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Environmental and Social Impact Assessment of the CBG Mine Expansion Project 18.5 MTPA Update Addendum

Chapter 3 – Biology Baseline Study

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Compagnie des bauxites de Guinée

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ABBREVIATIONS AND ACRONYMS

(Note: Text in square brackets [] is a translation of a French term for which there is no official English version.)

°C:	Degrees Celsius
AFD	Agence Française de Développement [French development agency]
AIDS:	Acquired immune deficiency syndrome
AIP:	Annual investment plan
AMC:	Alliance Mining Commodities Ltd.
ANAÏM:	Agence Nationale d'Aménagement des Infrastructures Minières [national agency for mining infrastructure development]
APA:	Laboratoire Archéologie et Peuplement de l'Afrique [African archeology and settlement laboratory]
APAÉ:	Association des parents et amis d'élèves [parents and friends of students]
ARV:	Antiretroviral
BAP:	Biodiversity action plan
BEPC:	<i>Brevet d'études du premier cycle du second degré</i> [middle-school leaving certificate]
BGÉE:	Bureau Guinéen d'Études et d'Évaluation Environnementale [Guinean bureau of environmental studies and assessment]
BM:	Banque Mondiale / World Bank (WB)
BPII:	<i>Bonnes pratiques industrielles internationales</i> / Industrial international best practices
C/P:	Frontline fishing camps and ports

- CA:** *Chiffre d'affaires* [revenues]
- CBG:** Compagnie des Bauxites de Guinée
- CCME:** Canadian Council of Ministers of the Environment
- CCNUCC:** *Convention-cadre des Nations Unies sur le changement climatique* / World Bank United Nations Framework Convention on Climate Change (UNFCCC)
- CDD:** *Contrat de durée déterminée* [contract of defined length]
- CDI:** *Contrat de durée indéterminée* [contract of indefinite length]
- CÉCI:** *Centre d'études et de coopération internationale* / Centre for international Studies and Cooperation
- CECIDE:** Centre du Commerce International pour le Développement [international trade center for development]
- CEDEAO:** Communauté économique des États de l'Afrique de l'Ouest / United Nations Economic Commission for Africa (UNECA)
- CFB:** Chemin de Fer de Boké [Boké railroad]
- CITES:** Convention on International Trade in Endangered Species
- CMG:** Chambre des Mines de Guinée [Guinean chamber of mines]
- COBAD:** Compagnie de Bauxite et d'Alumine Dian-Dian [Dian-Dian Bauxite and Alumina Company]
- COD:** Chemical oxygen demand
- COPC:** Contaminant of potential concern
- CoPSAM:** Comité Préfectoral de Suivi des Activités des Miniers [prefectoral mining activity monitoring committee]
- CPC:** *Contaminant potentiellement préoccupant* / contaminant of potential concern (COPC)

CPD:	Comité Préfectoral de Développement [prefectoral development committee]
CPÉ:	<i>Consultation et participation éclairées</i> / informed prior consent (IPC)
CR:	<i>Commune rurale</i> [rural commune]
CRD:	<i>Commune rurale de développement</i> [rural development commune]
CSA:	Centre de santé amélioré [improved health center]
CSO:	Civil society organizations
CSR:	Corporate social responsibility
CU:	<i>Commune urbaine</i> [urban commune]
CVÉ:	<i>Composante valorisée de l'écosystème</i> / valued ecosystem component (VEC)
dB:	Decibel
dB(A):	A-weighted decibel
dBZ:	Decibel relative to Z
DEP	Direction Préfectorale de l'Éducation [prefectoral directorate for education]
DPUHC:	Direction préfectorale de l'urbanisme de l'habitat et de la construction [prefectoral directorate for housing and construction]
DUDH:	<i>Déclaration universelle des droits de l'homme</i> / Universal Declaration of Human Rights (UDHR)
ÉDG:	Électricité de Guinée
EIA:	Environmental impact assessment
ÉIE:	<i>Étude d'impact environnemental</i> / environmental impact assessment
ÉIS:	<i>Étude d'impact social</i> / social impact assessment
EITI:	Extractive Industries Transparency Initiative

EPA:	Environmental Protection Agency (United States)
EPI:	Extended Program on Immunization
EPT:	Ephemeroptera, Plecoptera and Trichoptera (types of aquatic insects)
ESCOMB:	<i>Enquête de surveillance comportementale et biologique sur le VIH/SIDA</i> [HIV/AIDS behavioral and biological surveillance survey]
ESIA:	Environmental and social impact assessment
ESMP:	Environmental and social management plan
ETAE:	<i>Eaux tropicales de l'Atlantique Est</i> [tropical waters of the Eastern Atlantic]
FEL 1:	Front-end loading – preliminary economic assessment
FEL 2:	Front-end loading – prefeasibility study
FEL 3:	Front-end loading – detailed engineering study
FPIC:	Free prior and informed consent
GAC:	Guinea Alumina Corporation
GdG:	<i>Gouvernement de la Guinée</i> / Government of Guinea (GoG)
GDP:	Gross domestic product
GES:	<i>Gaz à effet de serre</i> / greenhouse gas (GHG)
GHG:	Greenhouse gas
GIEC:	Groupe d'experts intergouvernemental sur l'évolution du climat / Intergovernmental Panel on Climate Change (IPCC)
GIS:	Geographic information system
GNF:	Guinean franc
GoG:	Government of Guinea
GPS:	Global positioning system

GRI:	Global Reporting Initiative
GTP:	Ground truth point methodology
Ha:	Hectare
HAP:	<i>Hydrocarbure aromatique polycyclique</i> / polycyclic aromatic hydrocarbon (PAH)
HFO:	Heavy fuel oil
HP:	Horsepower
HSE:	Health, safety and environment
IBA:	Important bird area
ICCPR:	International Covenant on Civil and Political Rights
ICESCR:	International Covenant on Economic, Social and Cultural Rights
ICMM:	International Council on Mining and Metals / Conseil International des Mines et des Métaux
IFC:	International Finance Corporation / <i>Société Financière Internationale</i> (SFI)
IFI:	International finance institutions / <i>institutions financières internationales</i>
ILO:	International Labor Organization
IPCC:	Intergovernmental Panel on Climate Change
ISQG:	CCME Interim Sediment Quality Guideline
IST:	<i>Infections sexuellement transmissibles</i> / sexually transmitted infections (STIs)
ITIE:	Initiative pour la Transparence des Industries Extractives / Extractive Industries Transparency Initiative (EITI)
IUCN:	International Union for Conservation of Nature / Union internationale pour la conservation de la nature (UICN)

km:	Kilometer
km²:	Square kilometer
LA_{eq}:	Equivalent sound level (dBA)
LDIQS:	CCME Interim Sediment Quality Guideline
L_{eq}:	Equivalent sound level (dB)
m:	Meter
m²:	Square meter
m³:	Cubic meter
m³/h:	Cubic meters per hour
MDDEP:	Ministère du Développement durable, de l'Environnement et des Parcs du Québec, now called the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques [Quebec ministry of sustainable development, environment and parks, now called the ministry of sustainable development, environment and the fight against climate change]
MDT:	<i>Matières dissoutes totales</i> / total dissolved solids (TDS)
ml:	Milliliter
mm:	Millimeter
MME:	Ministère des Mines et de l'Énergie / Ministry of Mines and Energy
MTPA:	Million tonnes per annum
MW:	Megawatt
N/A:	Not applicable
NEP:	<i>Niveau d'effet probable du CCME</i> / CCME probable effects level (PEL)
NGO:	Nongovernmental organization
NP:	<i>Norme de performance de la SFI</i> / IFC Performance Standard (PS)

NSP:	<i>Ne s'applique pas</i> / not applicable (N/A)
OAU:	Organization of African Unity
OCDE:	Organisation de Coopération et de Développement Économique / Organization for Economic Cooperation and Development (OECD)
OECD:	Organization for Economic Cooperation and Development
OIT:	Organisation internationale du Travail / International Labor Organization (ILO)
OMS:	Organisation mondiale de la Santé / World Health Organization
ONG:	<i>Organisme non-gouvernemental</i> / nongovernmental organization
ONU:	Organisation des Nations-Unies / United Nations
OSC:	<i>Organisations de la société civile</i> / civil society organizations
OUA:	Organisation de l'unité africaine / Organization of African Unity
OWINFS:	Our World Is Not for Sale
PACV:	<i>Programme d'appui aux organisations villageoises</i> [village support program]
PAH	Polycyclic aromatic hydrocarbon
PAI:	<i>Plan annuel d'investissement</i> / annual investment plan
PARC:	<i>Plan d'action de réinstallation et de compensation</i> / resettlement and compensation action plan (RAP)
PCB:	<i>Plan de conservation de la biodiversité</i> / biodiversity action plan (BAP)
PCS:	<i>Partenaires contre le SIDA</i> [AIDS prevention group]
PDL:	<i>Plan de développement local</i> [local development plan]
PEL:	CCME probable effects level
PEPP:	<i>Plan d'engagement des parties prenantes</i> / stakeholder engagement plan (SEP)

PÉV:	<i>Programme élargi de vaccination / Expanded Programme on Immunization (EPI)</i>
PGES:	<i>Plan de gestion environnementale et sociale / environmental and social management plan (ESMP)</i>
PIB:	<i>Produit intérieur brut / gross domestic product (GDP)</i>
PIDCP:	<i>Pacte international relatif aux droits civiles et politiques / International Covenant on Civil and Political Rights (ICCPR)</i>
PIDESC:	<i>Pacte international relatif aux droits économiques, sociaux et culturels / International Covenant on Economic, Social and Cultural Rights (ICESCR)</i>
PK:	Point kilométrique / kilometer point
PM₁₀:	Particulate matter in air up to 10 micrometers in size
PM_{2.5}:	Particulate matter in air up to 2.5 micrometers in size
PMH:	<i>Pompe à motricité humaine / manually operated pump</i>
PNUD:	Programme des Nations-Unies pour le Développement / United Nations Development Program (UNDP)
PP:	<i>Parties prenantes / stakeholders</i>
PPV:	Peak particle velocity
PRCB:	Projet de renforcement des capacités de Boké [Boké rural community development project]
PS:	IFC Performance Standard
QSE:	Quality, safety and environment
RAP:	Resettlement and compensation action plan
RAP:	Rapid assessment program / rapid biological assessment
RSE:	<i>Responsabilité sociale des entreprises / corporate social responsibility (CSR)</i>

RTA:	Rio Tinto Alcan
SAG:	Société Aurifère de Guinée [Guinea gold corporation]
SDT:	<i>Solides dissous totaux</i> / total dissolved solids (TDS)
SEG:	Société des Eaux de Guinée [Guinea water corporation]
SEP:	Stakeholder engagement plan
SFI:	Société Financière Internationale / International Finance Corporation (IFC)
SIA:	Social impact assessment
SIDA:	<i>Syndrome d'immunodéficience acquise</i> / acquired immune deficiency syndrome (AIDS)
SIG:	<i>Système d'information géographique</i> / geographic information system (GIS)
SNAPE:	Service national des points d'eau [national water supply points service]
SO_x:	Sulphur oxides
SP:	<i>Sous-préfecture</i> [subprefecture]
SSC:	Species Survival Commission
SSE:	<i>Santé, sécurité, environnement</i> / health, safety and environment (HSE)
SST:	<i>Solides en suspension totaux</i> / total suspended solids (TSS)
STI:	Sexually transmitted infections
TDR:	<i>Termes de référence</i> / terms of reference (TOR)
TDS:	Total dissolved solids
TOR:	Terms of reference
TPE:	<i>Très petite entreprise</i> / very small business
TPH:	Tonnes per hour

TSP:	Total suspended particulates
TSS:	Total suspended solids
UDHR:	Universal Declaration of Human Rights
UICN:	<u>Union internationale pour la conservation de la nature</u> / International Union for Conservation of Nature (IUCN)
UN:	United Nations
UNDP:	United Nations Development Program
UNECA:	United Nations Economic Commission for Africa
UNESCO:	United Nations Organization for Education, Science and Culture / Organisation des Nations unies pour l'éducation, la science et la culture
UNFCC:	United Nations Framework Convention on Climate Change
UniGE:	Université de Genève / University of Geneva
UTM:	Universal Transverse Mercator
VEC:	Valued ecosystem component
VIH:	<i>Virus de l'immunodéficience humaine</i> / human immunodeficiency virus (HIV)
WB:	World Bank / Banque Mondiale (BM)
WHO:	World Health Organization / Organisation mondiale de la Santé (OMS)
ZÉE:	<i>Zone économique exclusive de la Guinée</i> [Guinea economic exclusive zone]
ZICO:	<i>Zone importante pour la conservation des oiseaux</i> / important bird area (IBA)

CHAPTER 3 – BIOLOGY BASELINE STUDY

3.1 Introduction

3.1.1 *The Reason for an Update*

The CBG Project and the purpose of this Addendum are described in Chapter 1.

This biology baseline study contributes to a good understanding of the biological elements in the potentially affected areas and forms, with the physical and social baseline studies, the basis for an exhaustive study of the impacts related to an increase in the extraction rates.

Since the publication of the original CBG Expansion ESIA in 2014, there have been a number of biological studies done on the South Cogon part of the CBG concession. Some of these have been reported on and released in other published studies, notably:

- The Supplementary Information Package (SIP) (2015);
- The Biodiversity Management System (BMS) (2016); and
- The COBAD Road Addendum to the CBG Extension Project ESIA (2017).

Others have not yet been published and are being released here for the first time: the biological studies for the Southeast Extension. The Southeast Extension refers to a spatial increase in the area to be mined towards the southeast part of South Cogon.

Finally there are ongoing biological studies in South Cogon:

- A forest management study (including ornithological and aquatic ecology surveys of the most southern part of South Cogon not previously studied during the ESIA studies);
- A chimpanzee and medium to large mammal monitoring survey;
- A herpetological survey; and
- A botanical survey.

Should data from these ongoing surveys become available during the production and review of this report, they will be included in this update.

Finally useful data have become available through the publication of the revised GAC ESIA (ERM, 2015).

The status of some of the species of concern have been revised since the 2014 ESIA, notably the Atlantic humpback dolphin (*Sousa tueszlii*), the West African chimpanzee (*Pan troglodytes verus*) and three vulture species have all been upgraded to Critically Endangered by the IUCN.

Given the significant increase in the knowledge of the biodiversity in the Project area, particularly in the South Cogon area, it was thought useful to do a targeted update of the biodiversity description.

3.1.2 *References Considered in the Updated Baseline*

3.1.2.1 CBG Expansion Project ESIA (ÉEM, 2014)

ÉEM/Sylvatrop Consulting, 2014. Biology Baseline Study. Summary Report. Volume 3 of the Environmental and Social Impact Assessment for the CBG Expansion Project (ESIA). 288 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 1 : Botanical baseline survey in Guinea for Compagnie des Bauxites de Guinée (CBG). 44 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 2: Marine mammal, sea turtle and crocodile occurrence in the Rio Nuñez region of Guinea, 24 October to 8 November 2013. 102 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 3 : Results of a Rapid Baseline Survey of the Fishery Resources of the Rio Nuñez Estuary, North- west Guinea. 36 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 4 : Inventaires des poissons et des macroinvertébrés aquatiques. 53 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 5 : A survey of the large mammals of Sangarédi and Kamsar in Boké prefecture. 61 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 6 : A survey of the birds of Sangarédi sous-prefecture. 34 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 7 : A survey of the birds of Kamsar. 13 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 8 : Inventaire des reptiles de la région de Sangarédi dans le contexte du Projet d'expansion de la mine de bauxite de la CBG. 67 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 9 : Inventaire des reptiles de la région de Kamsar dans le contexte du Projet d'expansion de la mine de bauxite de la CBG. 40 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 10 : Inventaire des amphibiens dans les sous-préfectures de Kamsar et Sangarédi (région de Boké). 36 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 11: Rapid Survey of Hunting and the Bushmeat Trade in and around Sangarédi, North-west Guinea. 23 p.

Sylvatrop Consulting, 2014. Biology Baseline Study. Volume C of the ESIA, Annexe 12 : Results of a Rapid Baseline Survey of the Use of Woodfuel Resources in and around Sangarédi, North-west Guinea. 32 p.

ÉEM, 2014. Biological Impact Assessment. Volume 4 of the Environmental and Social Impact Assessment for the CBG Expansion Project. 139 p.

3.1.2.2 Studies Produced as Part of the CBG Expansion Project Supplementary Information Package (ÉEM, 2015) (SIP)

CBG Expansion Project Supplementary Information Package (ÉEM, 2015) (SIP)

ÉEM, 2015. Main Report of the Supplementary Information Package (SIP).

ÉEM, 2015. Biology Maps. Appendix 9.7, Volume II of the Appendices to the SIP.

ÉEM, 2015. Framework for Conserving Biodiversity. Appendix 9.8, Volume III of the Appendices to the SIP.

ÉEM, 2015. Review of Selected Impacts. Appendix 9.9, Volume III of the Appendices to the SIP.

ÉEM, 2015. Summary of Commitments and Mitigation. Appendix 9.10, Volume III of the Appendices to the SIP.

ÉEM, 2015. The Biodiversity Consultancy Critical Habitat Assessment. Appendix 9.11, Volume III of the Appendices to the SIP.

ÉEM, 2015. Biodiversity Assessment Framework. Appendix 9.13, Volume III of the Appendices to the SIP.

ÉEM, 2015. Appendices to the Biodiversity Assessment Framework. Appendix 9.14, Volume III of the Appendices to the SIP.

3.1.2.3 Studies Included in the CBG Biodiversity Management System (BMS) (ÉEM, 2016)

ÉEM, 2015. CBG Biodiversity Management System (EEM, 2016)

ÉEM, 2016. Main Report, versions 1 and 2

ÉEM, 2015. Appendix A – Miscellaneous Data.

Wild Chimpanzee Foundation, 2015. Appendix B - Complementary Primates Study CBG Expansion Project.

The Biodiversity Consultancy, 2015. Appendix C - Chimpanzee Offset Strategy and Pre-Feasibility Study for the CBG Expansion Project.

2015. Appendix D-1 - Inventory of reptiles and amphibians in the region of Sangarédi – Guinea: Complementary mission to search for threatened species

2015. Appendix D-2 - Complementary Chimpanzee Study - CBG Expansion Project, Sangarédi region

2015. Appendix D-3 - Identifying Areas of Nesting Chimpanzees by Aerial Photography and Unmanned Aerial Vehicle⁸

ÉEM, 2016. Appendix E - Species Protected in Guinea

ÉEM, 2018. Appendix F – Additions to the BAP from the CBG COBAD Road Addendum to the ESIA

3.1.2.4 Studies Produced as Part of the COBAD Road in the CBG Concession ESIA (2017)

ÉEM, 2017. Chapter 3 – Biology Baseline Study – for the Addendum for the COBAD road in the CBG-Halco concession. Environmental and Social Impact Assessment of the CBG Mine Expansion Project

Sylvatrop Consulting, 2016. Annex 3-1 - Botanical inventories and impacts of the COBAD Road construction on CBG's Concession

Sylvatrop Consulting, 2016. Annex 3-2 - Herpetological Report –COBAD Road in the CBG Halco Concession

Sylvatrop Consulting, 2016. Annex 3-3 - Survey of chimpanzees and other large mammals along the COBAD Road in the CBG Concession

Sylvatrop Consulting, 2016. Annex 3-4 - Herpetological inventory for the environmental study of the original COBAD route in the CBG Concession

Sylvatrop Consulting, 2016. Annex 3-5 - Data extracts from a chimpanzee survey along the original Cobad route in the CBG Concession

Sylvatrop Consulting, 2016. Annex 3-6 - Botanical inventories of Section 3 of the COBAD Road

Sylvatrop Consulting, 2016. Annex 3-7 - Herpetological Report – Section 3 of the COBAD Road in the CBG Halco Concession

Sylvatrop Consulting, 2016. Annex 3-8 - Ornithological Report – Section 3 of the COBAD Road in the CBG Halco Concession

ÉEM, 2017. Chapter 4 – Biology Impact Assessment – for the Addendum for the COBAD road in the CBG-Halco concession. Environmental and Social

Impact Assessment of the CBG Mine Expansion Project **Studies Related to the New Boulléré Road**

ÉEM, 2017. Biology Baseline Study – New Boulléré Road.

Sylvatrop Consulting, 2016. Appendix - 1 - Inventaire botanique à l'état initial - Nouvelle route de Boulléré.

Sylvatrop Consulting, 2016. Appendix X - 2 - Inventaires de base des poissons et des macro-invertébrés - Nouvelle route de Boulléré.

Sylvatrop Consulting, 2016. Appendix - 3 - Inventaire herpétologique - Nouvelle route de Boulléré.

Sylvatrop Consulting, 2016. Appendix - 4 - Inventaire ornithologique à l'état initial - Nouvelle route de Boulléré.

Sylvatrop Consulting, 2016. Appendix - 5 - Inventaire moyen et grands Mammifères à l'état initial - Nouvelle route de Boulléré.

3.1.2.6 **Studies Related to the Southeast Extension**

(Included as part of this report)

Sylvatrop Consulting, 2016. Appendix 3-1. Inventaire botanique dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

Sylvatrop Consulting, 2016. Appendix 3-2. Inventaire d'écologie aquatique dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

Sylvatrop Consulting, 2016. Appendix 3-3. Inventaire herpétologique dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

Sylvatrop Consulting, 2016. Appendix 3-4. Inventaire ornithologique dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

Sylvatrop Consulting, 2016. Appendix 3-5. Inventaire des moyens et grands mammifères dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

3.1.2.7 Studies Related to the Dredging Management Plan

EEM produced a Dredging Management Plan (DMP) in 2017 that included two biodiversity components :

Jasco Applied Sciences, 2016. Port of Kamsar Quay Extension Project – Impact of Underwater Sounds.

UQAR SMER, 2016. Détermination de la Composition Spécifique Benthique du Secteur Côtier de Kamsar, Guinée. Laboratoire d'écologie benthique. Institut des sciences de la mer, Université du Québec à Rimouski.

3.1.2.8 GAC Studies

ERM, 2015. Social and Environmental Impact Assessment (SEIA) Addendum for GAC's Bauxite Export Project, Guinea.

Annex 6.4A: Biodiversity – Baseline data collection

Annex 6.4B: WCF Mammal baseline report

Annex 6.4C: WCF Bushmeat and wood collection report

Annex 7.1A: Benthic grab survey field report

Annex 7.1B: Benthic samples laboratory results

Annex 7.1D: Benthic data

3.1.2.9 IUCN Species Status Updates

The current status of species of most concern were checked using the IUCN site : <http://www.iucnredlist.org>.

3.1.3 *Goals of the Study*

The specific objectives of the biology baseline update are to provide a revised baseline for the biology impact assessment by:

- Describing the biodiversity studies in the Southeast Extension;

- Reassessing the faunistic and floristic diversity, in particular in the habitats affected by the Project based on the new data; and
- Reassessing the presence of vulnerable or threatened species (according to the current IUCN list) and species protected under Guinean law.

3.1.4 *Study Areas*

3.1.4.1 Identification of Study Areas

The Study Areas have been described in a general way in Chapter 1. Only some specific aspects related to the biological studies are brought up here reflecting additional work done in South Cogon.

3.1.4.2 Zone 1 – South Cogon

2014 ESIA

Fieldwork for establishing the biological baseline data for the 2014 ESIA was concentrated on:

- The areas that would see changes linked to the increase in the rate of bauxite extraction; and
- Reference sites.

The original fieldwork for the 2014 ESIA was done in the in the following order:

- As a first priority the direct impact areas subject to the effects of the increase in extraction rate (defined by CBG as the zones to be mined during 2024-2028 in the *CBG Long Term Mining Plan 2013-2028* [CBG LTMP 2013-2028 27B]);
- As a second priority, areas that might be potentially important or different biologically in the indirect impact areas. This in order to complete knowledge of the species present in Zone 1; and
- As a third priority, zones to be mined in the period 2013 to 2028 with the exception of those already identified as first priority targets.

The areas surrounding Boulléré were selected as a reference site. The remnant forest near Boulléré, in spite of an observed degradation, still offered some biological diversity.

WCF Chimpanzee Study (2015)

The WCF chimpanzee study covered all of the South Cogon part of the CBG concession, except for areas near Sangaredi.

Miscellaneous Chimpanzee Studies by Sylvatrop Consulting (2015-2016)

The miscellaneous chimpanzee studies conducted by Sylvatrop Consulting in 2015 and 2016 sought to address specific questions such as the presence of chimpanzees near active mining operations and the use of isolated patches of forest on the plateaus and this covered various selected and non-contiguous areas.

Additional Reptile and Amphibian Work by Sylvatrop Consulting (2015)

The additional reptile and amphibian work during 2015 concentrated on locating certain critical species and covered potential hot spots through the concession.

COBAD and Boullere Road Studies (2017)

The COBAD road studies included both the original planned COBAD alignment through the Kewewol valley and the final alignment to the east on the plateaus. The Boullere road study covered the area from Boullere to near Hamadallaye.

Southeast Extension Studies

The southeast extension studies covered a small area to the south of the 2014 planned mining area (see Map 3-1 in Section 3.2)

3.1.4.3 Zone 2 – Kamsar: the Plant and Port

The only systematic biology studies for Zone 2 were those done in 2013 for the 2014 ESIA. Limited fieldwork was done in 2015 for benthic invertebrates.

The environmental Study Area for Zone 2 in the 2014 ESIA took into account the main islands bordering the Rio Nuñez that could eventually be affected directly or indirectly by the Project (construction activities at the new ore quay and potential

dredging of the access channel), namely the islands of Taïgbé, Taïdi and the northwest part of Binari.

The northern part of Binari Island was selected as a biological reference site. This island, whose southern part is within a Ramsar site, by its distance from Kamsar and its limited accessibility, seemed at first glance during the scoping study to have an environment that was less modified by anthropic activities than the islands closer to Kamsar.

It should be noted that the especially in the marine environment, the biological Study Area in Kamsar was slightly extended towards the southwest to take into account the influence of potential dredging activities (transport of sediment in suspension for example) and the possible presence of an ore ship transfer point. Studies on marine mammals and reptiles and the fishery study therefore extended beyond the Study Area limits determined during the scoping study.

3.1.4.4 Zone 3 – the Railroad

Zone 3 was not the subject of specific biological field studies by CBG, apart from visits by the team botanists to the new siding areas in 2013. The railroad has been subject of a separate ESIA under the Multi-User Agreement but that document is not reviewed here.

3.1.5 *Participants*

The ESIA Project team is described in a general way in Chapter 1.

Eric Muller was the author of this update report. Detailed lists of participants in the various studies are given in each specialist study report.

3.1.6 *Prior Studies*

The following studies provided useful data :

[BERCA-Baara EIA for the N'Dangara and Boundou Wandé Mining Plateaus](#)

Preliminary version of a 2003 report commissioned by CBG and written by consulting firm BERCA-baara, entitled *Étude d'impact sur l'environnement du Projet d'exploitation des gisements de N'Dangara et de Boundou Wandé* (BERCA-Baara-BERD, 2003).

[BERCA-Baara Study of Flora of the Plateaus](#)

A 2003 report commissioned by CBG and written by consulting firm BERCA-baara, titled *Inventaire de la flore des plateaux miniers de Sangarédi, Bidikoum, Silidara et N'Dangara* (BERCA-Baara, 2003).

This study is useful and provides interesting data, particularly on ethnobotanical aspects and the use of certain species for revegetation

[Boké RAP Study](#)

The 2006 survey *A Rapid Biological Assessment (RAP) of Boké Préfecture, Northwestern Guinea* (Wright et al, 2006) is a good assessment of selected sites in Boké prefecture: "The RAP survey was carried out at several sites in Boké Préfecture along the coast of northwestern Guinea (Guinée Maritime): Sarabaya (Rio Kapatchez), Kamsar (including 5 subsites), and Boulléré."

[Critical Habitat Assessment Report, Guinea Alumina Corporation Project](#)

Study published in 2008 on the habitats of certain mammals (chimpanzees mainly) in the GAC concession (Ecology and Environment Inc. et Kormos, 2008).

3.1.7 Structure of the Report

This chapter includes the following subsections:

- Section 3.2 presents a summary of the findings from the southeast extension field studies and the detailed reports are presented as Appendices 3-1 to 3-5.

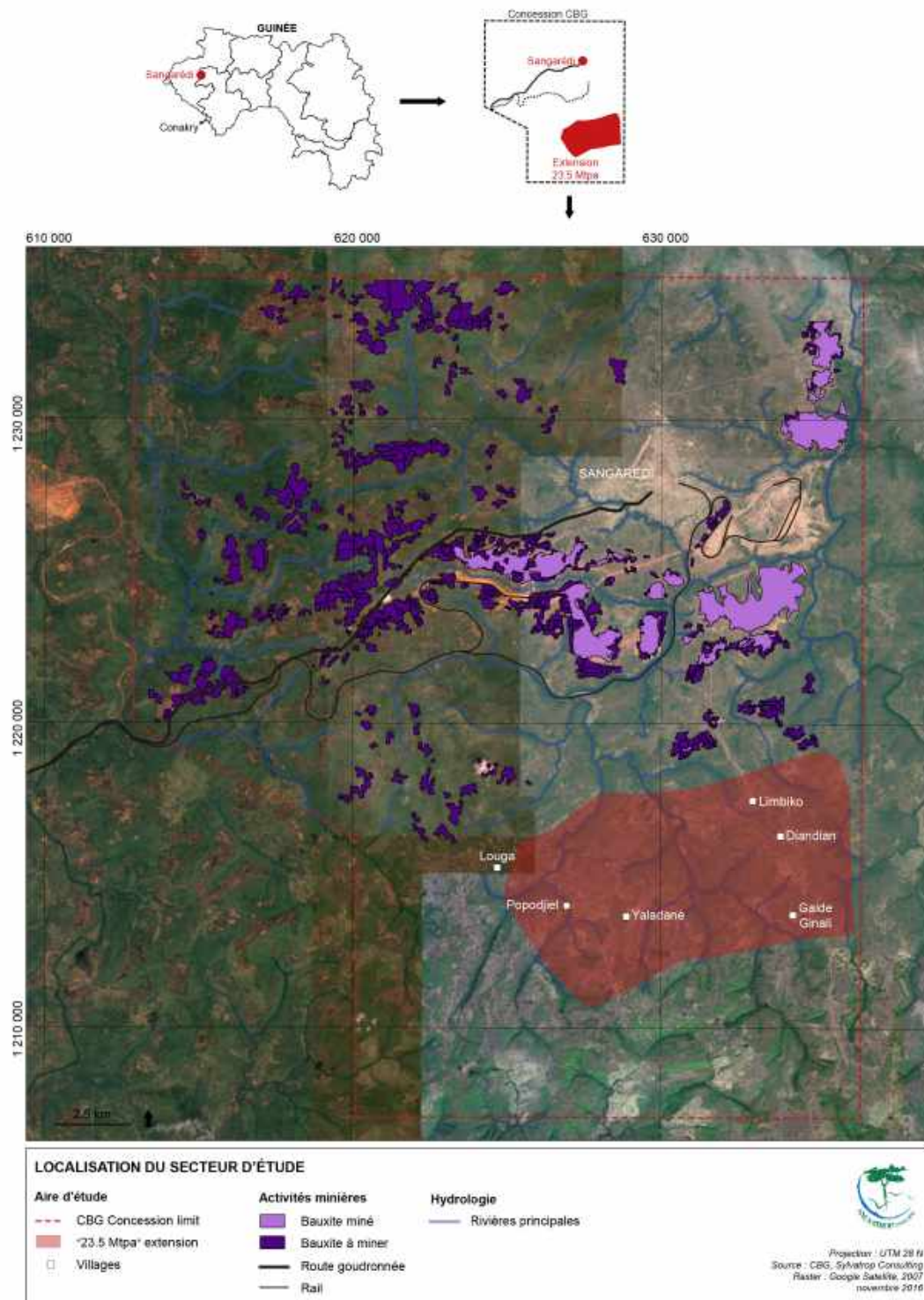
- Section 3.3 presents updates to the data based on an assessment of the additional data gathered since 2014.
- Section 3.4 presents updates to the species of concern lists.

3.2 Southeast Extension Field Studies

3.2.1 *Introduction*

The Southeast Extension area refers to a new area included in the latest version of the CBG mining plan. This area was not studied during previous biodiversity field work for the CBG and consequently EEM initiated a series of field studies in this area in the period from September 27 to November 11 2016 (Map 3-1).

Map 3-1 Map of Southeast Extension Area



The details of these studies are presented in a series of appendices in French to this chapter :

Appendix 3-1. Inventaire botanique dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

Appendix 3-2. Inventaire d'écologie aquatique dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

Appendix 3-3. Inventaire herpétologique dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

Appendix 3-4. Inventaire ornithologique dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

Appendix 3-5. Inventaire des moyens et grands mammifères dans le cadre de l'étude environnementale de la zone d'extension sud-est de la CBG.

3.2.2 *Botanical Surveys*

A total of 207 plant species were identified from the study area.

No IUCN Endangered or Critically Endangered species were found.

Six of the species found are considered Vulnerable by the IUCN: *Khaya senegalensis*, *Azalia africana*, *Albizia ferruginea*, *Milicia regia*, *Nauclea diderrichii*, *Terminalia ivorensis*.

One species was found that is considered Near Threatened by the IUCN : *Milicia excelsa*.

Only one invasive plant species was noted : *Chromolaena odorata*.

Vegetation types were similar to other parts of South Cogan with low areas of dense forest. Dense forest had the highest number of species and the most species of concern.

3.2.3 Aquatic Ecology Surveys

A survey of 22 sites on 18 watercourses and 2 ponds led to the identification of 19 fish species and 11 taxa of macroinvertebrates.

Two fish species of conservation interest were identified : *Paramphilus teugelsi* (Vulnerable IUCN status) and *Paramphius trichomycteroides* (Near Threatened IUCN status).

No Endangered or Critically Endangered species were found.

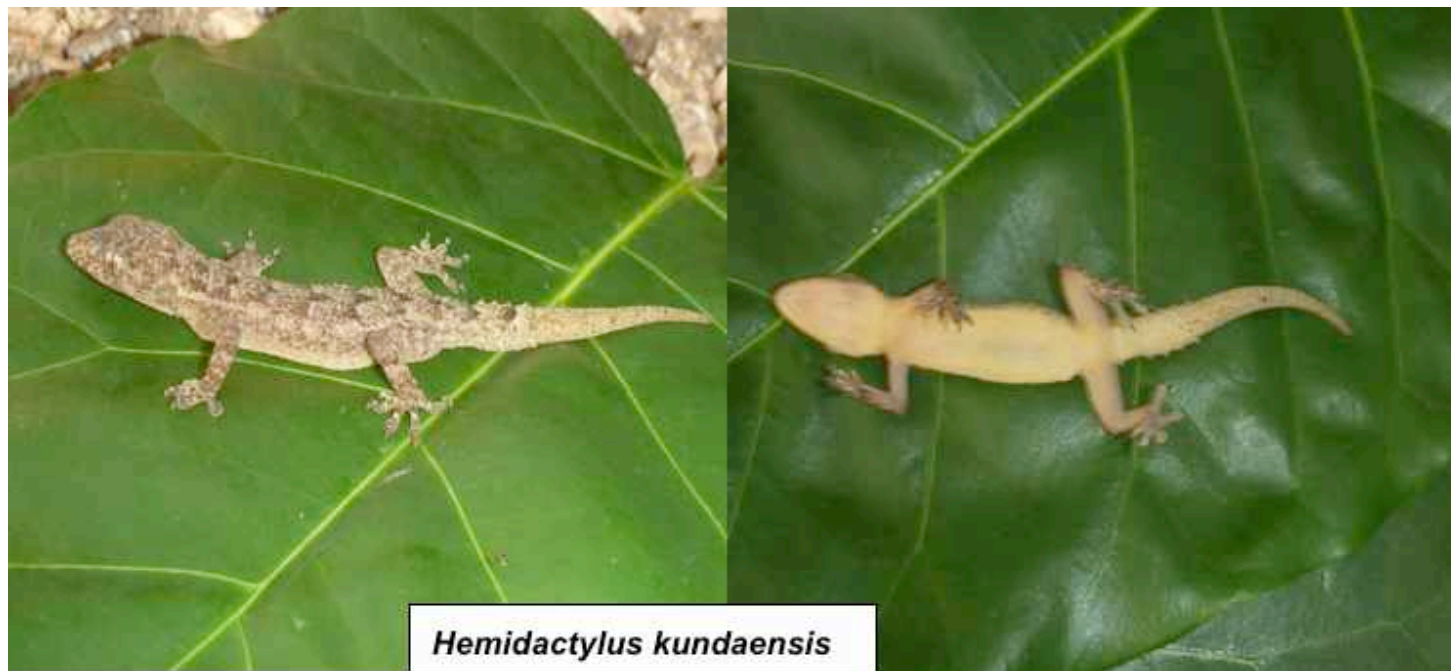
Water course quality was judged relatively satisfactory based on the EPT index.

3.2.4 Herpetological Surveys

The herpetological surveys identified 12 amphibian and 10 reptile species.

The IUCN Critically Endangered Kunda gecko (*Hemidactylus kundaensis*) was found at six different localities places during the surveys.

Photo 3-1 Kunda Gecko



The IUCN Vulnerable West African dwarf crocodile (*Osteolaemus tetraspis*) was found at one site.

Photo 3-2 West African Dwarf Crocodile



The frog *Odontobatrachus cf smithi* was found at one site. This species was only described in 2015 (Barej et al, 2015) and appears to have a very limited range. Although not yet evaluated by the UICN, it is likely based on its limited range and habitat to be considered Endangered (Barej et al, 2015).

Photo 3-3 *Odontobatrachus Cf Smithi*



3.2.5 *Ornithological Surveys*

The bird surveys identified 76 species from the study area.

Two Critically Endangered vultures (*Gyps africanus* and *Necrosyrtes monachus*) were found, and breeding on-site was confirmed for the latter species.

3.2.6 *Mammal Surveys*

The mammals survey identified 26 species of large and medium mammals.

Species found of conservation interest were the Critically Endangered West African chimpanzee (*Pan troglodytes verus*) and a number of Near Threatened species : the sooty mangabey (*Cercocebus atys atys*), the spotted-necked (*Hydrictis maculicollis*) and African clawless (*Aonyx capensis*) otters as well as the yellow-backed (*Cephalophus silvicultor*) and bay (*Cephalophus dorsalis*) duikers.

A total of 225 chimpanzee nests were noted.

Map 3-2 Map of Chimpanzee Nests

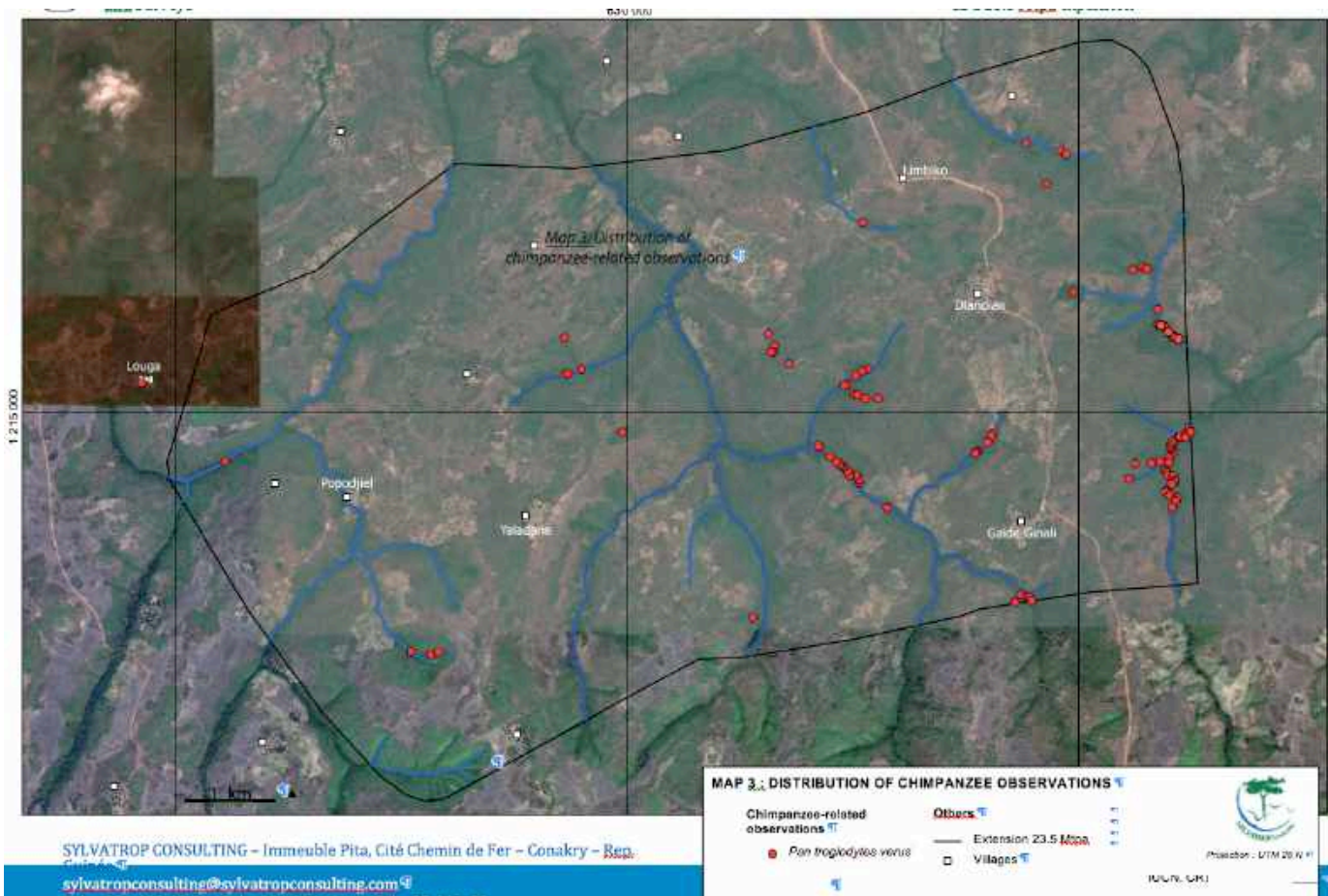


Photo 3-4 Chimpanzees Taken in Camera Trap

Mammal observations tended to be concentrated in the southeastern part of the study area and tended to confirm the importance of riparian and wooded habitats.

3.2.7 *Conclusions*

In many ways the southeast extension area was similar to the already studied parts of South Cogan. The number of *Hemidactylis kundaensis* sightings (6) was unusual but perhaps suggests that this area is closer to the central part of the range of this very spatially limited species. The finding of a new frog species for the CBG concession of very limited range confirms the importance of this area for amphibians. Chimpanzee numbers in the southeast quarter appeared high and may be a good indication of the potential importance of these southern parts of South Cogan for chimpanzees.

3.3 Updated Overall Information

3.3.1 *Plants*

The current running list of species from the CBG field work on Zone 1 and 2 now includes 443 plants, compared to the regional total of 834. The regional total includes the species lists from the RAP 40 study and other sources.

To date the only tentative IUCN Endangered or Critically Endangered plant is *Raphionacme cf caerulea* identified during the COBAD Road studies in grassland on the plateau. The specimen was sent to Kew Gardens for identification confirmation but confirmation was not received. Current studies in South Cogon by the Missouri Botanical Gardens may determine whether the sighting is correct.

The limited number of IUCN Endangered or Critically Endangered species is in part indicative of the limited number of Guinean plants evaluated by the IUCN.

A recent effort by Charlotte Couch of Kew Gardens and others to make a checklist of threatened plants of Guinea (Couch, C., S. Magassouba, S. Rokni, and M. Cheek, December, 2017. Threatened plant species of Guinea-Conakry : A Preliminary Checklist. Peerj Preprints.) is very useful. The list includes 253 species. A rapid comparison of the list with the CBG list does not indicate the presence of any of these species (save the possible *Raphionacme cf caerulea*) but a more careful check will be made.

3.3.2 *Fish*

The current running list of freshwater fish species from the CBG field work on Zone 1 and 2 now includes 68 species, compared to the regional total of 81. The regional total includes the species lists from the RAP 40 study and other sources. In addition, 35 species of estuarine and marine fish were found in the Kamsar area. The regional list for marine fish should be considerably larger but lack of studies do not allow compiling a reasonable regional list.

Three freshwater fish species were taken off the list of species found as a result of an analysis of the more recent field studies:

- *Epiplatys njalaensis* – Endangered
- *Epiplatys hildegardae* – Vulnerable
- *Nimbapanchax jeanpoli* (= *Archiaphyosemion jeanpoli*) – Endangered

All three of these species are normally found far to the east, in extreme southeastern Guinea or Sierra Leone over 500 km away (see BMS Appendix A, 2016). The results of the 2013 fieldwork for other taxonomic groups also showed significant western range extensions but typically of shorter distances (100-200 km), for example from the Fouta Djallon area to the Sangarédi area. It was decided in the 2014 ESIA to conservatively accept these species as valid records given the expertise of the persons responsible for the study but recognizing the need to verify these identifications with further fieldwork and perhaps DNA analysis.

During 2016-2018 there were five further freshwater ecology surveys, including close to where two of these species had presumably been found. No specimen of any of these three species has been found again. Furthermore, no confirmatory evidence has been supplied to bolster the initial identifications. For these reasons, it is currently assumed that the report of the presence of these three species was in error. Should there be any further evidence to substantiate the presence of these species, the issue will be revisited.

The most significant freshwater fish to date is *Malapterurus teugelsi*. Although only of Near Threatened IUCN status it is of limited range, essentially the Cogon watershed, and it is therefore of concern.

Two marine fish are Endangered according to the IUCN evaluations:

- *Epinephelus guaza* (= *marginatus*) Dusky grouper
- *Rhinobatos cemiculus* (= *Glaucostegus cemiculus*) Blackchin guitarfish

Given the limited fieldwork for marine fish, other high conservation status marine fish may well occur.

3.3.3 *Amphibians and Reptiles*

The current running list of amphibian species from the CBG field work on Zone 1 and 2 now includes 42 species, compared to the regional total of 58.

For reptiles, the current running list of species from the CBG field work on Zone 1 and 2 now includes 48 species, compared to the regional total of 93.

This group has the highest number of high conservation status species and is also the one with real potential for the identification of species new to science. This may be related to the lack of herpetological work in the past, but it also appears likely that the region is one of high diversity for reptiles and amphibians. Also, many of the species are of limited range.

3.3.4 *Birds*

The current running list of amphibian species from the CBG field work on Zone 1 and 2 now includes 262 species, compared to the regional total of 357. Ongoing ornithological fieldwork in the most southern part of South Cogan, not yet tabulated, in the running lists, will significantly add to this total.

Fieldwork done for CBG has identified significant range extensions and two species new for Guinea.

However the only Endangered and Critically Endangered bird species found remain the three vulture species previously noted. The IUCN status for these species however has recently been upgraded to Critically Endangered.

As noted in the 2013 fieldwork for the Kamsar area, the concentrations of migratory species in the Rio Nuñez estuary are sufficient to trigger criteria for the determination of IBAs.

3.3.5 *Mammals*

The current running list of medium and large mammal species from the CBG field work on Zone 1 and 2 now includes 39 species, compared to the regional total of 60.

The knowledge of the distribution and size of the now Critically Endangered West African chimpanzee in South Cogan has improved. The ongoing study on the chimpanzee population will pull together all of the existing data.

There is still no sighting of the Endangered red colobus within South Cogan.

The status of the Atlantic humpback dolphin has been upgraded from Vulnerable to Critically Endangered.

Although many of the larger mammals no longer occur in the South Cogon area (e.g. lion, leopard, larger savannah antilopes), the area still appears to be important in terms of smaller carnivores such as otters (2 species) and genets (at least 2 species).

3.4 Updated Lists

3.4.1 *List of Species of High Conservation Status*

There are several documents that try to identify the conservation status of species that are present in Guinea. At the national level, one can cite particularly the Monographie Nationale de la Diversité Biologique and the level of protection (total or partial) under the Code de la Chasse. There are also lists of species to protect under the various conventions to which Guinea is a signatory (par exemple the CITES statuses). In certain cases, books or articles in specialized journals may also give indications on the level of rarity of species. These sources have been consulted; however, the primary source remains the IUCN statuses. The IUCN categories are the most complete and up-to-date. They are described in IUCN Red List Categories and Criteria, Version 3.1, Second edition (IUCN, 2012). In addition, certain species that are of restricted range are considered of high importance.

The BMS (EEM, 2016) carefully analyzed the species present in the CBG concession, including consideration of a Critical Habitat Report that had been commissioned. The BMS identified the species found in the concession that were considered to be Critical Habitat Qualifying (CHQ) species; that is, species whose presence can trigger the identification of Critical Habitat under IFC's PS6. These are species that are either Endangered or Critically Endangered according to the IUCN list, or are considered to have a restricted range under PS6 criteria and are considered the important species for this ESIA Addendum. Each species thus becomes a subcomponent of the Important Species VEC.

The following list provides the current listing of species that are or on the verge of being Critical Habitat Qualifying, based on the most recent data.

Table 3-1 Species of High Conservation Status

Scientific name	English name	French name	Type	IUCN status	Presence	Notes
<i>Arhroleptis sp.</i>			Amphibian - frog	Species not yet described	Sangarédi (field work ÉEM SIP2, 2015, and subsequent fieldwork)	Very restricted range. Assumed CHQ
<i>Arhroleptis formosus</i>	Beautiful squeaker frog		Amphibian - frog	DD	Sangarédi (field work ÉEM SIP2, 2015)	Very restricted range. Assumed CHQ
<i>Caracal aurata</i>	African golden cat	Chat Doré Africain	Mammal - carnivore	Vulnerable A2c+3c	Sangarédi (field work ÉEM ESIA, 2013)	Species just moved to Vulnerable (2015). Stakeholder concern
<i>Cercocebus atys</i>	Sooty mangabey	Mangabey enfumé	Mammal - primate	Near Threatened	Sangarédi (field work ÉEM ESIA, 2013, and subsequent fieldwork)	Recent split of species. Stakeholder concern
<i>Chelonia mydas</i>	Green turtle	Tortue verte	Reptile – marine turtle	Endangered (A2bd)	Kamsar (field work ÉEM ESIA, 2013)	CHQ
<i>Cynisca cf oligopholis</i>	Unnamed worm lizard		Reptile - amphisbaenian	Endangered (B1ab(iii)) for <i>Cynisca oligopholis</i>	Sangarédi (field work ÉEM ESIA, 2013 and subsequent studies)	Endemic to Sangarédi subprefecture – species not yet described? CHQ
<i>Epinephelus guaza (=marginatus)</i>	Dusky grouper	Mérou Brun	Marine fish	Endangered (A2d)	Kamsar (field work ÉEM ESIA, 2013)	CHQ
<i>Eretmochelys imbricata</i>	Hawksbill turtle	Tortue à écailles	Reptile – marine turtle	Critically Endangered (A2bd)	Kamsar (field work ÉEM ESIA, 2013)	CHQ

Scientific name	English name	French name	Type	IUCN status	Presence	Notes
<i>Gyps africanus</i>	African white-backed vulture	Gyps africain	Bird of prey	Critically Endangered A2bcd+3bcd+4bcd (2015)	Kamsar, Sangarédi (field work ÉEM ESIA, 2013) and subsequent studies	CHQ
<i>Gyps rueppellii</i>	Rueppell's griffon vulture	Vautour de Rüppell	Bird of prey	Critically Endangered A2bcd+3bcd+4bcd (2015)	Sangarédi (field work ÉEM ESIA, 2013) and subsequent studies	CHQ
<i>Hemidactylus albivertebralis</i>	White-lined half-toed gecko	Gecko à ligne claire	Reptile - lizard	Data Deficient (to be revised soon)	Kamsar (field work ÉEM ESIA, 2013)	Rare species of restricted distribution
<i>Hemidactylus kundaensis</i>	Kunda half-toed gecko	Gecko de Kunda	Reptile - lizard	Critically Endangered (B2ab(iii))	Sangarédi (field work ÉEM ESIA, 2013) and subsequent studies	Endemic to Sangarédi subprefecture. CHQ ¹
<i>Hippopotamus amphibius</i>	Hippopotamus	Hippopotame	Mammal	Vulnerable (A4cd)	Sangarédi (field work ÉEM ESIA, 2013)	Status being revised and may move up to Endangered
<i>Malapterurus teugelsi</i>	Teugel's electric catfish		Freshwater fish	Near Threatened (NT)	Sangarédi (field work ÉEM ESIA, 2013 and subsequent studies)	CHQ Restricted range
<i>Necrosyrtes monachus</i>	Hooded vulture	Percnoptère brun	Bird of prey	Critically Endangered A2bcd+3bcd+4bcd (2015)	Kamsar, Sangarédi (field work ÉEM ESIA, 2013) and subsequent studies	CHQ
<i>Odontobatrachus cf smithi</i>	Smith's torrent frog		Amphibian - frog	Recently described species not evaluated	Sangarédi (field work ÉEM 2016)	Species first described 2015. Likely to be considered at least Endangered. Assumed CHQ

Scientific name	English name	French name	Type	IUCN status	Presence	Notes
<i>Osteolaemus cf tetraspis</i>	(African dwarf crocodile)	(Crocodile nain Africain)	Reptile - crocodile	Vulnerable (A2cd)	Sangarédi (field work ÉEM ESIA, 2013 and subsequent studies)	Species not yet described and status to be reviewed by the IUCN
<i>Pan troglodytes verus</i>	West African chimpanzee	Chimpanzé	Mammal - primate	Critically Endangered (A4bcd)	Sangarédi (field work ÉEM ESIA, 2013) and subsequent studies	CHQ
<i>Phrynobatrachus pintoii</i>	Pintoï's puddle frog	Grenouille de Pintoï	Amphibian - frog	Endangered (B1ab(iii))	Sangarédi (field work ÉEM ESIA, 2013) and subsequent studies	Endemic to the Sangarédi area. CHQ
<i>Piliocolobus badius</i>	West African red colobus	Colobe Bai D'Afrique Occidentale	Mammal - primate	Endangered (A2cd)	Sangarédi (field work ÉEM ESIA, 2013)	CHQ
<i>Raphionacme cf caerulea</i>	No common name		Plant	Endangered	Sangarédi (field work ÉEM 2016)	Identification needs confirmation.
<i>Rhinobatos cemiculus (=Glaucostegus cemiculus)</i>	Blackchin guitarfish	Guitare De Mer Fousseuse	Marine fish	Endangered (A4bd)	Kamsar (field work ÉEM ESIA, 2013)	CHQ
<i>Sousa teuszii</i>	Atlantic humpback dolphin	Dauphin à Bosse de L'Atlantique	Marine mammal	Critically Endangered A3cd+4cd; C2a(i)	Kamsar (field work ÉEM ESIA, 2013)	CHQ
<i>Trichechus senegalensis</i>	West African manatee	Lamantin D'Afrique	Marine mammal	Vulnerable (A3cd)	Kamsar (field work ÉIES ÉEM, 2013, observation CBG 2014)	Stakeholder concern

3.4.2 List of Species Protected in Guinea Found in CBG Study Areas

Table 3-2 Guinean Protected Species

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Reptile – crocodylian	<i>Crocodylus suchus</i>	West African crocodile	Crocodile d’Afrique de l’Ouest	NE	IP	DNA analyses indicate that the West African specimens belong to a different species than the Nile crocodile	Kamsar (field work ÉEM ESIA, 2013)	Mitigation measures to reduce collisions with ships in the Rio Nuñez estuary. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Reptile - crocodile	<i>Osteolaemus cf tetraspis</i>	(African dwarf crocodile)	(Crocodile nain Africain)	VU (A2cd)	IP	Species not yet described and status to be reviewed by the IUCN and Endangered or Critically Endangered status likely	Sangarédi (field work ÉEM ESIA, 2013, EEM 2016)	Change in alignment of the COBAD mine haul road in 2016, avoiding most of the Kéwéwol Valley, one of the strongholds of this species in the concession. Measures to be taken to protect the Boulléré KBA in future.
Reptile – marine turtle	<i>Chelonia mydas</i>	Green turtle	Tortue verte	EN (A2bd)	IP		Kamsar (field work ÉEM ESIA, 2013)	Mitigation measures to reduce collisions with ships in the Rio Nuñez estuary. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS. Measures to reduce dredging impacts.
Reptile – marine turtle	<i>Eretmochelys imbricata</i>	Hawksbill turtle	Tortue à écailles	CE (A2bd)	IP		Kamsar (field work ÉEM ESIA, 2013)	Mitigation measures to reduce collisions with ships in the Rio Nuñez estuary. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS. Measures to reduce dredging impacts.
Reptile – marine turtle	<i>Lepidochelys olivacea</i>	Olive Ridley turtle	Tortue de Ridley	VU (A2bd)	IP	Potential stakeholder concern (CHA, 2015)	Kamsar (field work ÉEM ESIA, 2013)	Mitigation measures to reduce collisions with ships in the Rio Nuñez estuary. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS. Measures to reduce dredging impacts.

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Reptile – freshwater turtle	<i>Pelusios castaneus</i>	Western hinged turtle	Péluse de Schweigger	NE	Status unclear – List A makes all freshwater turtles of the family Emydidae IP – this is sometimes interpreted to mean all freshwater turtles are protected – this species does not belong to the family Emydidae		Kamsar (field work ÉEM ESIA, 2013)	
Reptile – freshwater turtle	<i>Trionyx triunguis</i>	African soft-shelled turtle	Tortue molle du Nil	Mediterranean population CE	Status unclear – List A makes all freshwater turtles of the family Emydidae IP – this is sometimes interpreted to mean all freshwater turtles are protected – this species does not belong to the family Emydidae		Kamsar (field work ÉEM ESIA, 2013)	Mitigation measures to reduce collisions with ships in the Rio Nuñez estuary. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS. Measures to reduce dredging impacts.
Reptile – freshwater turtle	<i>Pelomedusa subrufa olivacea</i>	Marsh turtle	Péloméduse roussâtre	NE	Status unclear – List A makes all freshwater turtles of the family Emydidae IP – this is sometimes interpreted to mean all freshwater turtles are protected – this species does not belong to the family Emydidae		Sangarédi (field work ÉEM ESIA, 2013)	
Reptile – terrestrial turtle	<i>Kinixys belliana nogueyi</i>	Bell's hinged turtle	Cinixys de Bell	NE	IP		Sangarédi (field work ÉEM ESIA, 2013)	

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Reptile - lizard	<i>Varanus niloticus</i>	Nile monitor	Varan du Nil	NE	PP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	
Reptile - lizard	<i>Varanus exanthematicus</i>	Savannah monitor	Varan de savane	LC	PP		Sangarédi (field work ÉEM ESIA, 2013)	
Reptile - snake	<i>Python sebae</i>	African rock python	Python de Seba	NE	PP		Kamsar (field work ÉEM ESIA, 2013)	
Bird - pelican	<i>Pelecanus rufescens</i>	Pink-backed pelican	Pélican gris	LC	IP		Kamsar (field work ÉEM ESIA, 2013))	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird - ibis	<i>Threskiornis aethiopicus</i>	Sacred ibis	Ibis sacré	LC	IP		Kamsar (Demey 2006)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird - stork	<i>Ciconia episcopus</i>	Wooly-necked stork	Cigogne épiscopale	VU A2cd+3cd+4cd	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird - heron	<i>Bubulcus ibis</i>	Cattle egret	Héron garde-bœuf	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird - heron	<i>Egretta alba</i>	Great egret	Grande aigrette	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Bird - heron	<i>Egretta garzetta</i>	Little egret	Aigrette garzette	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird - heron	<i>Egretta (Ardea) intermedia</i>	Intermediate egret	Heron intermédiaire	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird - heron	<i>Ardea goliath</i>	Goliath heron	Heron goliath	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird – diurnal raptor	<i>Aviceda cuculoides</i>	African cuckoo-hawk	Buza coucou	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Pernis apivorus</i>	European honey-buzzard	Bondrée apivore	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	
Bird – diurnal raptor	<i>Elanus caeruleus</i>	Black-winged kite	Elanion blanc	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Milvus aegyptus</i>	Yellow-billed kite	Milan d’Afrique	LC	IP		Sangarédi (field work 2016)	

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Bird – diurnal raptor	<i>Milvus migrans</i>	Black kite	Milan noir	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Haliaeetus vocifer</i>	African fish-eagle	Pygargue vocifère	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Gypohierax angolensis</i>	Palm-nut vulture	Vautour palmiste	LC	IP		Kamsar (field work ÉEM ESIA, 2013), Sangarédi (field work 2016)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Circaetus beaudouini</i>	Beaudouin's snake eagle	Circaète de Beaudouin	VU (A2bcd+3bcd+4bcd;C1+2a(ii))	IP	Stakeholder concern (CHA, 2015)	Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Circaetus cinerus</i>	Brown snake eagle	Circaète cendré	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Gyps africanus</i>	African white-backed vulture	Gyps africain	CE A2bcd+3bcd+4bcd (2015)	IP		Kamsar, Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Gyps rueppellii</i>	Rueppell's griffon vulture	Vautour de Rüppell	CE A2bcd+3bcd+4bcd (2015)	IP		Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Necrosyrtes monachus</i>	Hooded vulture	Percnoptère brun	CE A2bcd+3bcd+4bcd (2015)	IP		Kamsar, Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Bird – diurnal raptor	<i>Polyboroides typus</i>	African harrier-hawk	Gymnogène d'Afrique	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Circus pygargus</i>	Montagu's harrier	Busard cendré	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	
Bird – diurnal raptor	<i>Micronisus gabar</i>	Gabar goshawk	Autour gabar	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Melierax metabates</i>	Dark chanting-goshawk	Autour chanteur	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Accipiter tachiro</i>	African goshawk	Autour tachiro	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Accipiter badius</i>	Shikra	Épervier shikra	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Accipiter melanoleucus</i>	Black sparrowhawk	Autour noir	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Kaupifalco monogrammicus</i>	Lizard buzzard	Autour unibande	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Buteo auguralis</i>	Red-necked buzzard	Buse d'Afrique	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Lophaetus occipitalis</i>	Long-crested eagle	Aigle huppard	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal	<i>Falco tinnunculus</i>	Common kestrel	Faucon crécerelle	LC	IP		Sangarédi (field work ÉEM ESIA,	

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
raptor							2013)	
Bird – diurnal raptor	<i>Falco biarmicus</i>	Lanner falcon	Faucon lanier	LC	IP		Sangarédi (field work 2016)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Falco ardosiaceus</i>	Grey kestrel	Faucon ardoisé	LC	IP		Sangarédi (field work ÉEM ESIA, 2013)	General lookout for all raptor nests.
Bird – diurnal raptor	<i>Falco peregrinus</i>	Peregrine falcon	Faucon pèlerin	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	
Bird – tern	<i>Gelochelidon nilotica</i>	Common gull-billed tern	Sterne hansel	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird – tern	<i>Sterna maxima</i>	Royal tern	Sterne royale	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird – tern	<i>Sterna sandvicensis</i>	Sandwich tern	Sterne caugek	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird – tern	<i>Sterna hirundo</i>	Common tern	Sterne pierregarin	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird – tern	<i>Sterna albifrons</i>	Little tern	Sterne naine	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Bird – tern	<i>Childonias niger</i>	Guifette noir	Black tern	LC	IP		Kamsar (field work ÉEM ESIA, 2013)	Impacts to aquatic birds near Kamsar considered to be minimal. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS.
Bird – nocturnal raptor	<i>Otus senegalensis</i>	African scops owl	Petit-duc africain	LC	IP		Sangarédi (field work 2016)	
Bird – nocturnal raptor	<i>Bubo cinerascens</i>	Greyish eagle-owl	Grand-duc du Sahel	LC	IP		Sangarédi (field work SIP2 2015)	
Bird - hornbill	<i>Tockus fasciatus</i>	African pied hornbill	Calao longibande	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	
Bird - hornbill	<i>Tockus nasutus</i>	African grey hornbill	Calao à bec noir	LC	IP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	
Mammal - manatee	<i>Trichechus senegalensis</i>	West African manatee	Lamantin D'Afrique	VU (A3cd)	IP	Stakeholder concern (CHA, 2015)	Kamsar (field work ÉIES ÉEM, 2013, observation CBG 2014)	Mitigation measures to reduce collisions with ships in the Rio Nuñez estuary. Entire Rio Nuñez estuary considered as Critical Habitat in ESIA and BMS. Measures to reduce dredging impacts.
Mammal - primate	<i>Pan troglodytes verus</i>	West African chimpanzee	Chimpanzé de l'Afrique de l'Ouest	CE (A4bcd)	IP		Sangarédi (field work ÉEM ESIA, 2013) and continuing field work during 2015 and 2016	Extensive mitigation and compensation measures.
Mammal - galago	<i>Galago sp</i>	Galago	Galago	-	IP	Two species of Galago are protected. Presence of one nest attributed to this group during 2016 field work.	Sangarédi (field work in 2016 in southeast part of the concession)	

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Mammal - rodent	<i>Hystrix cristata</i>	Crested porcupine	Porc épic à crête	LC	PP		Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	
Mammal - rodent	<i>Thryonomys swinderianus</i>	Greater cane rat	Grand aulacode	LC	PP	GoG status to be checked	Kamsar and Sangarédi (field work ÉEM ESIA, 2013)	
Mammal - rodent	<i>Cricetomys gambianus</i>	Northern giant pouched rat	Cricétome des savanes	LC	PP	GoG status to be checked	Sangarédi (field work 2015-2016)	
Mammal - carnivore	<i>Aonyx capensis</i>	African clawless otter	Loutre à joues blanches	NT	PP	Stakeholder concern (CHA, 2015)	Kamsar (field work ÉEM ESIA, 2013) and Sangarédi (field work 2015-2016)	
Mammal - carnivore	<i>Lutra (Hydriictis) maculicollis</i>	Spotted-necked otter	Loutre à cou tacheté	NT	PP		Sangarédi (field work 2015-2016) tracks are thought to be of this species	
Mammal - carnivore	<i>Caracal aurata</i>	African golden cat	Chat Doré Africain	VU (A2c+3c)	IP	Stakeholder concern (CHA, 2015)	Sangarédi (field work ÉEM ESIA, 2013)	Camera trapping to help estimate numbers.
Mammal - carnivore	<i>Leptailurus serval</i>	Serval	Serval	LC	IP			Camera trapping to help estimate numbers.
Mammal - ungulate	<i>Hippopotamus amphibius</i>	Hippopotamus	Hippopotame	VU (A4cd)	IP	IUCN status being revised and may move up to Endangered. Stakeholder concern (CHA, 2015)	Sangarédi (field work ÉEM ESIA, 2013)	Camera trapping to help estimate numbers.
Mammal - ungulate	<i>Cephalophus rufilatus</i>	Red-flanked duiker	Céphalophe à flancs roux	LC	PP		Sangarédi (field work ÉEM ESIA, 2013)	

Type	Latin name	English name	French name	IUCN status	Protected status in Guinea	Notes	Confirmed presence in study areas	Specific approach to protection where applicable
Mammal - ungulate	<i>Cephalopus silvicultor</i>	Yellow-backed duiker	Céphalophe géant, Céphalophe à dos jaune	NT	IP		Sangarédi (field work - 2016)	
Mammal - ungulate	<i>Cephalopus dorsalis</i>	Bay duiker	Céphalophe à bande dorsale	NT	PP		Sangarédi (field work - 2016)	
Mammal - ungulate	<i>Tragelaphus scriptus</i>	Bushbuck	Guib harnaché	LC	PP			
Mammal - ungulate	<i>Potamochoerus porcus</i>	Red river hog	Potamochère	LC	PP			

3.5 List of References

- AECOM. 2011. *Projet d'augmentation de la production de la Compagnie des Bauxites de Guinée (CBG). Étude d'impact environnemental et social (EIES) présentée au Ministère de l'Environnement de la Guinée.*
- Altenberg W and J van der Kamp 1991 The ornithological importance of coastal wetlands in Guinea. A and W. rapport 91.02/ICBP Study report no. 47/WIWO report no.35 Veenwouden/Cambridge/Zeist.
- Altenberg W et J van der Kamp. 1989. *Étude ornithologique préliminaire de la zone humide côtière du nord-ouest de la Guinée.* Joint report of WIWO and ICBP. WIWO report 23, Zeist and ICBP study report 30, Cambridge.
- Angel, F., (1950): *Arthroleptis crusculum* et *A. nimbaense*. Batraciens nouveaux de Guinée Française (Materiaux de la mission Lamotte, au Mont-Nimba). *Bulletin du Muséum National d'Histoire Naturelle* 22: 559-562.
- Bah M., Thiam A., Keita A., Sylla S., Barry H.M. et Lauriault J. 1997. *Monographie nationale sur la diversité biologique de la Guinée.* Ministère des Travaux Publics et de l'Environnement. Direction Nationale de l'Environnement. Conakry-République de Guinée, 311p.
- Bah, Maadjou. *Année non précisée. Rapport sur la mise en œuvre du programme sur la biodiversité marine et côtière. République de Guinée.*
- Bakarr, M., Bailey, B., Byler, D., Ham, R., Olivieri, S., & Omland, M., (eds.), (2001): From the forest to the sea: Biodiversity connections from Guinea to Togo. Conservation Priority Setting Workshop, December 1999, Washington DC. Conservation International, 78 pp.
- Bamy, I.L., Van Waerebeek, K., Bah, S.S., Dia, M., Kaba, B., Keita, N. and Konate, S. 2010. Species occurrence of cetaceans in Guinea, including humpback whales with southern hemisphere seasonality. *Marine Biodiversity Records*, 3: e48.
- Baran, E. (2000) "*Rôle des estuaires vis-à-vis de la ressource halieutique côtière en Guinée*" Pp. 137-157 in Domain, F., Chavance P., & Diallo A. (Eds.) *La Pêche Côtière en Guinée: Ressources et Exploitation.* Paris: IRD.
- Barnett, A. and Prangley, M.L. 1997. Mammalogy in the Republic of Guinea: an overview of research from 1946 to 1996, a preliminary check-list and a summary of research recommendations for the future. *Mammal Review* 27:115–167.

- Barrie, A. and Camara, M. *in* Wright, H.E., McCullough, J. and Diallo, M.S. (eds). 2006. A Rapid Biological Assessment of the Boké Préfecture, Northwestern Guinea. *RAP Bulletin of Biological Assessment* 41. Conservation International, Washington, DC.
- Belhabib, D. Doumbouya A. Diallo I. Traore S. Camara Y. Copeland D. Gorez B. Harper S. Zeller D. & Pauly D. (2012) "Guinean fisheries, past, present and...future? " *Fisheries Centre Research Reports*. 20(3): 91-104.
- Bellefontaine, R. 1997. *Synthèse des espèces des domaines sahélien et soudanien qui se multiplient naturellement par voie végétative. Pages 95-104 in Fonctionnement et Gestion des Écosystèmes Forestiers Contractés Sahéliens*. Edited by J.M. d'Herbès, J. M. K. Ambouta et R. Peltier. Paris: John Libbey Eurotext.
- BERCA-Baara-BERD. 2003. *Étude d'impact environnemental du Projet d'exploitation des gisements de N'Dangara et de Boundou Waadee.F*
- BERCA-Baara. 2003. *Inventaire de la flore des plateaux de Sangarédi*.
- BirdLife International. 2012. *Circaetus beaudouini*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on 21 January 2014.
- BirdLife International. 2012. *Gyps africanus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on 20 January 2014.
- BirdLife International. 2012. *Gyps rueppellii*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on 21 January 2014.
- BirdLife International. 2012. *Mirafra africana*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on 21 January 2014.
- BirdLife International. 2012. *Necrosyrtes monachus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on 20 January 2014.
- BirdLife International. 2012. *Streptopelia decipiens*. In: IUCN 2013). IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>.
- BirdLife International. 2013. *State of the world's birds: indicators for our changing world*. BirdLife International, Cambridge, UK.
- Böhme W., Rödel M.-O., Brede C. and Wagner P. 2011. The reptiles (Testudines, Squamata, Crocodylia) of the forested southeast of the Republic of Guinea (Guinée forestière), with a country-wide checklist. *Bonn Zoological Bulletin*, 60 (1): 35-61.

- Böhme, Wolfgang, Mark-Oliver Rödel, Christian Brede and Philipp Wagner. 2011. The reptiles (Testudines, Squamata, Crocodylia) of the forested southeast of the Republic of Guinea (Guinée forestière), with a country-wide checklist. Bonn zoological Bulletin, Volume 60, Issue 1, pp. 35–61, Bonn, May 2011.
- Borrow, N. and Demey, R. 2001. *Birds of Western Africa*. Christopher Helm. London.
- Borrow, N. and Demey, R. 2010. *Field Guide to the Birds of Western Africa*. Christopher Helm. London.
- Cadenat, J. (1947) *Noms vernaculaires des principales formes d'animaux marins des côtes de l'Afrique occidentale française*. Dakar: Institut Français d'Afrique Noire.
- Campbell G, Kuehl H, N'Goran Kouame P, Boesch C. 2008. Alarming decline of West African chimpanzees in Côte d'Ivoire. *Current Biology* 18:903–904.
- Carrière, M. 2000. Flore de Guinée : appellations vernaculaires et usages traditionnels de quelques plantes. Tiré de : Carrière, M. 1994. *Plantes de Guinée à l'usage des éleveurs et des vétérinaires*. Minist. Coop. Fr., CIRAD-EMVT (éds.): 235 p., 130 fig.
- Catry, P., Barbosa, C., Paris, B., Indjai, B., Almeida, A., Limoges, B., Silva, C. and Pereira, H. 2009. Status, ecology, and conservation of sea turtles in Guinea-Bissau. *Chelonian Conservation and Biology*, 8(2): 150-160.
- Chirio L. 2012. Inventaire des reptiles de la région de Sangarédi (Guinée : Afrique de l'Ouest) - *Bull. Soc. Herp. Fr.*, 144 : 67-100.
- Chirio, L., 2013. *Hemidactylus kundaensis*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>.
- Colyn, M. Dufour, S. Condé, C.P. and van Rompaey, H. 2005. The importance of small carnivores in forest bushmeat hunting in the Classified Forest of Diecké, Guinea. 1st International Symposium on Wolverine Research and Management.
- Cornish, A. and Harmelin-Vivien, M. (Grouper & Wrasse Specialist Group) 2004. *Epinephelus marginatus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on 06 February 2014).
- Couch, C. and Williams, C.T. 2006. In: Wright, H.E., McCullough, J. & Diallo, M.S. (eds). *A Rapid Biological Assessment of the Boké Préfecture, Northwestern Guinea*. RAP Bulletin of Biological Assessment 41. Conservation International, Washington, DC.
- Cumberlidge N. 1999. The Freshwater Crabs of West Africa: Family Potamonautidae. *Édition de l'IRD, Collection faune et Flore Tropicale N° 6*, 382p.

- Cumberlidge N. 2005. A rapid survey of the decapod crustaceans of the Boké Préfecture, Guinea. *In*: Wright H.E., McCullough J. and Diallo M.S. (eds.). A rapid Biological Assessment of Boké Préfecture, Northwestern Guinea. *Bulletin Biological Assessment*, 41, 38–46.
- Demey, R. 2006. A rapid survey of the birds of the Boké Préfecture, northwestern Guinea, pp 65-68, 137-140, 182-190. *In*: Wright, H.E., McCullough, J. & Diallo, M.S. (eds). A Rapid Biological Assessment of the Boké Préfecture, Northwestern Guinea. *RAP Bulletin of Biological Assessment* 41. Conservation International, Washington, DC.
- Demey, R. and Rainey, H.J. 2004. A rapid survey of the birds of the Forêt Classée du Pic de Fon, Guinea, pp 61-66, 165-171, 238-247. McCullough, J. (ed.). A Rapid Biological Assessment of the Forêt Classée du Pic de Fon, Simandou Range, Southeastern Republic of Guinea. *RAP Bulletin of Biological Assessment* 35. Conservation International, Washington, DC.
- Demey, R. and Rainey, H.J. 2006. Rapid surveys of the birds of the Fôret Classées de Déré, de Diécké and du Mont Béro, Southeastern Guinea, pp 59-68, 159-167, 236-244. *In*: Wright, H.E., McCullough, J., Alonso, L.E. & Diallo, M.S. (eds.). 2006. A Rapid Biological Assessment of Three Classified Forests in Southeastern Guinea. *RAP Bulletin of Biological Assessment* 40. Conservation International, Washington, DC.
- Dia, M. 2005. *Évaluation de la problématique viande de brousse en Guinée. Document de travail –FAO.*
- Diallo, S.T., Camara, M.H., Guilavogui, A., Diallo, B. et Sow, M. 2009. *Rapport synthèse sur le secteur de la pêche en Guinée. APPECCAO. Centre National des Sciences Halieutiques de Boussoura, BP 3738/39, Conakry, Guinée.*
- Dodman, T., Ndiaye, M.D.D. and Sarr, K. (eds.). 2008. Conservation Strategy for the West African Manatee. UNEP, Nairobi, Kenya and Wetlands International Africa, Dakar, Sénégal.
- Domain, F. & Bah, M.O. (2000) "*Description des fonds du plateau continental*" Pp. 37-49 in Domain, F., Chavance P., & Diallo A. (Eds.) *La Pêche Côtière en Guinée: Ressources et Exploitation*. Paris: IRD.
- Domain, F., Chavance P., & Diallo A. (2000) *La Pêche Côtière en Guinée: Ressources et Exploitation*. Paris: IRD.
- Doumbouya, A. (n.d). Guinean Fisheries: Case Study Identification and Selection.
- Doumbouya, A. 2010. Inventory and Sustainable Exploitation of Edible Mollusc Resources of the Guinean Coastline: Case Study in the Tristao Islands Marine Protected Area (Tristao MPA). Poster presented at the Tropentag 2010 Conference "World Food System - A Contribution from Europe" from September 14 - 16, in Zurich, Germany. Abstract available at:

- Dufour S. 2006. *Projet chasse et filière viande de brousse aux Monts Nimba, République de Guinée*. Fauna & Flora Int – CEGENS – SYLVATROP, 124pp.
- Dufour, S. 2000. *Étude préliminaire de la chasse villageoise dans la Réserve de Biosphère des monts Nimba – Guinée*. Non publié.
- Dufour, S. 2002. *Premier recensement des activités cynégétiques en Forêt Classée de Diécké. Rep. de Guinée. Ministère de l’Agriculture et des Eaux et Forêts*. PGRR/CF. GFA terra systems. 151p.
- Dufour, S.; Bikouyah, H.; Gautier, M.; Nganga, P.Y.; Ohlsen, A. 2013. *Etude de la chasse et de la filière gibier dans le corridor du chemin de fer – Projet SIMANDOU / Rio Tinto*.
- Eaton M. J., Martin A., Thorbjarnarson J. B. and Amato G. D. 2009. Species-level diversification of African dwarf crocodiles (Genus *Osteolaemus*): a geographic and phylogenetic perspective. *Molecular Phylogenetics and Evolution* (50): 496–506. (doi:10.1016/j.ympev.2008.11.009).
- Ecology and Environment Inc. and Kormos, R. 2008. *Critical Habitat Assessment Report, Guinea Alumina Corporation Project*. Guinea, West Africa. Prepared for Guinea Alumina Corporation (GAC), July 2008.
- Ecoscope Applied Ecologists (2001) : « *Highways and Birds: A best practice guide* », Highways Agency & Ecoscope Applied Ecologists, St Ives, Cambridgeshire.
- EEM, 2014. *Étude de base biologique pour l’ÉIES du Projet d’extension de la mine CBG. Rapport sommaire*. 288 p.
- EEM, 2014. *Étude de base biologique pour l’ÉIES du Projet d’extension de la mine CBG. Annex 1 : Botanical baseline survey in Guinea for Compagnie des Bauxites de Guinée (CBG)*. 44 p.
- EEM, 2014. *Étude de base biologique pour l’ÉIES du Projet d’extension de la mine CBG. Annex 2: Marine mammal, sea turtle and crocodile occurrence in the Rio Nuñez region of Guinea, 24 October to 8 November 2013*. 102 p.
- EEM, 2014. *Étude de base biologique pour l’ÉIES du Projet d’extension de la mine CBG. Annex 3 : Results of a Rapid Baseline Survey of the Fishery Resources of the Rio Nuñez Estuary, North-west Guinea*. 36 p.
- EEM, 2014. *Étude de base biologique pour l’ÉIES du Projet d’extension de la mine CBG. Annexe 4 : Inventaires des poissons et des macroinvertébrés aquatiques*. 53 p.
- EEM, 2014. *Étude de base biologique pour l’ÉIES du Projet d’extension de la mine CBG. Annex 5: A survey of the large mammals of Sangarédi and Kamsar in Boké prefecture*. 61 p.
- EEM, 2014. *Étude de base biologique pour l’ÉIES du Projet d’extension de la mine CBG. Annex: A survey of the birds of Sangarédi sous-prefecture*. 34 p.

- EEM, 2014. *Étude de base biologique pour l'ÉIES du Projet d'extension de la mine CBG. Annex 7: A survey of the birds of Kamsar.* 13 p.
- EEM, 2014. *Étude de base biologique pour l'ÉIES du Projet d'extension de la mine CBG. Annexe 8 : Inventaire des reptiles de la région de Sangarédi dans le contexte du Projet d'expansion de la mine de bauxite de la CBG.* 67 p.
- EEM, 2014. *Étude de base biologique pour l'ÉIES du Projet d'extension de la mine CBG. Annexe 9 : Inventaire des reptiles de la région de Kamsar dans le contexte du Projet d'expansion de la mine de bauxite de la CBG.* 40 p.
- EEM, 2014. *Étude de base biologique pour l'ÉIES du Projet d'extension de la mine CBG. Annexe 10 : Inventaire des amphibiens dans les sous-préfectures de Kamsar et Sangarédi (région de Boké).* 36 p.
- EEM, 2014. *Étude de base biologique pour l'ÉIES du Projet d'extension de la mine CBG. Annex 11: Rapid Survey of Hunting and the Bushmeat Trade in and around Sangarédi, North-west Guinea.* 23 p.
- EEM, 2014. *Étude de base biologique pour l'ÉIES du Projet d'extension de la mine CBG. Annex 12 : Results of a Rapid Baseline Survey of the Use of Woodfuel Resources in and around Sangarédi, North-west Guinea.* 32 p.
- Eriksson, J. and Kpoghomou, E. *in* Wright, H.E., McCullough, J. and Diallo, M.S. (eds). 2006. A Rapid Biological Assessment of the Boké Préfecture, Northwestern Guinea. RAP Bulletin of Biological Assessment 41. Conservation International, Washington, DC.
- Fishpool, L.D.C. & Evans, M.I. (eds.). 2001. Important Bird Areas in Africa and Associated Islands: Priority sites for conservation. Pisces Publications and BirdLife International, Newbury and Cambridge, UK.
- Guibé, J., & Lamotte, M., (1958a): *La réserve naturelle intégrale du Mont Nimba. XII. Batraciens (sauf Arthroleptis, Phrynobatrachus et Hyperolius). Mémoires de l'Institut fondamental d'Afrique noire, Série A, Dakar.* 53: 241–273.
- Guibé, J., & Lamotte, M., (1958b). *Morphologie et reproduction par développement direct d'un anoure du Mont Nimba, Arthroleptis cruscolum* Angel. Bulletin du Museum National d'Histoire Naturelle, 2e Série. Paris. 30: 125–133.
- Guibé, J., & Lamotte, M., (1963): *La réserve naturelle intégrale du Mont Nimba. XXVIII. Batraciens du genre Phrynobatrachus.* Mémoires de l'Institut fondamental d'Afrique noire, Série A, Dakar. 66: 601–627.
- Hillers, A., Bangoura, M.A., Loua, N.S., & Rödel, M.-O., (2006): Rapid survey of amphibians and reptiles in the Boké region, northwestern Guinea. *In*: Wright H.E., McCullough J. & Diallo M.S. (eds), A rapid biological

- assessment of Boké Préfecture, northwestern Guinea. *RAP Bulletin of Biological Assessment* 41, Conservation International, Washington D.C., pp. 131–136, appendices 5–7, pp. 178–181.
- Hillers, A., Loua, N.-S., & Rödel, M.-O., (2008a): A preliminary assessment of the amphibians of the Fouta Djallon, Guinea, West Africa. *Salamandra*, 43: 1–10.
- Hillers, A., Zimkus B. & Rödel M.-O., (2008b). A new species of *Phrynobatrachus* (Amphibia: Anura: Phrynobatrachidae) from north-western Guinea, West Africa. *Zootaxa*, 1815: 43-50.
- Hoffmann, M. 2008. *Aonyx capensis*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Downloaded on 11 April 2014.
- IFC 2012. Performance Standard 6. Biodiversity Conservation and Sustainable Management of Natural Resources. January 1, 2012. International Finance Corporation (IFC), Washington DC. [accessed 10 January 2014]
- IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>
- IUCN SSC Antelope Specialist Group 2008. *Cephalophus rufilatus*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <www.iucnredlist.org>. Last downloaded on 11 April 2014.
- Kasperek, Max. 2001. Priorities for the Conservation of the Nile Soft-shelled Turtle, *Trionyx triunguis*, in the Mediterranean. *Testudo, The Journal of the British Chelonia Group*, (2001), 5(3):49-45.
- Keita, N. 2002. Inventaire du lamantin d’Afrique en République de Guinée (*Trichechus senegalensis*). 6 pages. [Not seen].
- KEW Royal Botanic Gardens. 2014. Botanical baseline survey in Guinea for Compagnie des Bauxites de Guinée. Prepared for Sylvatrop Consulting. March, 2014.
- Kingdon J, 2011. The Kingdon Field Guide to African Mammals. A&C Black
- Knight Piésold and Co. 2008. Guinea Alumina Corporation - Projet d’alumine de Guinée Évaluation Sociale et Environnementale.
- Kormos, R. et Boesch, C. 2003. Regional action plan for chimpanzees in West Africa. Washington: Conservation International. 38 pp.
- Kourouma, Souleymane et Lancinè Faro. 2007. *Communication sur la situation des crocodiles en Guinée. Actes du 1^{er} Congrès d’Afrique de l’Ouest sur les Crocodiles « Élevage et Conservation des crocodiles » 13 au 15 novembre 2007 à la Tapoa, Parc Régional W du Niger*. Pp 114-120. IUCN.

- Krief S, Cibot M, Bortolamiol S, et al. 2014a. Wild chimpanzees on the edge: nocturnal activities in croplands. PLoS ONE 9: e109925.
- Lisowski, S. 2009. *Flore (Angiospermes) de la République de Guinée. Première partie (texte)*. Meise, Jardin Botanique National de Belgique. (Scripta Botanica Belgica, vol. 41).
- Mittermeier, R. A., Myers, N., Mittermeier, C. G., and Gill, P. R. (1999). Hotspots: Earth's Biologically, Richest and Most Endangered Terrestrial Ecoregions-CEMEX.
- Monod T. 1966. *Crevettes et crabes des côtes occidentales d'Afrique*. In : Gordon I., Hall D.N.F., Monod T., Guinot D., Postel E., Hoestlandt H. and Mayrat A. (éds.). *Réunion de spécialistes C. S. A. sur les crustacés. Mémoires de l'Institut Fondamental d'Afrique Noire, Zanzibar, N°77*: 103-234.
- Monod T., 1980. Décapodes. In: Durand J.R. and Levêque C. (éds). *Flore et faune aquatiques de l'Afrique sahélo-soudanienne*. ORSTOM, Paris, Tome I, 44: 369-389.
- Paugy D., Lévêque C. et Teugels G.G. 2003a. *Poissons d'eaux douces et saumâtres de l'Afrique de l'Ouest, édition complète. Tome I*. Edition IRD-MNHN-MRAC, Paris-Turvuren, 457p.
- Paugy D., Lévêque C. et Teugels G.G. 2003b. *Poissons d'eaux douces et saumâtres de l'Afrique de l'Ouest, édition complète. Tome II*. Edition IRD-MNHN-MRAC, Paris-Turvuren, 815p.
- Paugy, D., Lévêque C. & Teugels G.G. (2004) *Faune des Poissons d'Eaux Douces et Saumâtres de l'Afrique de l'Ouest*. Paris: IRD Éditions, Publications scientifiques du Musée Royal de l'Afrique Centrale.
- Peñate, J.G., Karamoko, M., Bamba, S. and Djadji, G. 2007. An update on marine turtles in Côte d'Ivoire, West Africa. *Marine Turtle Newsletter*, 116: 7-8.
- Penner, J., Adum, G.B., McElroy, M.T., Doherty-Bone, T., Hirschfeld, M., Sandberger, L., Weldon, C., Cunningham, A.A., Ohst, T., Wombwell, E., Portik, D.M., Reid, D., Hillers, H., Ofori-Boateng, C., Oduro, W., Plötner, J., Ohler, A., Leaché, A.D. & Rödel, M.-O. (2013). West Africa - A Safe Haven for Frogs? A Sub-Continental Assessment of the Chytrid Fungus (*Batrachochytrium dendrobatidis*). PLOS ONE 8: e56236
- Perrin, W.F. 2001. Conservation status of the West African Manatee. *Sirenews* 36.
- Plumptre A, Rose R, Nagnendo G, et al. 2010. Status survey and conservation action plan for the eastern chimpanzee (*Pan troglodytes schweinfurthii*), 2010–2020. Switzerland: IUCN. p 48.
- Robertson, P. 2001. Guinea. In: Fishpool, L.D.C. & Evans, M.I. (eds.). *Important Bird Areas in Africa and Associated Islands: Priority sites for conservation*. Newbury and Cambridge, UK: Pisces Publications and BirdLife International. Pp. 391-402.

- Rödel M.-O. & Bangoura M., (2004). A conservation assessment of Amphibians in the forêt classée du Pic de Fon, Simandou Range, southeastern Republic of Guinea, with the description of a new *Amnirana* species (Amphibia, Anura, Ranidae). *Tropical Zoology*, 17: 201-232.
- Rödel M.-O. & R. Ernst (2004): Measuring and monitoring amphibian diversity in tropical forests. I. An evaluation of methods with recommendations for standardization. *Ecotropica*, 10: 1–14.
- Rödel M.-O., Bangoura, M.A., & Böhme, W., (2004): The amphibians of south-eastern Republic of Guinea (Amphibia: Gymniphiona, Anura). *Herpetozoa*, 17: 99–118.
- Rödel, M.-O. (2000a). Amphibians of the West African savanna. Frankfurt/M. (ed. Chimaira), 335 pp.
- Rödel, M.-O. (2000b). *Les communautés d'amphibiens dans le Parc National de Taï , Côte d'Ivoire. Les anoures comme bio-indicateurs de l'état des habitats*. In: Girardin, O., I. Koné and Y. Tano (eds). *État des recherches en cours dans le Parc National de Taï (PNT)*, Sempervira, *Rapport de Centre Suisse de la Recherche Scientifique*, Abidjan, 9: 108-113.
- Rödel, M.-O. & Ernst, R., (2002): A new reproductive mode for the genus *Phrynobatrachus*: *Phrynobatrachus alticola* has nonfeeding, nonhatching tadpoles. *Journal of Herpetology*, 36: 121–125.
- Shepard DB, Kuhns AR, Dreslik MJ, Phillips CA. 2008. Roads as barriers to animal movement in fragmented landscapes. *Animal Conservation* 11:288–296.
- Shirley M. H., Vliet K. A., Carr A. N. and Austin J. D. 2014. Rigorous approaches to species delimitation have significant implications for African crocodylian systematic and conservation. *Proceedings of the Royal Society Publishing* 281: 20132483.
- Shirley, M.H. and M.J. Eaton. 2012. Procédures Standard de Suivi des Populations de Crocodiles. Groupe Spécialiste de Crocodiles : Darwin. (édition électronique ; www.iucncsg.org/pages/Publications.html).
- Siemers, Bjorn and Andrea Schaub. 2010. Hunting at the highway: traffic noise reduces foraging efficiency in acoustic predators. *Proc. R. Soc. B* 2011 278, 1646-1652.
- Silveira, L., Jacomo, A. and Diniz, J. 2003. Camera trap, line transect census and track surveys: a comparative evaluation. *Biological Conservation*, 114 (3), 351-355.
- Simandou Project. 2013a. Marine mammals baseline report. Simandou Project (Guinea): Port Component. Final Report, January 2013. Presented to SNC Lavalin Environnement by Environnement Illimité inc. Available online from: <http://www.riotintosimandou.com>
- Simandou Project. 2013b. Simandou Project (Guinea). Available online from: <http://www.riotintosimandou.com>

- Simandou Project. 2013c. Sea turtles – Kabak Island area baseline report. Simandou Project (Guinea): Port Component. Final Report, January 2013. Presented to SNC Lavalin Environnement by Environnement Illimité inc. Available online from: <http://www.riotintosimandou.com>
- Simandou Project. 2013d. Crocodiles complementary report: genetic analysis. Simandou Project (Guinea): Port Component. Final Report, January 2013. Presented to SNC Lavalin Environnement by Environnement Illimité inc. Available online from: <http://www.riotintosimandou.com>
- Simandou Project. 2013e. Crocodiles baseline report. Simandou Project (Guinea): Port Component. Final Report, January 2013. Presented to SNC Lavalin Environnement by Environnement Illimité inc. Available online from: <http://www.riotintosimandou.com>
- Singleton, M. (1982). *De l'intendance indigène du gibier à une gestion endogène de la faune. Pages 69-106 in Gestion de la Faune Sauvage, Facteur de Développement? Actes du colloque des 5,6 et 7 mai 1982. Environnement africain-Série Études et Recherches N°71/72. Edited by Vincke, P. P. & Singleton M. Dakar: ISE, ENDA, MAB/UNESCO.*
- Trape J.-F. et Mané Y. 2006. Guide des serpents d'Afrique occidentale - savane et désert. I.R.D. Editions, 226 pp.
- Trape J.-F., Trape S. et Chirio L. 2012. Lézards, crocodiles et tortues d'Afrique occidentale et du Sahara. I.R.D. Editions, 503 pp.
- Weir, C. R. 2013. Marine mammal, sea turtle and crocodile occurrence in the Rio Nuñez region of Guinea, 24 October to 8 November 2013. Report for Sylvatrop Consulting, Guinea.
- Weir, C.R. 2010a. A review of cetacean occurrence in West African waters from the Gulf of Guinea to Angola. *Mammal Review*, 40(1): 2-39.
- Weir, C.R. 2010b. A review of marine mammal occurrence in Guinea and surrounding waters. Report to Environnement Illimité inc. Ketos Ecology, UK. October 2010. 76 pp.
- Weir, C.R. 2011a. Ecology and conservation of cetaceans in the waters between Angola and the Gulf of Guinea, with focus on the Atlantic humpback dolphin (*Sousa teuszii*). PhD Thesis, University of Aberdeen, UK.
- Weir, C.R. 2011b. Distribution and seasonality of cetaceans in tropical waters between Angola and the Gulf of Guinea. *African Journal of Marine Science*, 33: 1–15.
- White, F. 1983. The vegetation of Africa, a descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. UNESCO, Natural Resour. Res. 20: 1-356.

Wright, H.E., McCullough, J. & Diallo, M.S. (eds). 2006. A Rapid Biological Assessment of the Boké Préfecture, Northwestern Guinea. RAP Bulletin of Biological Assessment 41. Conservation International, Washington, DC.