mangrove forests, and related threatened species.

Summarised, global data is provided in Table 26.

Guinea-Bissau

> Rio Cacheu-Cufada-Cantanhez-Rio Buba-Iles Tristao (CCCBT) mangrove KLC (4780 km² of PAs)

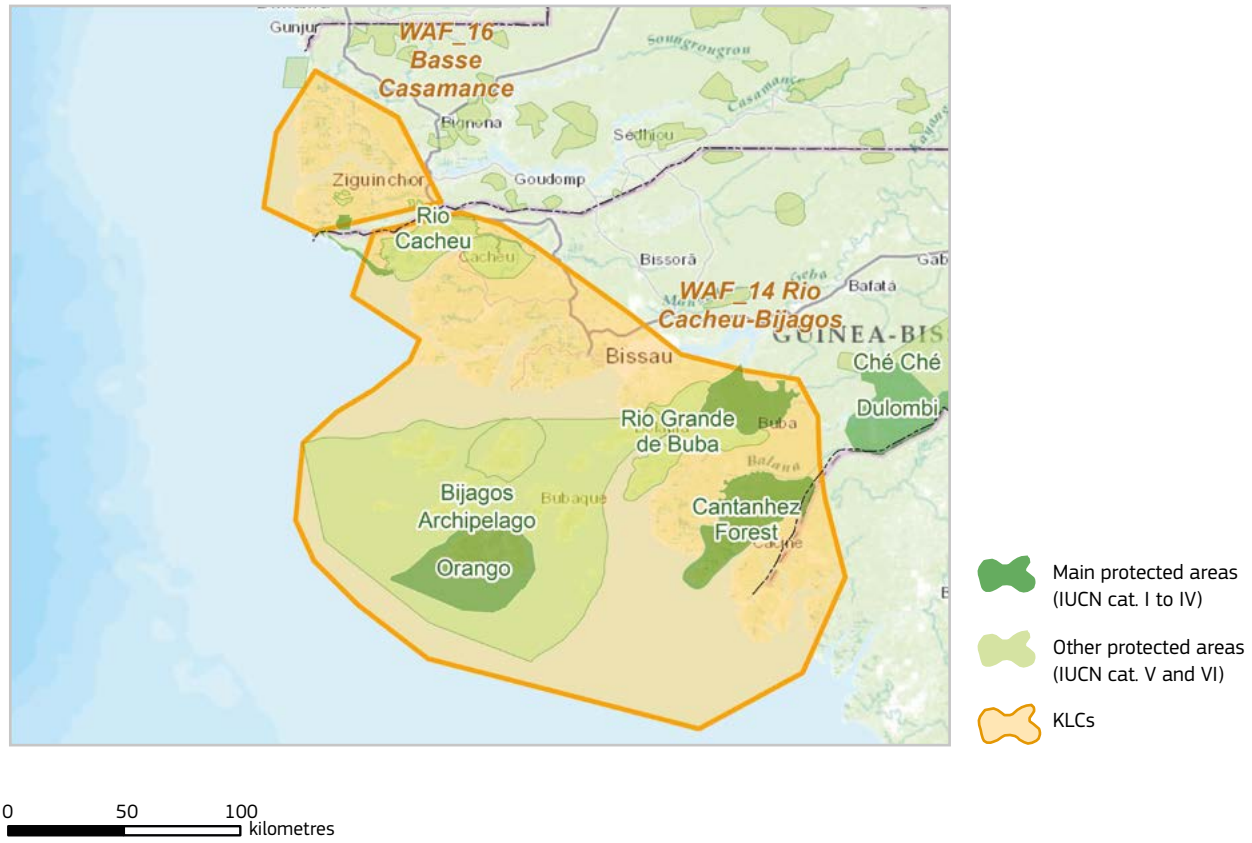
The complex encompasses in Guinea-Bissau: the 886 km² Rio Cacheu Mangroves (IBA – GW001), the 723 km² Lagoas de Cufada (IBA – GW004), the 1 148 km² Rio Grande de Buba (IBA – GW005), the 1 209 km² Cantanhez Forest (IBA – GW008), and the Bijagos islands; and in Guinea: the 814 km² Iles Tristao (IBA – GN004). The complex of mangrove forests is contiguous to the 10 279 km² Bijagos Archipelago Biosphere Reserve with three marine protected areas (MPAs): (i) Ilhas Formosa, Nago and Tchediã (Urok); (ii) Orango, and (iii) João Vieira and Poilão Marine National Park.

This complex includes the ocean coasts and the land on both banks of the rivers and lakes. Much of the area is covered in mangrove as well as fresh and brackish water marshes. The complex encompasses primary forest and sacred forest, palm forest, semi-dry woodland, savannah areas and agricultural land. The area includes mudflats and sandbanks, rivers, freshwater lagoons and lakes (Table 24).

Table 24.
Key elements of the Rio Cacheu-Cufada-Cantanhez-Rio Buba-Iles Tristao (CCCBT) mangrove KLC

Approach	Priority elements
KLC	**The best developed mangroves in West Africa with migratory and waterbirds, endangered species (manatee) and a success story of forest governance**
Conservation objectives	1. Preserve the best developed mangroves in West Africa 2. Establish an ecosystem-landscape governance system and save corridors between the major ecological blocks 3. Adopt the most appropriate conservation actions for threatened species (manatee and birds)
Key species	– West African manatee – migratory birds
Key habitats	– mangroves as nursery and feeding areas for marine fish – ocean coasts and land on both banks of the rivers and lakes, mudflats, sandbanks – forest, palm forest, semi-dry woodland, savannah – rivers, freshwater lagoons and lakes

Figure 22. The Rio Cacheu-Bijagos KLC



National level: West African mangrove KCAs requiring high priority direct support (3 062 km² of PAs)

Sierra Leone

Sherbro and Turtles Islands

The ca. 450 km² of the area encompasses more than two-thirds of the country's mangroves. The site should be classified as a MPA, one of the largest in the region. The Sherbro Island and the Turtle Bank Is a mosaic of rivers and marine areas unique to the region and a breeding ground for green sea turtle as well as leatherback sea turtle.

Senegal

Saloum Delta National Park

This 1 800 km² site is an IBA (SN013), but only 760 km² are designated as a national park and Ramsar site. The site consists of deltas of the seasonal rivers. There is a network of interlinking channels and additional, seasonal freshwater streams that flow into the delta. The site is made up of sea, sandy coast and islands and islets with mangrove, savannah and forest. The national park and part of the buffer zone of the Biosphere Reserve are managed by the central authorities, but the remainder is managed by liaising between a rural council and national park and forest service authorities.

Basse Casamance National Park

The 50 km² of the national park (IBA – SN014) is in the delta of the Casamance River. The habitat consists of low-lying lands with mangroves fringing tidal channels, seasonally bare saline mudflats, some wooded savannah and terrestrial forest, including the only remaining small area of Guinea-Congo forest in the country.

Ghana

Keta Lagoon Ramsar site (Ghana)

The 530 km² Keta Lagoon (IBA – GH033) is an extensive, brackish body of water situated to the east of the Volta river estuary. The site comprises the open water of the lagoon and the surrounding floodplains and mangrove swamps. The lagoon is bordered by numerous settlements and the surrounding floodplain consists of marsh, scrub, farmland and substantial mangrove stands, which are heavily exploited for fuelwood.

Songor Lagoon

The 232 km² Songor Lagoon (IBA – GH036) is, with Keta Lagoon, one of the two major lagoon systems associated with the Volta river estuary. The site comprises a brackish lagoon with extensive mudflats and islands, saltpans, a broad sandy beach and the floodplains of a number of small streams. It is separated from the sea by a narrow sand dune on which small villages are situated. The lagoon has no direct access to the sea and seawater replenishment is from seepage through the sand dunes. The main wetland vegetation type is saline marsh with degraded mangrove.

Table 25.
Key elements of the mangrove/coastal KCAs

Approach	Priority elements
KCA	**The mangrove forest blocks that could be elevated to the status of conservation areas are already listed as UNESCO Biosphere Reserves, Ramsar sites, Important and Endemic Bird Areas**
Conservation objectives	1. Preserve the best developed mangroves in West Africa 2. Establish ecosystem-landscape governance and save corridors between the major ecological blocks 3. Adopt the most appropriate conservation actions for threatened species (manatee and birds)
Key species	– West African manatee – migratory birds
Key habitats	– mangrove as nursery and feeding areas for marine fish – ocean coast and the land on both banks of rivers and lakes, mudflats, sandbanks – forest, palm forest, semi-dry woodland, savannah – rivers, freshwater lagoons and lakes

New or larger KLCs and KCAs should be created (Nigeria, Côte d'Ivoire, Liberia, Sierra Leone, Senegal and Guinea)

An evaluation needs to be carried out on about 1 300-2 000 km² of mangrove to form new or larger PAs (an addition of 15-25 %, as considered by the strategic approach for the specific mangrove/coastal ecotype).

Protecting biodiversity	Countries	Biome/ecotype/ key species	Main KLCs-KCAs and priorities	Analysis	Objectives and proposed actions
- Mangroves are very rich in biodiversity with a variety of specialist fish (they harbour widespread pelagic fish), marine turtle, invertebrates, various unique species such as the West African manatee, and a large number of Palearctic and Afrotropical bird species - Low number and under-representation of this habitat/ecotype in protected areas or no representation in some instances (e.g. in Nigeria) - Many mangrove forest blocks are designated as UNESCO Biosphere Reserves, Ramsar sites, Important and Endemic Bird Areas - Fragmentation does not greatly affect mangrove biodiversity, as mangroves are naturally fragmented, and are able to disperse over long distances - Important mangrove forest blocks could be elevated to the status of conservation areas	- Gambia - Ghana - Guinea - Guinea-Bissau - Côte d'Ivoire - Liberia - Mauritania - Nigeria - Senegal - Sierra Leone	**Biome:** - mangrove **Ecotype:** - Guinean mangrove - Central African mangrove **Key species and status:** Niger Delta red colobus ▼▼▼ West African manatee ▼▼▼	**Key Landscapes for Conservation** **1. Rio Cacheu-Cufada-Cantanhez-Rio Buba-Iles Tristao (CCCBT) mangrove landscape for conservation** (4780 km² of PAs) **Key Conservation Areas** (3062 km² of PAs) **Sierra Leone** **2. Sherbro and Turtles Islands** **Senegal** **3. Saloum Delta National Park** **4. Basse Casamance National Park** **Ghana** **5. Keta Lagoon Ramsar site (Ghana) GH033** **6. Songor Lagoon** **7. New or larger KLCs and KCAs should be created** (Nigeria, Côte d'Ivoire, Liberia, Sierra Leone, Senegal, Guinea)	**Negative aspects** - clearing for agriculture, human settlements and infrastructure - overharvesting of mangrove trees for firewood, wood, wood chip and pulp - mining exploitation and oil spillage - river changes resulting from dams and irrigation which kill the trees - excessive hunting of species - pollution by fertilisers, pesticides and other toxic man-made chemicals - exotic/invasive plant species colonisation (water hyacinth) - climate change - civil and political unrest (Nigeria) **Positive aspects** - important ecological and economic potential for mangroves when utilised to (a) stabilise the shoreline, (b) provide protection against tsunamis, and (c) provide critical nursery areas for fish and shrimps - positive example of Guinea-Bissau where communities were empowered to maintain and monitor their mangrove areas; today the PA network covers 15% of the country and provides 70000 people with food, jobs and livelihoods - successful efforts in the past to replant the mangrove trees	**Objectives** **1.** Preserve the best developed mangroves in West Africa **2.** Establish ecosystem-landscape governance and save corridors between the major ecological blocks **3.** Adopt the most appropriate conservation actions for threatened species (manatee and birds) **Actions** - West African Governments to sign mangrove-related legislation and international conventions (i.e. Convention on Climate Change, Convention on Biodiversity, CITES, and Ramsar Convention) - adopt a holistic approach for policy development, legislation and institutions that integrates PAs and mangrove forests in the development context, and promotes conservation principles at local, national and international levels - elaborate adequate policy, law and institutional provisions for mangrove forests for the implementation of international conventions and National Action Plans, including mangroves in protected areas - adopt an inter-sectorial approach in order to give greater importance to mangrove forest conservation - collaborate with national and international NGOs (e.g. African Mangrove Network and its national focal offices) and local communities on various projects and programmes for the conservation of mangroves, and the sustainable management of natural resources and poverty reduction - maintain a balance between the needs of the local coastal communities and the ecological services of the remaining mangrove ecosystems - continue searching for strategies geared towards sustainable management of mangrove forests - increase the role of private sector participation - orientate research towards providing more quantitative data for management effectiveness - collaborate to achieve a strong inter-sectorial coordination on policies and actions between agriculture, infrastructures and other developments, and conservation - raise awareness in local communities on opportunities for sustainable natural resource conservation

Note: Red arrows denote declines in status.

Carved ivory tusk and taxidermy specimens confiscated by the Spanish police at Adolfo Suarez Madrid-Barajas Airport in October 2014 and stored in a government warehouse.

5.1.7 Dismantling wildlife traffic network

West Africa is already considering the establishment of a strategic plan for dismantling the illegal wildlife traffic networks. At present, priority is being given to the establishment of agreements between countries [29] and the strengthening of border control actions for the WAPOK complex. The proposal for dismantling wildlife trafficking networks in West Africa is structured by areas of intervention. The analysis below concerns the international illegal wildlife trade (elephant poaching and ivory trade, and live animal trade). Further details of the efforts throughout Africa to tackle wildlife trafficking are presented in Chapter 5 of this report.

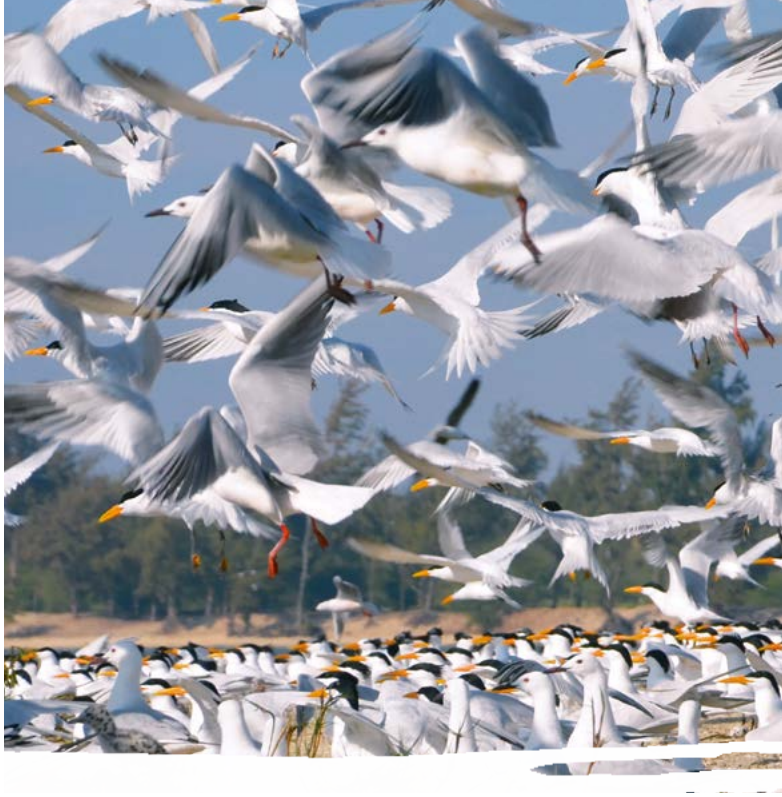
Political and diplomatic

- Build awareness of the serious threats that poaching and smuggling pose to economic, regional and social security at the national and international [30] levels.
- Build awareness of the current limitations in the effort to combat poaching and wildlife smuggling.
- Strengthen the outreach to West African countries on the illegal wildlife trade.
- Adopt a regional approach to fighting the illegal wildlife trade and dismantle international criminal networks.
- Strengthen national wildlife legislation, and establish the principle of international crime for illegal wildlife activities in West African countries.
- Designate / establish a high authority for this task within regional institutions (WAEMU under ECOWAS).

Intelligence and security

- Develop and implement national and international intelligence gathering systems.
- Increase investigations, especially at key transit points or borders, and in local markets.
- Establish effective lines of communication with the different services concerned (wildlife, police, defence, security), intra- and interstate.
- Strengthen the capacities of anti-poaching operations in PAs (human resources, training, equipment, facilities, resources and incentives).
- Strengthen the capacities of the teams responsible for investigating and arresting poachers and wildlife traders (human resources, training, equipment, facilities, resources and incentives).
- Establish effective collaboration between NGOs and government and intergovernmental agencies to support the establishment and operation of intelligence and security networks. It would be worthwhile to **support the growth of a network of non-governmental organisations in West Africa that support government law-enforcement efforts** under the auspices of, or closely linked with, the Last Great Ape Organisation (LAGA) (already initiated by WAEMU) (see also Chapter 3 on Central Africa). The NGOs' intervention should be supported but not coordinated by the regional institutions to preserve their specific approach.

(29) Benin and Burkino Faso signed an agreement on 12 July 1984 to fight against poaching; Niger joined in 1986. The agreement was implemented from January 1986.
(30) West Africa provides less information on the populations of elephant. Source: MIKE.



Judiciary and conviction of illegal activities in PAs

- Establish effective cooperation and collaboration between the supervisory authorities and judicial authorities involved in the enforcement of laws against illegal wildlife networks in West Africa.
- Establish effective coordination and communication with law-enforcement agencies (in order to ensure better conviction rates of poachers and illegal traffickers).
- Monitor and support legal proceedings against poachers and illegal wildlife traffickers in order to ensure convictions.

Security communications

- Provide regular information on the evolution of intelligence, security and legal proceedings.
- Define indicators and benchmarks for actions to dismantle wildlife trafficking networks.
- Monitor and communicate operations by the designated authority within regional institutions (WAEMU – ECOWAS).
- Provide full press coverage.

The interventions should be carried out under the coordination of a special task force headquarters in the WAEMU (currently under discussion) and implemented by a competent body or an association of competent bodies.

5.1.8 Special analysis

Monitoring and planning of highly threatened species and habitats

This is a priority action that must establish: (i) the status of the most endangered species and habitats and (ii) a bailout plan at regional and interregional levels (i.e. a plan for an emergency package in support of threatened key species such as desert antelope and gorilla, and habitats such as the Inner Niger Delta and its mangroves). The actions must be entrusted to the IUCN specialist groups or to specialised NGOs. The actions must be associated with PHVA analysis (see below) and could lead to joint actions in situ and *ex situ* conservation between specialist national conservation agencies, NGOs and international institutions, and WAZA.

Population and habitat viability assessment (PHVA)

The PHVA is a key planning tool to develop targets and recommendations for the conservation of endangered species and habitats, or for the analysis and support for the introduction or reintroduction of individuals into a new habitat. The PHVA is based on knowledge of stakeholder groups and uses stochastic and social measures (threats and opportunities), each of them with a degree of sustainability and uncertainty, leading to concrete proposals. The core element of the PHVA is a quantitative assessment of the risk to species and habitat extinctions, a process known as population viability analysis, or PVA. Population viability analysis evaluates the risk of wildlife population decline or extinction under current conditions, or under future conditions by using computer simulation models. The model can project the demographic behaviour of a simulated population for a specified period of time into the future, under a specific set of assumed conditions. These underlying conditions can then be altered to determine the primary drivers of population growth or decline, as well as the best options for population management to minimise the risk of extinction.

The PHVA has successfully contributed to preserving the last population of Giraffe peralta in West Africa. Considering the high extinction risk of species and habitats in West Africa, this strategic approach proposes using this key tool in a programme of direct action to better target interventions in order to safeguard endangered species and habitats.

New or larger KLCs and KCAs

In West Africa, the high level of degradation of wildlife, the inadequate representation of ecosystems and habitats, and the fragmentation and reduced connections between the PAs all contribute to the need for a special contingency plan to better amalgamate protected areas, forming new Key Landscapes for Conservation to recover significant wildlife ecosystems and endangered species and habitats.

The action is critical but will not succeed unless some emergency actions are first taken. Direct interventions for saving the PAs identified in this document are urgently required, alongside a brief initial presentation phase to national and regional institutions in West Africa to confirm and win support for the strategic approach. The process of creating new PAs is very important, but it is a long and difficult step that requires emergency interventions on existing sites of conservation if it is to succeed.

The Langue de Barbarie National Park on the northern coast of Senegal is an extremely important site for large numbers of breeding and wintering gulls and terns.

The intervention in support of KLCs should be carried out under the coordination of a special unit with headquarters in WAEMU and implemented by a competent body or an association of competent bodies. The specially tasked WAEMU unit should propose KLC formation studies in the following prioritised ecosystems:

- wetland ecosystems in the savannah ecotype (e.g. Hadejia-Jamare Komadogu Yobe Basin) so as to prevent the further decline of wetlands and to preserve the Afrotropical-Palaearctic and intra-African bird migrations;
- new and/or larger KLCs and KCAs to protect wildlife ecosystems in the forest and mangrove/coastal ecotypes. In the case of marine-coastal PAs, the planning should take place in collaboration with the strategic plan for marine protected areas on the Atlantic coast (as an implementation of the Abidjan Convention).

Further information on the resources required to implement the proposed studies on formation of new KLCs and KCAs, and on wetlands, is presented in Sections 5.1.3 to 5.1.6 under the 'specific strategies and actions' given for each major ecotype.

5.1.9 Wildlife protection training

One of the principal threats to the survival of wildlife in West Africa is the unsustainable hunting and poaching of wild animals. This is related in significant part to the comparatively high human population density and long-established trade networks. On the other hand, given the decline of salaries and the increased incomes from illegal wildlife trade, corruption has also spread amongst the rangers and other staff of the parks. Illegal activities, such as poaching, fishing and logging, have converted some PAs into empty forests or empty savannahs that can only be classified as paper parks.

To reverse this trend, it will be necessary to return to the fundamentals of conservation: first and foremost, full control of the parks must be gained by re-establishing the park-management tradition and esprit de corps. To achieve this it is necessary to build capacity for the protection of wildlife.

The following steps are required for ranger training:

- identify conservation sites with the capacity to deliver basic training for new rangers;
- prepare and implement training programmes that target the specific needs of each specific PA;
- support implementation of the appropriate anti-poaching programmes for each PA;
- attractive career opportunities for rangers must be assured to enable staff turnover and the welfare of rangers after their period of anti-poaching activities.

These interventions should be carried out under the coordination of a special task force with its headquarters in WAEMU and implemented by a competent body or an association of competent bodies.

Monitoring the endangered population of West African (or peralta) giraffe at Kouré, Niger. Activities related to research, monitoring and tourism provide an incentive for the local community to protect this species.

5.2 Proactive process

5.2.1 Institutional support and coordination

A strong process of coordination for the wildlife interventions recommended in the strategic approach for West Africa will be essential to ensure the following synergies:

- the availability and proper use of resources;
- a shared and harmonised implementation between the countries, including the necessary agreements for transfrontier protected areas;
- the identification and implementation of wildlife protection and law-enforcement agreements across borders and between the West African and Central African regions;
- a stronger balance of conservation initiatives in the major ecotypes of West Africa;
- attention to the specificities of conservation at national, regional and interregional levels (e.g. specific plans for highly threatened species, decline in wetlands and mangrove ecosystems).

At present, there is no single organisation in West Africa that can provide all the services needed for the interventions of conservation in the region. Coordinating the actions for wildlife conservation must therefore also ensure the establishment of institutional, technical and scientific, and organisational capacities. It is recommended that the institutional reform involves the combination of existing institutions: the West Africa Economy and Monetary Union (WAEMU), the West Africa Protected Areas Network (WAPAN) and a task-force unit to provide support.

WAEMU is more operational on conservation than ECOWAS. It has the capacity to coordinate the active and proactive processes described above during implementation by agencies, NGOs, institutions and universities, as demonstrated by their expertise in other sectors (agriculture, biosecurity). Furthermore, a conservation unit of WAEMU currently supports a programme of interventions in the WAPOK complex. This strategic approach proposes that this conservation unit is maintained and extended to undertake the coordination of the governance and implementation of the wildlife strategic approach in West Africa. To achieve theses goals, WAEMU must observe the following institutional aspects:

- promote and coordinate conservation activities in the countries of West Africa by complying with the regional strategic approach;
- support and harmonise policies and laws;
- boost the convergence plan (strategic plans) for achieving specific and inter-sectorial interventions in favour of conservation;
- ensure institutional support in the fight against the illegal wildlife trade.

The technical part of the coordination unit must:

- technically support WAEMU and ECOWAS in order to fully adopt the principles of the wildlife strategic approach;
- upgrade the strategic approach over time;
- coordinate with the regional BIOPAMA observatory on making informed decisions about directing funds towards key management priorities and institutions.

It is recommended that WAPAN operates on the technical aspects of conservation:

(i) promote, monitor and develop the regional strategies;
(iI) detect the needs for planning and managing conservation with regard to landscapes, species and habitats;
(iii) identify and set up conservation actions on the ground;
(iv) monitor indicators of the key aspects of PA conservation and management effectiveness in collaboration with the BIOPAMA project.

The task force, as a support unit of WAEMU and the WAPAN, must ensure:

- high levels of technical support in collaboration with the IUCN's Protected Areas Programme for Central and West Africa;
- organisational and financial/administrative support.

The proposed structure composed of WAEMU, WAPAN and the task force does not currently exist and requires a solid investment of one or two years at the beginning of the implementation phase to organise the unit, followed by several years to establish its capacity to intervene in all aspects of conservation in West Africa. Specifically, WAEMU must evolve from managing priorities for transborder parks to the promotion and support of transborder and national landscape interventions, and to improving the status of key and threatened species and habitats. WAPAN (with the West Africa Marine Protected Areas Network, or WAMPAN) must evolve from its role as a representative body of the directors of PAs to a regional technical support body coordinating the institutional parties represented by WAEMU and the international technical and financial institutions. The task force must provide technical support and facilitate the mobilisation of funds for the conservation initiatives in West Africa. The task force should be closely advised by the IUCN's Programme on African Protected Areas & Conservation (IUCN-PAPACO). The IUCN-PAPACO could offer technical support, experience with both capacity building with cross-regional initiatives amongst neighbouring countries of West Africa and the mobilisation of specialist groups for analysis in decision support systems, and as a partner in the BIOPAMA project. The expertise from the EU and other international partners could ensure a consistent evolution of the strategic approach and help in the mobilisation of resources.

The special unit on this strategic approach to conservation in West Africa (composed of WAEMU – WAPAN – task force) could assure the promotion and coordination of the following tasks:

- dismantling the wildlife traffic networks;
- special analysis;
- wildlife protection training;
- monitoring and planning;
- communication;
- biological research;
- management – governance training.

5.2.2 Monitoring and planning

The poor performance of wildlife conservation in West Africa arises from insufficient availability of information on biodiversity, and a lack of coordination and inter-sectorial approach in the interventions.

Data on conservation in West Africa is insufficient, and is not available as a structured and orientated decision support system. This large deficit in the capacity of West African conservation can be improved by the use of resources and tools made available by two EU initiatives: (i) the Biodiversity and Protected Areas Management Programme (BIOPAMA) (Box 2) and (ii) the Digital Observatory for Protected Areas (DOPA) (Box 3). The two initiatives are complementary: BIOPAMA strengthens the process of collecting, organising and structuring information as a decision support system at the local, national and regional levels; DOPA operates at a higher level on informatics infrastructures combined with interoperable web services connected with the Regional Reference Information System (RRIS) of BIOPAMA. The two initiatives form a bottom-up (BIOPAMA) and top-down (DOPA) integrated information system as a decision support system at all levels of the interventions on conservation.

BIOPAMA forecasts the establishment of regional observatories and the RRIS to improve the access and availability of data on biodiversity in the four regions of Africa. The BIOPAMA regional observatory for West and Central Africa should collect and organise existing information, and also boost the collection of information through the use of a form organised for collecting vital information on the state of conservation, management effectiveness and quality of governance (this last element is scheduled as a future action).

The periodic update of data scheduled by the BIOPAMA observatory could enable West and Central African regions to have baselines and trends on the key aspects of their wildlife and its conservation. The objective will be to base the management effectiveness of wildlife conservation on an information baseline and related benchmarks.

5.2.3 Communication

A major effort in the communication of wildlife and environmental issues is needed in Africa; this can be usefully informed by a successful series of awareness campaigns on the illegal wildlife trade in Asia. Awareness raising is particularly needed in West Africa where there is very little environmental awareness amongst all age groups. Building conservation constituencies to change attitudes and mobilise political support for conservation will require action at many levels:

- undertake environmental education at both the local level (where the direct threats are occurring) and in the urban areas (where many of the drivers of threats originate and political decisions are made);
- make greater use of broadcast media and use well known charismatic personalities to deliver conservation messages;
- implicate international NGOs specialised in environmental education to strengthen and stimulate national NGO environmental education activities;
- stimulate nature clubs in schools to inspire tomorrow's conservation leaders[31];
- create small-scale urban natural parks to allow urban community members, who may not have the means to visit or to participate regularly in nature-based recreation, the opportunity to interact with nature and learn about conservation.

The interventions should be carried out under the coordination of a special task force with its headquarters in WAEMU (currently under discussion) and implemented by a competent body or an association of competent bodies.

5.2.4 Biological research

Knowledge on the biology and threats to West African wildlife remains relatively superficial (for instance, a survey is underway in Togo at the time of writing to ascertain whether or not any chimpanzees still survive in that country). Although sponsoring scientific research may be outside this document's immediate scope in this instance, the need for more research must not be ignored. **Apart from further surveys on the distribution of and threats to the most endangered species, better genetic data is vital for some conservation priority-setting and decision-making.**

To take one example, it remains a matter of debate as to how many species of elephant should be recognised in Africa. The IUCN Red List (2013) states:

- Preliminary genetic evidence suggests that there may be at least two species of African elephants, namely the Savannah Elephant (*Loxodonta africana*) and the Forest Elephant (*Loxodonta cyclotis*). A third species, the West African Elephant, has also been postulated. The African Elephant Specialist Group believes that more extensive research is required to support the proposed re-classification. Premature allocation into more than one species may leave hybrids in an uncertain conservation status[32].

The African Elephant Specialist Group's statement of 2003 (AfESG 2003) does not appear to have been updated. It recommends that:

- Further analysis of the existing West African samples should be carried out.
- Additional genetic samples from a wider range of sites should be collected and analysed.
- There should be a consensus on the significance of the genetic and morphological data between the scientists working on this issue.

This scientific issue needs urgent resolution, both for conservation priority-setting and for the design of legislation affecting protection and trade. It is especially important to understand the distinctiveness of West African elephants, which are now so rare. The Conference of the Parties (CoP) to CITES agreed in their meeting in Bangkok in March 2013 that the DNA testing of large ivory seizures should be mandatory. For such testing to be of full value **the evolutionary genetics of all African elephants (at the DNA level) needs to be well understood as a matter of urgency**.

The interventions should be carried out under the coordination of a special task force with its headquarters in WAEMU and implemented by a competent body or an association of competent bodies.

(31) For example, many of BirdLife's African Partners run long-standing nature clubs in schools across their countries. BirdLife Partners have also developed a flyway-scale education programme, 'Spring Alive', to help children across the East Atlantic flyway to understand and enjoy the wonder of migration. See: http://www.springalive.net/

(32) IUCN SSC African Elephant Specialist Group 2003.

A group of senior West African protected area staff participating in a regional training course at Tapoa, W National Park, Niger.

5.2.5 Management – Governance training

In the West African region, biodiversity conservation activities are mainly in IUCN category II sites (national parks). Other categories of protected area and governance systems are largely overlooked for biodiversity conservation. In West Africa the focus has traditionally been on highly centralised management with a strong accent on law enforcement, which requires substantial resources. Less than 100 PAs have permanent staff and resources, and these are generally insufficient. Given the current difficulties and constraints in terms of resources, policy-makers are looking towards a more decentralised and diversified approach to PA management, including greater community involvement. The new approach requires new skills, particularly for planning and the implementation of cross-sectorial and participatory management for conservation, and for managing the sustainable use of natural resources (hunting, fishing, forestry, non-timber forest products). The new approach enables livelihood issues and poverty reduction to be addressed, both in categories IV to VI PAs (where sustainable resource use is already allowed) and in category II PAs (national parks, where development activities are conducted in the buffer zone). This change in the conservation strategic approach represents a major challenge for biodiversity conservation in West Africa. The new scenarios require a variety of new management competencies for ensuring the conservation of biodiversity but at the same time boost the development process of local populations.

Capacity building in the community model of conservation must be organised for the mid-level (senior site officers) and high-level officers (senior government officers and other wildlife professionals working in conservation, education and environmental sectors). The most important capacity-building institutions are the École régionale d'aménagement intégré des forêts et territoires tropicaux (ERAIFT) in Kinshasa, DRC and the École de faune de Garoua (EFG) in Cameroon. However, neither institution is able to provide direct and specific support for implementing the wildlife strategic approach in West Africa. This strategic approach recommends an intervention to strengthen these institutions for the creation of specific conservation courses for mid-level and high-level officers from West Africa.

Finally attractive career opportunities in conservation must be created if PAs are to attract and retain quality staff. Staff capacity building needs to be accompanied by attractive career prospects, otherwise the brightest managers will continue to seek employment elsewhere.

The interventions recommended here should be carried out under the coordination of a special unit with its headquarters in WAEMU and implemented by a competent body or an association of competent bodies.

5.3 Concluding recommendations

Halting or reducing biodiversity loss requires tackling both its direct and indirect drivers. The direct drivers can be divided into general and specific. General direct drivers apply across the region of West Africa and in some cases to all of Africa. Specific direct drivers are formulated for each of the four major ecotypes: desert, savannah, forest and mangrove (and coastal areas).

5.3.1 Recommendations for tackling key indirect threats to conservation

There are several factors in West Africa that mitigate against effective conservation actions: high political and security instability, rapid population growth, slow growing economy, permanent food insecurity, significant environmental fragility, high risks from climate change, and insufficient awareness of civil society on wildlife matters. These issues generate an increasing demand for natural resources in the ecosystems, and consequently all the protected areas in West Africa face pressure from grazing, cultivation, wood harvesting, hunting, fishing, use of water and extraction of natural medicines. This results in fragmentation, reduction and isolation of PAs in the landscape with habitat loss, intrusion of human infrastructures and overhunting.

Governments generally do not invest in PAs: protected areas are considered as unproductive areas that are reserved (hence the term 'reserves') for later exploitation and are generally not viewed as economic and spatial elements of the landscape. PA management is also inadequately supported. As a result, PAs are exploited for illegal grazing, cutting, agriculture, fishing and poaching, sometimes with the complicity of PA rangers. In the case of breakdowns in law and order, the PAs easily become targets for refugees and rebel groups or are used as sources of funding and illegal trading by rebel groups and religious fundamentalist movements.

Possible global solutions to indirect drivers must be linked to issues of livelihoods, including the sustainable use of natural resources and the exploitation of non-use values of biodiversity and ecosystems. Focusing exclusively on responses and values at one level (e.g. provisioning economic services) often hinders responses that could promote wider values (e.g. services that support livelihoods, cultural values).

In conclusion, the following actions are recommended for tackling indirect drivers of biodiversity loss:

- Managing protected areas and their surroundings for a wide range of sustainable uses. This is extremely important in West Africa where biodiversity loss is sensitive to changes in key drivers.
- Mainstreaming biodiversity conservation and ecosystem services into all the primary sectors, such as agriculture, pastoralism, forestry, fisheries, mining and energy, through an intersectorial approach.
- Build the capacity of African governmental and non-governmental institutions to adopt the new specific and intersectorial approaches to conservation (e.g. ERAIFT, the regional postgraduate school for the integrated management of natural resources in Sub-Saharan Africa for students and governmental officials from 23 African countries).
- Strengthen the institutions with control over the environmental and biodiversity impacts of mining, agro-industry, hydroelectric and other infrastructure projects.
- Support government institutions on questions of internal security (police, forestry, wildlife and/or national parks' departments, and justice) with respect to wildlife law enforcement as part of national programmes and projects financed by donors.
- Capture benefits and reduce costs for local communities, especially the local opportunity costs based on the principle of equitable sharing.
- Increase transparency and accountability of the government and private sector through the involvement of concerned stakeholders and rights-holders in decision-making on biodiversity issues.
- Increase public awareness, communication and education.
- Promote and facilitate awareness building in civil society for wildlife management and protection; support the growth of a network of local non-governmental wildlife organisations in West Africa.

5.3.2 Recommendations for tackling general direct threats to conservation

The wide range of ecosystems in West Africa is what gives it such biological richness and diversity. From the African continental perspective, West Africa has an enviable natural heritage:

- largest system of deserts;
- most extensive mangrove system;
- highest levels of plant and animal species richness of any forest in Africa;
- some of the largest and most beautiful antelopes;
- high levels of endemism;
- immense importance for over two million migrant birds (Afro-tropical-Palearctic and intra-African migrations).

Yet these natural resources and biodiversity are being degraded rapidly due to the complex political and socio-economic situation. In particular, West African governments generally do not give enough importance to PA management for two reasons: inadequate prioritisation of funds and poor institutional governance. The results are: (i) weak and ineffective planning, management and monitoring of PAs, and (ii) illegal wildlife trade and corruption.

Recommendations to tackle general direct drivers of biodiversity decline are as follows:

Availability of funds for PAs

- Increase the opportunity for more private sector investment and sponsorship in management, eco-tourism activities and in valuing ecosystem services (Payments for Ecosystem Services – PES).
- Plan for long-term financial sustainability for each PA by extending the time frame of interventions and strengthening the inter-sectorial approach for community support (to reduce threats and, indirectly, surveillance costs).

Institutional governance of PAs

- Seek more efficient structures that avoid duplication in natural resource management. This will require creating inter-sectorial guidelines on natural resource management and biodiversity conservation at national and regional levels (convergence in legislation, strategies and planning).
- Create parastatal bodies, and link the wildlife skills of national and international NGOs, natural resource rights-holders and the private sector.
- Integrate aspects of wildlife and habitat management into national forestry policies for logging concessions.

Illegal wildlife trade and corruption

- Seek greater support for law enforcement with better-equipped and trained anti-poaching units, and greater integrity from wildlife officers, police, army and justice.

Specific measures for the West African elephant

- Highlight the importance of the WAP complex to ensure the survival of West Africa's most important elephant population.
- Evaluate viable populations, and provide special protection for them (e.g. the elephants at national level and for those in Zakouma NP in Chad).
- Create and strengthen intelligence-gathering services, with monetary incentives for useful information leading to successful anti-poaching results.

Bushmeat

- Develop partnerships involving the private sector, communities and government agencies for forest and wildlife management in logging concessions. This must include economic alternatives, alternative sources of protein and wildlife monitoring.

Illegal live wild animal trade

(see common solutions above)

Weak and ineffective planning, management and monitoring of PAs

- Improve data collection to build a more effective monitoring and decision support system (objectives – indicators – bench markers) that facilitates adaptive management and proactivity.
- Emphasise the role of stakeholders and natural resource rights-holders, national and international NGOs, private sector operators and other non-traditional partners with a view to enhancing management effectiveness at the ecosystem/landscape scale (PAs and buffer zones).
- Strengthen institutional capacities, particularly through greater training opportunities, for protected area management at the local, national and regional levels.

5.3.3 Recommendations for tackling specific direct threats to conservation

The major recommendation to overcome both general and specific threats to conservation in West Africa in the medium term is to invest in a comparatively small number of Key Landscapes for Conservation that have the capacity to conserve viable populations of the large and charismatic wildlife species within intact and self-sustaining ecosystems. This will greatly assist in reversing the decline of threatened species and the loss of biodiversity in the region. Our proposals for conserving 14 KLCs are summarised in Table 27.

On a short-term basis, we further recommend that conservation efforts are focused on Key Conservation Areas to stem the wildlife emergency, which threatens to bring about the extinction of West African lions and other key wildlife species (Table 27).

Table 27. Summary table of KLCs and KCAs and priorities for West Africa

No KLC	No KCA	KLCs-KCAs and priorities	No PAs	Surface km²
		Deserts: major ecotypes **Total deserts**	**14**	**453065**
1		1. NCA: Termit & Tin Toumma NNR; Aïr and Ténéré NP; Addax Sanctuary NNR; Ouadi Rimé-Ouad NP; Fada Archei NP; Tassili-n-Ajjer NP; Ahaggar NP	7	416750
2		2. SMWL1: Diawling NP; Djoudj NP-WL1; Saint-Louis MPA; Ndiael Wildlife Reserve; Keur Momar Sarr Forest Reserve	4	2465
3		3. MWS: Banc d'Arguin NP; Réserve Intégrale de Cap Blanc NNR; Dakhla NP	3	33850
		Savannahs: major ecotypes **Total savannahs**	**18**	**119971**
4		1. WAPOK: W transborder park; Arly Faunal Reserve; Pendjari NP; Oti Monduri Faunal Reserve; Keran NP	7	38000
5		2. CM: Comoé NP; Mole NP	2	16571
6		3. NBBBFF: Niokolo Koba NP; Badiar NP; Bafing NP; Boucle du Baoulé NP; Falémé area NC; Fouta Djalon area NC	4	25000
7		4. GS: Gourma Elephant NP; Sahel Faunal Reserve; Inner Niger IBA	2	26500
	8	5. LION KCAs: Kainji Lake NP; Yankari NP	2	8200
9		6. VC: Volta Transboundary Ecosystem Wildlife	1	3700
		7. New or larger KLC and KCA	?	(1000-3000)
		Forests: major ecotypes **Total forests**	**18**	**38395**
CAF-01 (Shared with Central Africa)		1. CKTGTF: Cross River NP; Korup NP; Mont Cameroon; Tamakanda NP; Gashaka-Gumti NP; Tchabel Mbabo Wildlife Reserve; Faro NP	6	19100
10		2. TGS: Taï NP; Nzo Faunal Reserve; Grebo National Forest; Sapo NP	3	7700
21		3. MN: Nimba Mountains Strict Nature Reserve; East and West Nimba Nature Reserve in Liberia	3	415
11		4. GLF-MWWZ: Gola-Lofa-Foya Forest Reserves Transborder Park; Mano NF; Wologizi NF; Wonegizi NF; Ziama MAB	3	5400
12		5. OKKPS: Outamba-Kilimi NP and Forest Reserves Kuru Hill (in Sierra Leone); Pinselli and Soya (in Guinea)	1	1100
	13	6. Forest KCAs: Ankasa NP; Bia NP	2	680
		7. New or larger KLC and KCA (Liberia, Ghana, Nigeria)	?	(3000-5000)

No KLC	No KCA	KLCs-KCAs and priorities	No PAs	Surface km²
		Mangroves/coastal: major ecotypes **Total mangroves**	**3**	**9592**
14		1. CCCBT: Rio Cacheu Mangroves NC; Lagoas de Cufada NC; Rio Grande de Buba NC; Cantanhez Forest NC; Iles Tristao NC	0	4780
	15, 16, 17, 20	2. Mangrove KCAs: Sherbro et Turtles Islands NC; Saloum Delta NP; Basse Casamance NP; Keta Lagoon Ramsar site; Songor Lagoon NC	3	3062
		3. New or larger KLC and KCA (Nigeria, Côte d'Ivoire, Liberia, Sierra Leone, Senegal, Guinea)	?	(1500-2000)
		Total West Africa	**53**	**c. 620000**

The critically endangered Dama Gazelle. Formerly widespread in the Sahara and Sahel zones this species is now probably extinct in North Africa. South of the Sahara the species is still present in very small and fragmented populations in Mali, Niger, and Chad but are thought to be extinct in Mauritania, Nigeria and Burkina Faso.

#4

Landscape of the central Sahara desert, Niger.

The KLC and KCA protected-area approach must be integrated with recommendations for specific direct drivers formulated for each of the four major ecotypes: deserts, savannahs, forests and mangroves/coastal.

5.3.3.1 Deserts

- Apply a species approach for scimitar oryx, Saharan cheetah, Dama gazelle, addax.
- Adopt synergistically *in situ* and *ex situ* conservation techniques in order to have the greatest probability of effective conservation.
- Be flexible enough to intervene in areas and countries as soon as security conditions allow.
- Save the habitat in which the species can live and reproduce (with PAs and KLCs).
- Preserve and improve the genetic heritage (DNA), under the responsibility of WAZA, with a view to future reintroduction of the species in their natural habitats. It is essential that these habitats remain occupied by the conservation services until such time as the reintroductions can take place.
- Exploit every possibility in land surveys (including information from the military) for better protection (and knowledge) of wildlife.

5.3.3.2 Savannahs

- Establish a convergence plan of conservation interventions in this ecotype.
- Save the WAP(OK) ecosystem, the only functional ecological complex to have the potential for regeneration and reintroduction of species in the savannah ecotype.
- Preserve the most important ecological blocks of protected areas: (i) Comoé-Mole (Côte d'Ivoire and Ghana); (ii) Niokolo-Badiar-Bafing-Faleme-Fouta Djalon (Guinea, Mali, Senegal), and (iii) Gourma Elephant and Sahel Faunal Reserve (Mali and Burkina Faso), even if wildlife densities are low.
- Establish transboundary corridors between major ecological blocks such as the Volta Transborder Ecosystem Wildlife Corridors between Burkina Faso and Ghana.
- Support cross-border activities such as those in the WAPO complex (or WAPOK with the inclusion of Park Keran) or new management initiatives such as the Volta Transboundary Ecosystem Wildlife Corridors between Burkina Faso and Ghana.

Wooded savannah in the morning mist, Fazao National Park, Togo.

5.3.3.3 Forests

- Concentrate actions in the principal PAs, with equal priority for all the sites given their biological diversity and richness.
- Create new or enlarged national protected areas (Liberia, Ghana and Nigeria) in the important forest blocks to complement the overall biodiversity protection of this ecotype. Fill in information gaps (and scientific knowledge) and establish priorities, objectives, indicators and benchmarks for conservation actions.
- Reduce threats to PAs by adopting a systems approach to ensure inter-sectorial policy and development activities, analysis of environmental impacts, the valuing of ecosystem services and the respect of conservation principles.
- Determine the most appropriate conservation actions for threatened species (by the establishment of PHVA analysis if necessary), the preservation of specific habitats inside or outside PAs, and the combination of *in situ* and *ex situ* conservation.
- Create the political will to tackle conservation problems.

5.3.3.4 Mangroves

- Apply legislation and international conventions related to mangroves, and adopt adequate policies and inter-sectorial approaches for the implementation of actions.
- Concentrate actions in priority PAs and community mangrove forests.
- Create new or enlarged national protected areas (Nigeria, Côte d'Ivoire, Liberia, Senegal and Guinea) and develop an integrated PA and reserve network of coastal and marine areas encompassing mangrove and other coastal habitats. Collaborate with national and international NGOs and empowered local communities to maintain and monitor the community mangrove areas.
- Develop an integrated PAs and reserves network of coastal and marine areas encompassing mangrove and other coastal habitats.
- Establish a fund to maintain sustainable economies that are based on the ecologically sustainable management of mangroves and coastal habitats.
- Determine the most appropriate research and conservation actions for improving the management effectiveness of PAs and mangrove forests and related threatened species.

Appendices

> _ Appendices

Appendix 1. West Africa data – miscellaneous

Table 28. Countries currently subject to a recommendation to suspend trade (CITES) (9 September 2013)

Country	Notification	Basis	Common name	Scope	Valid from
Benin	No 2013/013 (02/05/2013)	Significant trade	Emperor scorpion	*Pandinus imperator*	2 May 2013
Cameroon	No 2013/013 (02/05/2013)	Significant trade	Hippopotamus	*Hippopotamus amphibius*	7 September 2012
Côte d'Ivoire	No 2013/013 (02/05/2013)	Significant trade		*Pericopsis elata*	7 September 2012
Guinea	No 2013/013 (02/05/2013)	Significant trade	Black-crowned crane	*Balearica pavonina*	2 May 2013
	No 2013/017 (16/05/2013)	Compliance and enforcement		All commercial trade	16 May 2013
Mali	No 2013/013 (02/05/2013)	Significant trade	Cape parrots	*Poicephalus robustus*	9 July 2001
			Mali spiny-tailed lizard	*Uromastyx dispar*	22 August 2008
Mauritania	No 2004/055 (30/07/2004)	National legislation		All commercial trade	30 July 2004
Niger	No 2013/013 (02/05/2013)	Significant trade	African chameleon	*Chamaeleo africanus*	30 July 2004
Togo	No 2013/013 (02/05/2013)	Significant trade	Cape parrots	*Poicephalus robustus*	9 July 2001
	No 2013/013 (02/05/2013)	Significant trade	Emperor scorpion	*Pandinus imperator*	2 May 2013

Table 29. The biodiversity features of West Africa

		Biodiversity						Threat % of land trans-formed	Response % of land protected
		Mammals		Birds		Plants			
Country	Area km²	Endemic	Total	Endemic	Total	Endemic	Total		
Benin	112 620	0	188	0	503	0	2 500	9	6
Burkina Faso	274 000	0	147	0	447	-	1 100	48	12
Cape Verde	4 030	0	5	5	87	86	774	-	-
Côte d'Ivoire	322 460	0	230	0	454	62	3 660	25	6
Gambia	11 303	0	117	0	666	Not known	974	42	0
Ghana	238 540	1	222	0	447	43	3 725	17	5
Guinea	245 860	1	190	0	676	88	3 000	14	0
Guinea-Bissau	36 120	0	108	0	628	12	1 000	7	-
Côte d'Ivoire	322 460	0	230	0	454	62	3 660	25	6
Liberia	111 370	0	193	1	536	103	2 200	30	1
Mali	1 240 190	0	137	0	561	11	1 741	15	4
Mauritania	1 025 520	1	61	0	459	Not known	1 100	3	0
Niger	1 267 000	0	131	0	433	Not known	1 460	2	8
Nigeria	923 770	4	274	3	848	205	4 715	34	4
Senegal	196 720	0	192	0	546	26	2 086	47	11
Sierra Leone	71 740	0	147	0	581	74	2 090	38	2
Togo	56 790	0	196	0	551	Not known	3 085	7	8
All countries	**6 138 033**	**7**		**9**		**710**		**16%**	**4%**

Sources: Biodiversity information taken from Groombridge and Jenkins[33]. Calculation of the proportion of transformed land was based on the reclassification by Hoekstra et al.[34] of the GLC3 Global Landcover Classification[35]. Hoekstra et al. defined four classes of transformed land: 1) artificial surfaces and associated areas, 2) cultivated and managed areas, 3) mosaic: cropland/tree cover, and 4) mosaic: cropland/other natural vegetation. In this section, all four classes have been integrated into the calculation of the proportion of transformed land. The area covered by classes 3 and 4 was divided by two, assuming that this reflects their mosaic character, with a certain proportion of land remaining untransformed. Note that this method does not account for the degree of fragmentation within the mosaic land cover classes. Data on protected areas (IUCN categories I-V) was obtained from WRI 2005[36].

(33) Groombridge B. and M.D. Jenkins (2002). World Atlas of Biodiversity: Earth's living resources in the 21st century, UNEP-WCMC.
(34) Hoekstra J.M., T.M. Boucher, T.H. Ricketts and C. Roberts (2005). Confronting a biome crisis: Global disparities of habitat loss and protection, *Ecology*, Letters 8, pp. 23-29.
(35) Straher A.H., L. Boschetti, G.M. Foody, M.A. Friedl, M.C. Hansen, M. Herold, P. Mayeux, J.T. Morisette, S.V. Stehman and C.E. Woodcock (2006). Global land cover validation: Recommendations for evaluation and accuracy assessment of global land cover maps, Office for Official Publications of the European Communities.
(36) United Nations Development Programme, United Nations Environment Programme, The World Bank and World Resources Institute (2005). World Resources 2005 – The Wealth of the Poor: Managing Ecosystems to Fight Poverty, WRI. See http://earthtrends.wri.org

Table 30. Internationally protected areas in West Africa

Country	Biosphere reserve		World heritage sites		RAMSAR sites		Important Bird Areas		Endemic Bird Areas
	Number	Area km²	Number	Area km²	Number	Area km²	Number	Area km²	Number
Benin	1	6230	0	0	2	1390	6	14901	0
Burkina Faso	1	1860	0	0	3	2990	10	16279	0
Cape Verde	-	-	-	-	-	-	15	4685	1
Côte d'Ivoire	2	14800	3	15040	1	190	14	23221	1
Gambia	0	0	0	0	1	200	13	585	0
Ghana	1	80	0	0	6	1780	40	16076	1
Guinea	2	1330	1	13	6	2250	18	7078	1
Guinea-Bissau	1	1100	0	0	1	390	8	7578	0
Liberia	0	0	0	0	0	0	9	6302	1
Mali	1	23490	1	4000	3	1620	17	28692	1
Mauritania	0	-	1	12000	2	12310	24	17906	0
Niger	2	251280	2	79687	4	7150	15	83431	0
Nigeria	1	<1	0	0	1	580	27	32468	4
Senegal	3	10940	2	9290	4	1030	17	25799	1
Sierra Leone	0	-	0	0	1	2950	10	6149	1
Togo	0	0	0	0	2	1940	4	5085	0
Total	**15**	**311110**	**10**	**120030**	**37**	**36770**	**247**	**296235**	**12**

Source: Data from Wetlands International undated, UNESCO 2006[37].

([37]) See http://whc.unesco.org/en/periodicreporting/; http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/africa/

	Biomes	Ecotypes	BJ	BF	CI	GM	GH	GN	GW	LR	ML	MR	NE	NG	SN	SL	TG
Realms: Palearctic	Deserts and xeric shrubland	A. Deserts															
		Sahara Desert															
		Atlantic coast															
		South Saharan steppe and woodlands															
		West Saharan montane xeric woodlands															
Realms: Afrotropics	Tropical and subtropical grasslands, savannahs, and shrublands	B. Savannahs															
		Sahelian acacia savannah															
		West Sudanian savannah															
		Guinean forest-savannah mosaic															
	Montane grasslands and shrublands	Jos Plateau forest-grassland mosaic															
	Tropical and subtropical moist broadleaf forests	C. Forests															
		Guinean Montane Forests															
		Western Guinean lowland forests															
		Eastern Guinean forests															
		Nigerian lowland forests															
		Cameroonian Highlands forests															
		Cross-Sanaga-Bioko coastal forests															
		Niger Delta swamp forests															
		Cross-Niger transition forests															
	Mangroves and flooded systems	D. Mangroves															
		Guinean Mangroves															
		Central African mangroves															

Country abbreviations (ISO-2): BJ – Benin; BF – Burkina Faso; CI – Côte d'Ivoire; GM – Gambia; GH – Ghana; GN – Guinea; GW – Guinea-Bissau; LR – Liberia; ML – Mali; MR – Mauritania; NE – Niger; NG – Nigeria; SN – Senegal; SL – Sierra Leone; TG – Togo.

Table 32. Data for West African countries

WB Indicators	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Population growth (annual %)	3.1	3.3	3.5	3.5	3.4	3.2	3.0	2.8	2.7	2.8
Population in the largest city (% of urban population)	30.6	30.4	30.0	29.2	28.4	27.8	27.3	26.9	26.5	26.1
GDP growth (annual %)	9.0	4.2	3.0	5.8	2.0	6.0	4.3	5.7	4.0	5.3
GDP per capita growth (annual %)	5.6	0.8	-0.6	2.2	-1.4	2.7	1.3	2.8	1.1	2.4
GNI growth (annual %)	2.9	4.2	5.2	2.6	4.7	4.6	5.4	5.4	3.7	4.8
Corruption Perceptions Index (score)										
International tourism, expenditures (% of total imports)										
Third pillar: Macroeconomic stability										
Terrestrial protected areas (% of total surface area)	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8
Forest area (% of land area)	51.1	50.5	49.8	49.2	48.6	48.0	47.4	46.7	46.1	45.5
Agricultural land (% of land area)	20.1	20.2	20.4	20.6	21.3	22.3	24.0	25.6	27.0	27.6
Population density (people per km² of land area)	42.3	43.8	45.3	46.9	48.5	50.1	51.6	53.1	54.6	56.1

Source: Africa Development Indicators

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	TREND
2.9	3.1	3.2	3.2	3.2	3.1	3.1	3.0	3.0	2.9	2.8	2.8		=
25.7	25.1	24.5	24.0	23.4	23.0	22.6	22.2	21.9	21.7	21.6	21.4		↘
4.9	6.2	4.4	3.9	3.1	2.9	3.8	4.6	5.0	2.7	2.6	3.5		=↗
1.8	3.0	1.2	0.6	-0.1	-0.3	0.6	1.5	2.0	-0.3	-0.3	0.7		=↘
5.7	5.4	4.5	4.2	2.9	2.5								↙
				3.2	2.9	2.5	2.7	3.1	2.9	2.8	3.0	36.0	↑
					5.1	5.1	5.1	4.3	3.9	4.0			↘
						4.0	4.7	4.6	4.8	4.5	4.9		=
23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8	23.8			=
44.9	44.4	44.0	43.6	43.1	42.7	42.2	41.8	41.3	40.9	40.4	40.0		↓
28.3	29.0	29.8	30.7	31.6	31.2	29.6	29.6	30.6	29.3	30.1	30.4		↑
57.8	59.6	61.5	63.5	65.6	67.7	69.8	71.9	74.1	76.3	78.5	80.7		↑

Appendix 2. Bibliography

Documents

- AfDB (2012). Africa's demographic trends, African Development Bank.
- AfDB (2013). West Africa monitor, Africa Development Bank.
- African Elephant Database, the African Elephant Status Report from 1995 to 2012.
- Agreement on the Conservation of African-Eurasian Migratory Waterbirds (1995).
- Afrique de l'Ouest Communauté européenne. Document de stratégie régionale et Program indicatif régional pour la période 2008-2013.
- Arnold van Kreveld A. and I. Roerhorst (Ulucus Consultants) (2009). Great Ape & logging, WWF.
- Atelier régional d'élaboration d'un plan d'action d'urgence de lutte anti braconnage dans le complexe WAPO.
- Armstrong D. (2012). Great Apes threatened again, this time by habitat loss, *The Earth Times*, United Kingdom.
- Beudels R.C., P. Devillers, R-M. Lafontaine, J. Devillers-Terschuren, M-O. Beudels (Eds.) (2005). Sahelo-Saharan Antelopes. Status and Perspectives. Report on the conservation status of the six Sahelo-Saharan Antelopes, CMS SSA Concerted Action, Second edition, CMS Technical Series Publication No 11, UNEP/CMS.
- Bouché P., I. Douglas-Hamilton, G. Wittemyer, A.J. Nianogo, J-L. Doucet, P. Lejeune and C. Vermeulen (2011). Will Elephants Soon Disappear from West African Savannahs? *PLOS ONE*, 6:6.
- Brugiere D., B. Chardonnet and P Scholte (2014). Pattern and correlates of mammal extinction as a measurement of conservation effectiveness of protected areas in west and central Africa, Preliminary results V1.2.
- Clement T. et al. (2012). Conservation status of chimpanzees (Pan troglodytes verus) and other large mammals across Liberia: results from a nationwide survey, Oryx – *The International Journal of Conservation*.
- Corcoran E., C. Ravilious and M. Skuja (2007). Mangroves of Western and Central Africa, UNEP-Regional Seas Program/ UNEP-WCMC.
- GRASP (2009). The UNEP Convention on Migratory Species (CMS), the UNEP/UNESCO Great Apes Survival Partnership (GRASP) and the World Association of Zoos and Aquariums (WAZA) have joined hands to declare 2009 the Year of the Gorilla (YoG).
- Eves H.E. et al. (2000). Bushmeat: A wildlife crisis in west and central Africa and around the world, Bushmeat Crisis Task Force.
- Hartley A.J., A. Nelson, P. Mayaux and J-M. Grégoire (2007). The Assessment of African Protected Areas, A characterisation of biodiversity value, ecosystems and threats to inform the effective allocation of conservation funding, Office for Official Publications of the European Communities, Luxembourg.
- Hausser Y. (Janvier 2013). Evaluation régionale des besoins et des formations disponibles pour les professionnels des aires protégées d'Afrique de l'ouest et du centre synthèse des études existantes et recommandations. Report published by Initiatives Conseil International for IUCN-PACO (Programme Afrique centrale et occidentale).
- Herbinger I. (2006). Report on Education and Awareness Activities to improve the protection of wild chimpanzees in West Africa, Wild Chimpanzee Foundation.
- Henschel P. (2014). The lion in West Africa is critically endangered, Panthera's Lion Program Survey, *PLOS ONE*.
- IUCN SSC Cat Specialist Group (February 2006). Conservation strategy for the lion in West and Central Africa.
- Kormos R., C. Boesch, M.I. Bakarr and T.M. Butynski (2003). Regional Action Plan for the Conservation of Chimpanzees in West Africa, IUCN/SSC Primate Specialist Group.
- Oates J.F. (1999). Myth and reality in the rain forest, how conservation strategies are failing in West Africa, University of California Press.
- Oates J.F. et al. (2007).Regional Action Plan for the Conservation of the Cross River Gorilla (Gorilla gorilla diehli), IUCN/SSC Primate Specialist Group and Conservation International.
- Mahot L. (2013). TRAFIC D'IVOIRE: Problèmes et solutions, Leçons des expériences de EAGLE, Eco Activists for Governance and Law Enforcement.
- Mittermeier R.A., C. Schwitzer, A.B. Rylands, L.A. Taylor, F. Chiozza, E.A. Williamson and J. Wallis (2014). Primates in Peril, The World's 25 Most Endangered Primates, 2012-2014, IUCN/SSC Primate Specialist Group, International Primatological Society, Conservation International and British Zoological Society.
- Office des Nations Unies Contre la Drogue et le Crime (2012). Compilation d'outils pour l'analyse de la criminalité liée aux espèces sauvages et aux forêts, office des Nations Unies contre la drogue et le crime.
- PNUD, Projet WAPO (2012). Inventaire aérien de l'écosystème W-Arly-Pendjari, Mai-Juin 2012.
- PNUD, Projet WAPO (2013). Inventaire pédestre de la grande faune de l'écosystème W Arly Pendjari.
- Program CITES-MIKE, 2013: Afrique de l'Ouest réunion du comité sous-regional de pilotage, Ouagadougou, Burkina Faso, 29-30 Mai 2013.
- CITES-MIKE (2013). Minutes of the CITES-MIKE Programme, West African Sub-regional Steering Committee Meeting, Ouagadougou, Burkina Faso, 29-30 May 2013.
- UICN (2003). Plan d'action pour la gestion des éléphants des corridors transfrontaliers d'Afrique de l'Ouest.
- UICN (2005). Plan d'action pour la gestion des éléphants des corridors transfrontaliers d'Afrique de l'Ouest.
- UICN (2005). Stratégie pour la conservation des éléphants de l'Afrique de l'Ouest.
- Workshop Report, Shumba Valley Lodge, South Africa (August 2001). Global Cheetah, Conservation Action Plan.
- Zwarts L. et al. (2009). Living on the Edge: Wetlands and Birds in a Changing Sahel, KNNV Publishing, Zeist, The Netherlands.

Websites

- Biodiversity and Protected area Management (BIOPAMA):
  http://www.biopama.org
- Digital Observatory for Protected Areas (DOPA):
  http://ehabitat-wps.jrc.ec.europa.eu/dopa_explorer/#
- Wildfinder, Worldwide Fund for Nature:
  http://worldwildlife.org/pages/wildfinder
- African Development Bank Group:
  http://www.afdb.org/
- Cheetah Conservation Fund:
  http://www.cheetah.org/
- Rangewide Conservation Program for Cheetah and African Wild Dogs:
  http://www.cheetahandwilddog.org
- Earth Times on great apes:
  http://www.earthtimes.org/conservation/great-apes-threatened-time-habitat-loss/2203/#sthash.1V0pgJxZ.dpuf
- Sahara Conservation Fund:
  http://www.saharaconservation.org
- Agreement on the Conservation of African-Eurasian Migratory Waterbirds:
  http://www.unep-aewa.org
- Great Apes Survival Partnership:
  http://www.un-grasp.org