Towards a Strategic National Plan for Biodiversity Offsets for Mining in the Republic of Guinea, West Africa With a Focus on Chimpanzees

Rebecca Kormos and Cyril Kormos, 2011

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ACRONYMS

BBOP	Business and Biodiversity Offsets Program
BHP	BHP Billiton Limited
CAR	Central African Republic
CBG	Compagnie des Bauxites de Guinée
CITES	Convention on International Trade in Endangered Species
CI	Conservation International
CTF	Conservation Trust Fund
CWA	Clean Water Act (U.S.)
E & E	Ecology and Environment, Inc.
EIB	European Investment Bank
ESA	Endangered Species Act (U.S.)
ESAP	Environmental and Social Assessment Procedure
DECC	Department of Environment and Climate Change (New South Wales Aus.)
DFG	Department of Fish and Game (California, U.S.)
DSE	Department of Sustainability and Environment (Victoria, Aus.)
EU	European Union
FCBC	Fundación para la Conservacion del Bosque Chiquitano
FEDEC	Foundation for Environment and Development in Cameroon
GAC	Guinea Alumina Corporation
GAO	General Accounting Office (U.S.)
GEF	Global Environmental Facility
GTCI	Grupo Técnico de Coordinación Interinstitucional (Peru)
ha	hectare
HCP	Habitat Conservation Plan
IBA	Important Bird Areas
ICMM	International Council on Mining and Metals
IFC	International Finance Corporation
IMC	Indomet Coal Project
IRG	International Resources Group
IUCN	International Union for the Conservation of Nature
IUCN DD	IUCN Red List – Data Deficient
IUCN EN	IUCN Red List – Endangered Species
IUCN CR	IUCN Red List – Critically Endangered Species
IUCN NT	IUCN Red List – Near Threatened
IUCN VU	IUCN Red List – Vulnerable Species

km	kilometer
km2	square kilometer
NGO	non-governmental organization
NNTNPA	Nakai-Nam Theun National Protected Area
NRC	National Research Council (U.S.)
NT2	Nam Theun 2 HydroPower Project
POE	International Environmental and Social Panel of Experts (World Bank)
PROFONANPE	Fondo de Promocion de Áreas Naturales por el Estado (Peru) / National Fund for Protected Areas, Peru
PS	Performance Standard
RAP	Rapid Assessment Program
SEA	Social and Environmental Assessment
SSC	Species Survival Commission
STNF	Sangha Tri-National Foundation
TNC	The Nature Conservancy
USFWS	United States Fish and Wildlife Service
NSW	New South Wales
WCF	Wild Chimpanzee Foundation
WAMSSA	West Africa Mineral Sector Strategic Assessment
WCS	Watershed Management and Protection Authority (Lao PDR)
WWF	World Wildlife Fund

DEFINITIONS

Aggregate Biodiversity Offset: "Aggregated offsets are measurable conservation outcomes resulting from coordinated actions designed to compensate for the combined residual adverse biodiversity impacts arising from more than one development project in a specific geographical area, after appropriate prevention and mitigation measures have been taken."

From: Business and Biodiversity Offsets Programme, Initial scoping study. BBOP7Aggregated Offsets.pdf

Biodiversity Offset: "Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity"

From: Business and Biodiversity Offsets Programme, 2009.

Conservation (or Mitigation) Bank:
A conservation bank is a parcel of land managed for its conservation values. In exchange for permanently protecting the land, the bank owner is allowed to sell credits to parties who need them to satisfy legal requirements for compensating environmental impacts of development projects.

From: Carroll, N., Fox, J., and Bayon, R., eds. 2008, Conservation and Biodiversity Banking: A Guide to Setting Up and Running Biodiversity Credit Trading Systems, Earthscan, London and Sterling, VA.

Conservation Trust Fund:
A private, legally independent grant-making institutions that provide sustainable financing for biodiversity conservation and often finance part of the long-term management costs of a country's protected area (PA) system.

From: Rapid Review of Conservation Trust Funds, Second Edition, Conservation Finance Alliance, May 2008. http://www.conservationfinance.org/ upload/library/ arquivo20100514173044.pdf

Critically Endangered Species:
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

From: IUCN Red List Categories and Criteria, Version 3.1, 2000.

Endangered Species:
A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

From: IUCN Red List Categories and Criteria, Version 3.1, 2000

Equator Principles: The Equator Principles (EPs) are "a credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions." EPs are "adopted voluntarily by financial institutions and are applied where total project capital exceeds $10 million. The EPs are primarily intended to provide a minimum standard for due-diligence to support responsible risk decision making." The EPs are based on the International Finance Corporation's Performance Standards.

From: http://www.equator-principles.com/index.php/about-the-equator-principles

International Finance Corporation Performance Standards: IFC's Performance Standards define clients' roles and responsibilities for managing their projects and the requirements for receiving and retaining IFC support. The standards include requirements to disclose information.

From: http://www.ifc.org/ifcext/sustainability.nsf/Content/PerformanceStandards.

"Like-for-like": "'Like-for-like' is usually understood to require achievement of broad comparability in terms of biodiversity structure, composition and function, although this is rarely tightly defined in policy documents. There is a balance to be struck between ensuring that important individual components are catered for and achieving functional ecosystems in which the needs of all components are balanced."

From: Biodiversity Offset Design Handbook, BBOP 2009.

Mitigation Hierarchy: The mitigation hierarchy is defined as:

a. Avoidance: measures taken to avoid creating impacts from the outset, such as careful spatial or temporal placement of elements of infrastructure, in order to completely avoid impacts on certain components of biodiversity. This results in a change to a 'business as usual' approach.

b. Minimization: measures taken to reduce the duration, intensity and /or extent of impacts that cannot be completely avoided, as far as is practically feasible.

c. Rehabilitation / restoration: measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and /or minimized.

d. Offset: measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimized and / or rehabilitated or restored, in order to achieve no net loss or a net gain of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation or averted risk, protecting areas where there is imminent or projected loss of biodiversity.

From: Biodiversity Offset Design Glossary, http://bbop.forest-trends.org/guidelines/ glossary.pdf.

"No net loss": A biodiversity offset should be designed and implemented to achieve *in situ*, measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity.

From: Principles on Biodiversity Offsets Supported by the BBOP Advisory Committee, http://bbop.forest-trends.org/guidelines/ principles.pdf.

Species/Habitat Credit:
Species/habitat credits are awarded to conservation banks for the amount of protection they provide, measured in terms of species or habitat. The USFWS 2003 Guidance on conservation banking states that a species/habitat credit generally represents "one acre of habitat or the area supporting one nest site or family group".

Vulnerable Species:
A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

From: IUCN Red List Categories and Criteria, Version 3.1, 2000

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Author's Notes

The concept of "biodiversity offsets" has gathered momentum in recent years as a means to compensate for losses of species and habitat caused by a development project that cannot otherwise be avoided or mitigated on site. The objective of a biodiversity offset is therefore to compensate for a development project's "residual losses" of biodiversity by implementing a conservation project off site.

Lessons learned with offsets and their potential in the context of mining in Guinea are discussed in this document. We note that although the offsets concept has merit, it can be problematic to apply successfully in practice. Although we use the term "offsets" in this document because it has become the accepted terminology in the conservation community, we note that we do so with great reluctance in the case of chimpanzees (and other great apes). The term "offset" assumes that losses of chimpanzees are acceptable, a proposition that we are not comfortable with. Nonetheless, in light of the fact that development activities are ongoing in Guinea, and given that losses of chimpanzees as a result of these mining activities likely cannot be completely avoided or mitigated, we do use the "offset" terminology in this document.

We would also like to note that in this report we focus specifically on chimpanzees. Mining companies seeking to comply with International Finance Corporation (IFC) Performance Standards are required to achieve "no net loss" and preferably a "net gain" in any Endangered and Critically Endangered species affected by their project activities. Because chimpanzees are distributed throughout Guinea, because they are an Endangered species, and because it is likely to be impossible to mitigate the impacts of mining on chimpanzees in mining concessions, the species that will need to be "offset" time and time again will be chimpanzees. We believe that chimpanzees could represent an "umbrella" or "flagship" species in Guinea and therefore that protecting their habitat will also protect the habitat of many other species. However, we would like to stress that we also believe that a national strategy for biodiversity offsets in Guinea should be designed to protect a representative set of all the ecosystems in Guinea and all of the country's biodiversity, not just chimpanzees.

Executive Summary

Guinea is believed to have the largest bauxite reserves in the world, and the Simandou range in the southeast of the country is one of the largest iron ore deposits in Africa. Mining increased exponentially in Guinea between 2004 and 2008. A decade ago, Guinea was home to the largest population of one of the most Endangered sub-species of chimpanzees: the Western chimpanzee *Pan troglodytes verus*. However, the scale and intensity of mining activity in Guinea will inevitably have profound impacts on chimpanzee populations throughout the country. Some of these impacts may be avoided with careful planning, and in some cases some impacts may also be mitigated. It is likely, however, that substantial losses of chimpanzees will occur as a result of mining.

One approach to addressing the unavoidable impacts of mining on chimpanzees is biodiversity offsets. A biodiversity offset is an attempt to compensate for the unavoidable or "residual" biodiversity impacts of a development project by implementing a conservation project off site.

Conservation offsets are gaining in popularity globally. Although offsets are not required under Guinean law, the IFC - which provides project financing to a number of mining companies - has integrated offsets into its Performance Standards. As a result, a number of mining companies are investigating the possibility of offsetting chimpanzee losses on mining concessions with conservation projects in other parts of Guinea.

However, reliance on offsets to protect chimpanzees in Guinea is a risky approach. Even in the United States, where offset policies and programs have existed for decades, offsets remain an emerging mechanism, and few studies have been conducted to assess systematically their success or failure. Some critics have argued that offset programs have actually been counter-productive because they encourage government agencies to grant development permits too easily, ultimately resulting in biodiversity declines. In most other countries, offset programs are a very recent phenomenon, making it even more difficult to gauge their effectiveness. Offsets are growing in popularity, and provide a number of advantages, but they are not a proven mechanism.

Most offset programs in developed countries are highly regulated, relying heavily on the expertise of multiple government agencies to help design, implement and monitor offset projects. Government programs usually include requirements that offsets be legally permanent and funded in perpetuity and that they are implemented within the context of existing conservation strategies (e.g. watershed/catchment management plans or species recovery plans). These measures help minimize the risk of project failure. Whether the IFC will provide the oversight necessary to ensure successful offset implementation in perpetuity is an open question. Nor will it be possible to rely on government agencies in developing countries that have no familiarity with offsets and little capacity to support offset projects with planning and technical assistance.

Nevertheless, due to the scale of expected mining activities in Guinea, offsets may be the only mechanism able to prevent a net loss of biodiversity within the country, and several mining companies are already investigating possible sites.

Developing offsets on a project-by-project basis, if carefully planned, may indeed result in "no net loss" of chimpanzees in Guinea for those projects. Without coordination, however, project-by-project offsets could eventually lead to the protection of multiple smaller sites while failing to identify synergies that could generate greater conservation impact (e.g. by establishing connectivity, buffering conservation areas, creating larger protected areas etc.). The result could be isolated offsets and decreased sustainability of species over time. Failure to coordinate also creates a risk that individual offset projects will not account for the cumulative impacts of mining throughout the country, thus leading to a set of individual offsets that are not sufficient to truly offset the total loss of individuals nationally and over time. Lack of coordination could even result in duplication if different projects inadvertently target the same sites for offsets. A project-by-project approach can also increase transaction costs, for example, if each mining company develops offset methodologies independently, or if mining companies fail to pool resources for scientific study etc.

We suggest, therefore, that while project-by-project offsets are being developed, stakeholders in Guinea should also be working towards a national offset strategy that results in a representative, viable, well-managed and well-funded network of protected areas complemented by conservation and sustainable development measures outside of protected areas. Designing these solutions will require a deeper understanding of the cumulative impact of mining in Guinea (including projected mining concessions), a more coordinated approach to biodiversity offset initiatives and "aggregated offsets[1]", and a well-funded national plan for enhancing and expanding biodiversity conservation in Guinea.

Unfortunately, the government of Guinea does not currently have the policy framework and institutional capacity to design and implement a national offset strategy: the Government of Guinea itself notes in its 4th report to the Convention on Biological Diversity (Bah *et al.* 2009) that it has limited capacity to coordinate and implement national conservation plans. Therefore, we suggest what is needed is a multi-stakeholder donor-funded process to design and help implement a coordinated national offset strategy. Such a process is important as experience with large-scale extractive industries projects suggests that funding established to support offset projects without engaging in a carefully planned multi-stakeholder design process has not produced sustainable results.

Developing such a national plan could also serve a second important function, which is to lay the foundation for a national conservation trust fund endowed by mining companies, multilateral and bilateral donors and private donors. Protected areas and biodiversity conservation are chronically underfunded in Guinea and the need to establish a reliable

[1] BBOP defines "Aggregated offsets" as: "measurable conservation outcomes resulting from coordinated actions designed to compensate for the combined residual adverse biodiversity impacts arising from more than one development project in a specific geographical area, after appropriate prevention and mitigation measures have been taken"

source of funding is urgent. A national conservation trust fund also has the advantage that it can be used as an umbrella for other funds, addressing other sustainable development objectives (community development, non-biodiversity environmental issues such as erosion, clean water etc.).

Such a conservation trust fund is an ambitious project and will clearly take time to develop. On the other hand, protecting chimpanzees and biodiversity from mining projects that will be entering into production in the near-term is urgent. We therefore suggest that a two-pronged approach might be the best way forward, i.e. proceeding with individual offset projects while also launching a multi-stakeholder process for designing a national offset strategy and a national conservation trust fund. This would ensure the necessary national, longer-term planning, and in the short-term would facilitate dialogue between mining companies that are currently not coordinating their offset efforts. Offset projects currently under development could be integrated into a national trust fund when such a fund becomes operational.

This paper does *not* aim to lay out the national strategy itself. For this, assembling a working group of multiple stakeholders would be necessary and we hope that this can be the next step. Based on the findings of the analysis, however, this paper does aim to lay out the case for why a national strategy for biodiversity offsets is the most logical and beneficial way to proceed. Individual project offsets are extremely important and urgent in the short term. A national strategy for offsets should, however, be the ultimate long-term goal and the work needed to develop this strategy and national trust fund should begin as soon as possible.

We are most grateful to the Arcus Foundation for funding this research. In addition to informing the Foundation, we hope to share these ideas with mining companies and conservationists working in Guinea, with the Guinean government, and with bilateral and multilateral donors.

As many species of great ape, and other Endangered and Critically Endangered species throughout the world are under similar threat, we hope that if the different sectors in Guinea can work together to produce a viable plan for species conservation, this could serve as a model and provide important lessons learned for developing national or regional plans for biodiversity offsets in other countries.

PART I: INTRODUCTION

1. Chimpanzees in Guinea

Figure 1. Republic of Guinea in West Africa (http://www.usaid.gov/locations/sub-saharan_africa/countries/guinea/)

The Republic of Guinea lies on the West Coast of Africa, bordered by Guinea-Bissau, Senegal and Mali to the North, and Sierra Leone, Liberia and Côte d'Ivoire to the South **(Figure 1).** The Republic of Guinea is at the northwestern most edge of the Guinean Forests[2]: one of the World's 34 Hotpots[3] of Biodiversity. This hotspot harbours more than a quarter of Africa's mammals. Guinea is home to many of the Endangered mammals in the hotspot, including pygmy hippos *Hexaprotodon liberiensis*, zebra duikers *Cephalophus zebra*, and several species of primates including Diana monkeys *Cercopithecus diana*, Red Colobus monkeys *Procolobus badius* and western chimpanzees *Pan troglodytes verus.* In fact, Guinea has the largest number of one of the most Endangered subspecies[4] of chimpanzee: the Western Chimpanzee (*Pan troglodytes verus*) (Kormos *et al.* 2003). In a nationwide survey from 1995-1997, the number of chimpanzees in Guinea was estimated to be 17,500 (8,000-29,000) (Ham 1997).

Chimpanzees are distributed throughout the country. Information compiled for the *IUCN/SSC Status Survey and Action Plan for West African Chimpanzees* (Kormos *et al*., 2003) documented the existence of chimpanzees in at least 96 locations (**Figure 2**).

[2] "The Guinean Forests of West Africa hotspot encompasses all of the lowland forests of political West Africa, stretching from Guinea and Sierra Leone eastward to the Sanaga River in Cameroon. This includes the countries of Liberia, Côte d'Ivoire, Ghana, Togo, Benin, and Nigeria, which maintain remnant fragments of the forests. The hotspot also includes four islands in the Gulf of Guinea: Bioko and Annobon, which are both part of Equatorial Guinea, and São Tomé and Príncipe, which together form an independent nation. Bioko is a continental-shelf island, whereas the remaining three are oceanic".
http://www.biodiversityhotspots.org/xp/hotspots/west_africa/Pages/default.aspx

[3] To qualify as a hotspot, a region must meet two strict criteria: it must contain at least 1,500 species of vascular plants (> 0.5 percent of the world's total) as endemics, and it has to have lost at least 70 percent of its original habitat.

[4] There are four sub-species of chimpanzees in Africa and all are classified as EN[4] by the 2010 IUCN Red List since their population has been reduced by more than 50% over a three-generation (i.e., 60 year) period from the 1970s to 2030 (Oates *et al.* 2008). Guinea is a home to one of the most EN sub-species of chimpanzee: the Western Chimpanzee, *Pan troglodytes verus* (Kormos *et al.* 2003). The Western chimpanzees is patchily distributed throughout West Africa, with only an estimated 21,300 to 55,600 individuals remaining, in Burkina Faso, Côte d'Ivoire, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Senegal, Sierra Leone (Humle *et al.* 2010). Chimpanzees are now extinct in Benin and Gambia, regionally extinct in Togo, and their presence is uncertain in Nigeria.

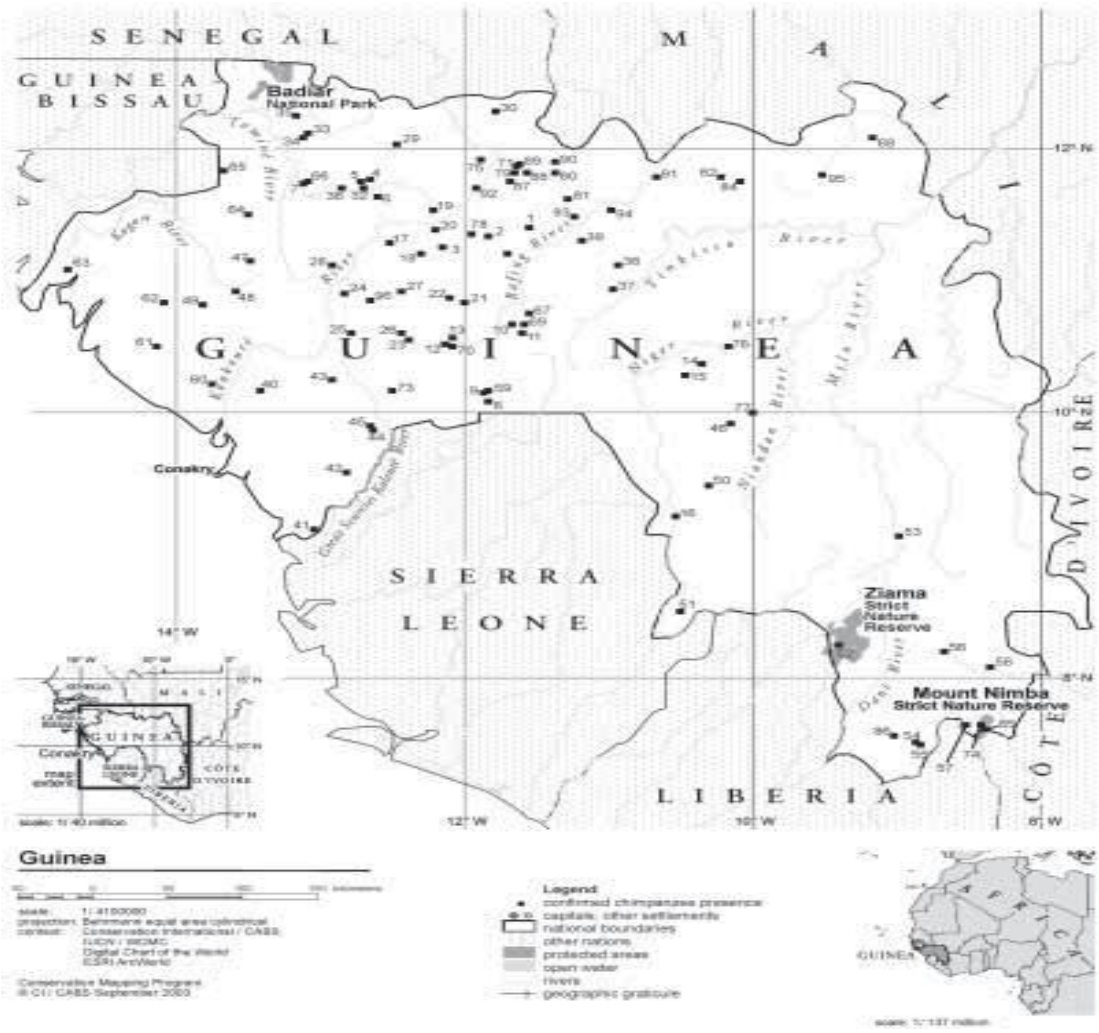

Figure 2. Confirmed presence of chimpanzees *Pan troglodytes verus* in Guinea from Kormos *et al.* (2003)

More than half of the populations are concentrated in the Fouta Djallon region of Guinea (**Figure 3)** (Ham 1997). This is primarily because many of the people living in the Fouta Djallon do not hunt and eat chimpanzees due to religious and cultural taboos.[5]

However, it has now been 15 years since the last nationwide survey of chimpanzees in Guinea was conducted. As chimpanzees throughout Guinea face threats from hunting, habitat destruction and disease, it is probable that chimpanzee numbers have decreased greatly. A new nationwide survey of chimpanzees in Guinea being conducted by the Wild Chimpanzee Foundation (WCF) will reveal the scale of decline. A recent survey of chimpanzees in Côte d'Ivoire documented a decline of 90% (Campbell *et al.* 2008) and findings are expected to be similar in Guinea.

[5] In many other parts of Guinea, chimpanzees are hunted and eaten although there are still many areas where chimpanzees are not eaten due to local taboos, religious or cultural beliefs. Bossou provides an example where people have lived side by side with chimpanzees for generations.

Figure 3. Map of Guinea, showing Prefectures and geographical regions. From west to east: Guinée Maritime, Foutah Djallon, Moyenne Guinée (Haute Guinea) and Guinée Forestière. (From IUCN, 2008)

Assessing the extent of the protected area network in Guinea is complicated by the fact that some protected areas are not legally gazetted and some lack the funding necessary for effective management (IUCN 2008). There has been disagreement over what percentage of Guinea's territory is considered "protected". Brugiere and Kormos (2008)[6] found that Guinea has a small protected area network relative to other countries in Africa, both in terms of size (2.9% of the country) and number of parks. They observed that as a result, two of the five ecoregions of the country and six of the 14 globally threatened large and medium-sized mammals occurring in Guinea[7] are not found in the national protected area network. IUCN (2008) on the other hand, found that 0.7% of Guinea was "strictly protected"[8], and a total of 5.2% was "protected"[9]. According to the most recent assessment in Guinea's fourth national report to the Convention on Biological Diversity (Bah *et al.* 2009), Guinea's protected areas network now covers roughly 7% of the national territory. (See **Appendix 1** from Bah *et al.* 2009 for a full list of protected areas in Guinea).

[6] Brugiere and Kormos (2008) included only five protected areas in the IUCN categories I–IV.
[7] *Hexaprotodon liberiensis, Hippopotamus amphibious, Tragelaphus derbianus, Cephalophus jentiincki, Cephalophus zebra, Loxodonta africana, Loxodona cyrclotis, Trichechus senegalensis, Panther oleo, Profelis aurata, Lycaon pictus, Cercopithecis Diana, Procolobus badius, Pan troglodytes.*
[8] They defined "strictly protected" as those areas officially classified by decree as required under Guinea law
[9] They defined "protected" including areas that are classified by Guinea as "forêts classes" and "réserves de faune" and that have biodiversity as a management objective and have received funding for their management.

Despite acting as a stronghold for many threatened species and harboring a rich diversity of species, Guinea receives little international support for conservation. IUCN (2008) notes that, with the exception of Mount Nimba which benefits from funding from a GEF project, the financial resources for managing Guinea's protected areas is clearly insufficient.

In summary:

- Guinea is a Critically important country for the conservation of Western Chimpanzees.
- Chimpanzees are widespread throughout the country.
- The current protected areas network in Guinea does not fully cover all of Guinea's Critically Endangered and Endangered species.
- Current protected areas have limited funds for adequate management.

2. Mining in Guinea

Although Guinea has hydropower potential as well as underdeveloped agricultural and fisheries resources, the mining sector accounts for more than 70% of the country's exports (CIA World Factbook 2010) and about 80% of its foreign currency earnings. Guinea's mineral wealth could make it one of Africa's richest countries but the people of Guinea are currently among the poorest in the world: Guinea is ranked 170 out of 182 countries by the UN Human Poverty index (Human Development Report 2009).

Guinea holds the world's largest known bauxite reserves[10] (used to produce aluminum): about 25 billion metric tons of bauxite, likely to be more than half of the total global reserves. In 2009 Guinea ranked fifth among the world's leading producers of bauxite (U.S. Geological Survey, Mineral Commodity Summaries, January 2011), exporting roughly 20 million metric tons each year. The government of Guinea is seeking to increase its revenues by refining more aluminum in Guinea, which would provide substantially more revenue than simply shipping raw materials abroad.[11]

Guinea also has significant iron ore reserves (which is used to make steel: widely considered the second most important commodity for the global economy after oil). At roughly 4 billion metric tons, the Simandou high-grade iron ore deposit in the southeast of the country is expected to be one of the largest in Africa. Simandou alone will make West Africa one of the world's foremost iron ore exporters, comparable with established producers like Brazil and Australia (Mining Weekly January 24, 2011).

[10] Bauxite is produced by a number of companies. By far the largest producer is the Compagnie des Bauxites de Guinee (CBG), a joint venture between the Government of Guinea, Alcoa, and Rio Tinto-Alcan. The Compagnie des Bauxites de Kindia (CBK), a joint venture between the Government of Guinea and Russki Alumina (Rusal), produces roughly a fifth of the CBG production. Rusal also operates FRIGUIA, an aluminum refinery operated via the Rusal subsidiary Alumina Compagnie de Guinee (ACG). Finally, the other major consortium in operation is the Guinea Alumina Corporation (GAC), which includes BHP-Billiton, the Global Alumina Corporation, the Dubai Alumina Corporation, and the Mubadala Development Company.

[11] These projects include the alumina refinery at Sangarédi by Global Alumina Corporation, the alumina refinery at Kamsar by Alcoa, Rio Tinto and Alcan, and an alumina refinery at Dian-Dian by Rusal.

Guinea also has significant gold[12] and diamond deposits, (both of which are underdeveloped), and undetermined quantities of uranium.

As a result of this mineral wealth, mining concessions blanket much of the country. Please see **Appendix 2** through **5** for maps of mineral reserves and permits for bauxite, iron ore, diamonds and gold. Although these concessions may not all be exploited – and those that are will likely be exploited on varying time scales – the need to alleviate poverty and the opportunity to supply increased global demand for minerals makes mineral extraction in Guinea a high priority. It is therefore likely that Guinea will be subject to intensive and widespread open-pit mining activity in the near future. Mining in Guinea increased exponentially during the first decade of the century: between 2004 and 2008 Guinea's exports increased on average by 24%.

Mining in Guinea has recently faced some challenges. First, in response to the coup in the country in 2009, international donors including the G8, the IMF, and the World Bank cut development assistance to Guinea significantly, making a resumption of aid contingent on a successful democratic transition (CIA World Factbook 2010). Investor confidence also wavered when the new regime that seized power in December 2008 announced that all mining contracts negotiated under President Conté would be subject to immediate audit and review. However, in November 2010, Guinea held its first democratic elections since 1958.[13] The new, democratically elected government has now appointed a new mining minister and international investors are expressing renewed interest in Guinea's iron ore mines.

In summary:

- Guinea is an extremely important country for mining with the largest bauxite reserves in the world, and probably the largest iron ore deposit in Africa.
- The mining sector is of vital importance to Guinea's economy, and is growing at a significant rate.
- International investment in Guinea's mining sector is likely to increase with the advent of a new, democratically elected government.

3. The threat of mining to chimpanzees in Guinea

There is clearly a special interface between mining and chimpanzees. As shown above, chimpanzees are found throughout Guinea and will probably be found in most major mining concessions. As companies aim to minimize their impact on biodiversity, and on Endangered and Critically Endangered species in particular, they will repeatedly

[12] Today gold is mined by three companies: the Société Ashanti de Guinée (SAG), SEMAFO, a Canadian-based gold mining company with several mines in West Africa and the Société Miniere de Dinguiraye (SMD). Gold mining is also conducted by more than 100,000 artisanal miners in the gold belt of higher Guinea.

[13] Guinea gained independence from France in 1958, and was led by Sékou Touré's single-party regime for 26 years until his death in 1984. Lansana Conté seized power shortly after Sékou Touré's death, and ruled the country for the next 24 years. In December 2008, Captain Moussa Dadis Camara seized power from Conté. In December 2009, Camara was wounded in an assassination attempt, and sent to Morocco for treatment. The National Council for Democracy and Development (CNDD) Minister of Defense Brigadier General Sekouba Konate stepped in as interim President. In November 2010, Guinea held its first democratic elections since 1958 and voted Alpha Conde as Guinea's new President.

encounter the problem of how to proceed with mining activities while minimizing impacts on chimpanzees. Because forests in Guinea are already extremely fragmented as a result of human encroachment, there are few places that can sustain these last populations of chimpanzees across landscapes not substantially impacted by anthropogenic activities or settlements. Every site where chimpanzees still occur is therefore of critical global importance for the species and is recognized as such by the international environmental community (Kormos *et al.* 2003).

Chimpanzees are listed as Endangered on the IUCN Red List (http://www.iucnredlist.org/). In addition, they play an integral role in the ecosystem as seed dispersers of many plants. Chimpanzees also represent a special case because they are humans' closest living relatives, capable of similar emotions and of higher intelligence. Mining activities that result in chimpanzee deaths also, therefore, have important moral implications for the global community.

Due to the highly destructive nature of bauxite and iron ore mining to the environment, and given that mining activities will continue for many decades, significant negative impacts on chimpanzees are predicted. Bauxite and iron ore mining begins with removing all vegetation and organic matter from the mining site. After clearing and stripping, holes are drilled and explosives placed inside. After blasting, the fragmented ore is extracted with hydraulic shovels or loaders. This material is then put into trucks and hauled to the "stockpile" and "refinery" area. From there, material is usually transported by rail to the coast.

Mining frequently takes place over very large areas. For example, the total active mining area of the Guinea Alumina Corporation (GAC) project in Northwest Guinea is approximately 100 hectares per year (ha/yr) with approximately 75 additional hectares cleared on an annual basis, and 75 hectares being placed into rehabilitation/restoration. In addition to the mining sites themselves, many other areas are cleared for roads, refineries and stockpiles. In **Appendix 6,** we provide a brief overview of the mining process for those who are unfamiliar with bauxite and iron ore mining.

How do chimpanzees react to this type of mining? Until very recently there have been no studies on the effects of mining on chimpanzees. The Wild Chimpanzee Foundation (WCF) is currently studying the impacts of mining on chimpanzees in the GAC concession and is setting up a long-term monitoring program to document the changes in chimpanzee population size and behavior. Studies such as this one are desperately needed to understand both the short and long-term impacts of mining on wildlife. Such studies will also be essential for designing better mitigation strategies.

To date, most of the guidance on the reaction of chimpanzees to large-scale disturbances comes from the literature on how chimpanzees react to selective logging, but there are obvious differences between mining and selective logging. Selective logging, in principle, involves the removal of several trees per hectare whereas bauxite/iron ore mining involves clear-cutting and removal of all topsoil. The effects of mining on chimpanzees are therefore likely to be much more dramatic and long-term.

It is also difficult to extrapolate information about how chimpanzees may react to mining activities from logging studies due to the fact that there is conflicting information about how chimpanzees react to logging. Some studies suggest that the most likely effect of mining activities on chimpanzees is that the noise, machinery, human activity and the loss of their habitat will cause chimpanzees to migrate out of the area (White and Tutin 2001, Reynolds 2005).

Other studies show differing responses according to the intensity of timber extraction and the degree of the change in habitat (Skorupa 1988). Morgan's *et al.* (2010) study on the effects of logging on chimpanzees in the Republic of Congo found that "disturbance associated with forestry activities caused shifts in species distribution from high quality habitat to neighboring forest 'refuges' of lower quality".

However, even if chimpanzees do merely "shift" their range into adjacent areas to avoid noise and human activity during mining activities, this could still result in a decline in chimpanzee numbers. Chimpanzees are a highly territorial species and chimpanzees in the resident group may injure or kill intruding individuals. This has been observed in Uganda (Mitani *et al.* 2010) Tanzania (Goodall 1986) and Ivory Coast (Boesch *et al.* 2008). Such studies show that chimpanzees living in adjacent communities will kill individuals in adjacent groups when they enter their territory or when one troop is taking over their territory of another. White and Tutin (2001) hypothesized that the noise and general high level of disturbance caused by chainsaws and the movement of heavy machinery during logging in Gabon caused chimpanzees to flee into the territories of adjacent chimpanzee communities, triggering violent encounters that resulted in mortality. They observed that while populations of non-territorial species bounced back quickly after logging, chimpanzee populations took much longer to return to their original population sizes (White and Tutin 2001). Morgan's *et al.* (2010) study however, noted no decline in gorilla and chimpanzee populations over a six-year period as a result of selective logging in the Republic of Congo. Boesch *et al.* (2008) have hypothesized that demographic factors such as group size and number of adult males can affect the nature of intergroup interaction.

There are also other factors that may also cause a decline in populations if chimpanzees are forced to make a shift in their range. For example, the new habitat may not be able to support an increase in population size and food may be scarce for a population above carrying capacity. Resources that may be vital to help chimpanzees survive through periods of fruit scarcity - such as keystone resources[14] or terrestrial herbaceous vegetation (eg. Wrangham *et al.* 2007) - may not be abundantly available to chimpanzees in a new territory. Permanent water sources may not be available in adjacent habitat. The available adjacent habitat may be fragmented or not large enough to support the migrating community of chimpanzees. Threats from humans in adjacent communities may also be greater than in the area the chimpanzees are leaving.

[14] Keystone resources are "plant species that show little inter-annual variation, either in the amount of resources produced or in the seasonal timing of availability" (Terborgh 1986).

The presence of the mining company may also affect the chimpanzees in other ways. For example, increases in human population in surrounding areas caused by increased employment and bolstered by people migrating to the area hoping for work, may lead to increased pressure on natural resources and increased hunting. This may also be the case in areas where chimpanzees are not commonly hunted, since people from different cultural backgrounds not sharing local taboos on eating chimpanzee meat may migrate to the area. Poaching to supply bushmeat for mining camps has been document in Central Africa (Wilkie and Carpenter, 1999; Fa *et al.* 2000; Brashares *et al.* 2004; Poulsen *et al.* 2009).

Another increased threat to chimpanzees from mining may be disease. Chimpanzees are susceptible to many of the same diseases as humans (Wolfe *et al.* 1998) and an increase in human activity within chimpanzee habitat can increase the risks of disease transmission. Even during the exploration phase, when chimpanzees and humans do not come into contact, diseases can be easily transmitted by indirect means such as through human feces and saliva. Also, like humans, animals subject to stress are more vulnerable to disease. Stress may lead to diminished immunity and therefore to an increase in vulnerability to disease and fatalities. Some studies have shown that selective logging can result in an increased infection risk and susceptibility to infection by parasites in resident populations of primates (Chapman *et al.* 2006; Gillespie *et al.* 2005). In addition, stress can also lead to a decrease in reproductive fitness (Emery-Thompson *et al.* (2007).

Finally, road development often facilitates the exploitation of wildlife for bushmeat. This has been well documented in Central Africa (Wilkie *et al.* 2000; Brashares *et al.* 2004; Blake *et al.* 2008; Brugiere and Magassouba, 2009; Poulsen *et al.* 2009). Road construction may also lead to habitat fragmentation (Malcom and Ray 200l, Gullison and Hardner, 1993). Isolating small populations of chimpanzees can result in decreased genetic diversity within a group, which in turn can result in increased susceptibility to disease (e.g. Shimada *et al.* 2008).

This list of possible effects is by no means exhaustive. Every situation is unique, and understanding and measuring the impacts of mining activities on chimpanzees will be highly dependent on the scale of the mining activities, the dynamics of the chimpanzee populations, and the habitat. Quantifying impacts requires special studies in the field. Direct experience on site is essential to understand both the risk and what can be done to decrease those risks. However, the potential effects of large-scale disturbances on chimpanzees are many and are likely to result in population declines.

In addition to understanding the impacts of mining on chimpanzees on a project-by-project basis, it is also necessary to look at the *cumulative impact* of mining on chimpanzees. Cumulative impacts are "those that result from the incremental impact of the project when added to other existing, planned and reasonably predictable future projects and developments" (IFC Performance Standard 6 December 1 2010 footnote 15). While impacts may be insignificant by themselves, they may be more significant when resulting from more than one project. With regard to chimpanzees, another concern is that where mining concessions are adjacent to each other and mining is occurring

concurrently, the assumption that chimpanzees will simply flee from noise and activity may not be valid as there will be no refuge for them between mining sites.

Can these negative impacts be mitigated? As with measuring impacts, mitigation activities are extremely specific to each situation. They will involve such activities as educating and raising awareness among mining company employees and people living in and around the concession; preventing increased hunting of chimpanzees through increased law enforcement within and around the mining concession; decreasing the likelihood of disease transmission from humans to chimpanzees through proper protocols[15]; road planning, and designating and protecting corridors etc.

Mining companies have recently become skilful at rehabilitation of mining sites. We did not consider rehabilitation a mitigation activity, however. This activity is essential for the long-term but we do not believe that reforestation will mitigate harm to chimpanzees over the short or medium term. By the time forests have grown back, it may be too late for chimpanzee populations to return.

If chimpanzee populations do decline in the short term, how long it might take them to bounce back will depend on a variety of factors. These include how long it takes for key fruiting trees mature to produce sufficient levels of fruit to sustain the size of the former population of chimpanzees; for former tree species diversity to be reestablished, and for trees to reach sufficient height to be preferred for nesting. Chimpanzees are slow breeders: giving birth once every four to five years. Once a population has declined, it takes longer than for most species for the population to bounce back to its original size. Walsh (2006) estimates that it will take as long as 100 years for the chimpanzees in some regions of Gabon and Congo to return to their former population size following declines as a result of the Ebola virus.

Another activity that has commonly been proposed as a mitigation activity for great apes is translocation of chimpanzees to another area. We did not include this in a list of mitigation activities either, for several reasons. First, the process of locating, darting, caging and translocating chimpanzees would be logistically very difficult and would no doubt result in mortalities as well. Finding a place for reintroduction of the chimpanzees would also be very difficult: there are very few places in Guinea where chimpanzees are not already present. Those areas that do not have chimpanzees, do not have them for a reason: most likely because they have been hunted to extinction, or because the habitat is not suitable.

In summary, although there are many mitigation activities that should be implemented to decrease the negative effects of mining on chimpanzees in Guinea, it is likely that none of these can fully buffer chimpanzees from the harmful effects of mining, and it is probable that chimpanzees populations will still decline as a result of mining activities.

[15] The IUCN/SSC Primate Specialist Group are producing guidelines about avoiding disease transmission between humans and apes (http://primate-sg.org/best.practices.htm).

In summary:

- Open pit mining is a hugely environmentally disruptive industrial process.
- Impacts of mining on chimpanzees are poorly understood and most of our understanding about chimpanzee reactions to large disturbances comes from studies of the impacts of logging on chimpanzees.
- Logging is not the same as mining. Whereas logging (in principle) involves the removal of only a few trees per hectare, bauxite and iron ore mining involves removal of all topsoil and vegetation over large areas.
- Nevertheless, what evidence is available seems to suggest that chimpanzee populations will decline as a result of mining activities.
- Current studies of the effects of mining on chimpanzees in Guinea will provide cutting edge information that will increase our understanding of how chimpanzees react to large disturbances and will ultimately help guide mitigation activities better in the future.
- For each company to look at their own impact is not enough. As more and more mining pits are opened up throughout Guinea, the impacts of individual mines will be magnified by the *cumulative* impacts of mining throughout the country. The cumulative losses of chimpanzees from projects all over Guinea and over time may be significant.
- Due to the severe, long-term, and cumulative impacts on chimpanzees, it is likely that mitigation measures will not be able to fully avoid losses in chimpanzee numbers.

PART II. BIODIVERSITY OFFSETS

If mitigation is not likely to prevent losses of chimpanzees in Guinea as a result of mining activities, is there another approach that could prevent declines in chimpanzee populations?

One possible approach to addressing the unavoidable impacts of mining on chimpanzees is "biodiversity offsets". A biodiversity offset is an attempt to compensate for the unavoidable or "residual" biodiversity impacts of a development project by implementing a conservation project off site.

Biodiversity offsets are a still emerging mechanism that is being widely promoted by a number of governments and non-profit organizations, as well as the World Bank and the IFC[16] and other multilateral development banks. The IFC's emphasis on offsets is particularly important as it is the largest source of multilateral private sector funding[17] and their projects often include large-scale infrastructure, extractive industries and other natural resource intensive projects that usually have a significant impact on biodiversity and the environment. Several mining companies in Guinea have obtained, or are applying for loans from the IFC, which has developed Performance Standards on social and environmental sustainability, two of which focus on biodiversity conservation[18]. Mining companies applying for loans from the IFC must comply with the IFC's social and environmental safeguard policies.

The IFC therefore has significant potential to leverage environmental protection for chimpanzees. The fact that the Equator Principles, which are the voluntary environmental standards developed by commercial banks, are closely modeled on the IFC's policies further increases the IFC's potential leverage. The Equator Principles have been adopted by 68 commercial banks including some of the largest in the world. The IFC is currently undergoing a review of the first three years of experience with its Performance Standards and has revised them as a result of this review. The complete final draft text of the Performance Standards is expected to be presented to the IFC Board in May 2011 (http://www.ifc.org/ifcext/policyreview.nsf/Content/Process). Unfortunately, these standards have been weakened with respect to biodiversity and to Endangered and Critically Endangered species (please see Kormos and Kormos 2011) and also place a high degree of reliance on offsets as a strategy to compensate for the losses of Endangered and Critically Endangered species.

[16] The IFC is a member of the World Bank Group, and serves as the World Bank Group's private sector lending arm: whereas the World Bank lends exclusively to governments the IFC only lends to private entities. Its mission is to advance economic development objectives by encouraging socially and environmentally sustainable private sector investment in developing countries in a manner that also furthers the IFC and World Bank's sector and country strategies (IFC 1993). The IFC also provides technical advice to the private sector on investing in developing countries (IFC 1993).

[17] Despite the global economic downturn, 2010 was a record year for the IFC, which made USD $13 billion in loans for 528 projects in 103 countries, leveraged an additional USD 5 billion from other sources, and netted USD 1.7 billion in income (IFC 2010).

[18] Performance Standard 1 (PS1), "Social and Environmental Assessment and Management System", and Performance Standard 6 (PS 6) "Biodiversity Conservation and Sustainable Natural Resource Management".

While the Government of Guinea does not have offset policies, mining companies operating in Guinea that receive funding from the IFC will be required to offset losses of chimpanzees as a result their activities.

Despite a growing emphasis on biodiversity offsets, there is still a lack of awareness among conservationists, governments and the banking sector regarding how offsets work. For example, the Business and Biodiversity Offsets Program (BBOP) conducted a review of current application of biodiversity offsets in the banking sector in March 2010 and found that

> *"The finance sector is at a relatively early stage in understanding, assessing and managing biodiversity risks" and "most banks have relatively limited understanding of the mitigation hierarchy and biodiversity offsets".*

This section provides some background information on biodiversity offsets that could be useful for offset design in Guinea. We first present the definition of biodiversity offsets that has been developed by BBOP and general principles concerning their design. We then review the different types of offsets including government (sometimes referred to as "mandatory") offset programs and voluntary offsets, and provide examples of each. Based on this review, we then ask the question whether biodiversity offsets have been successful and then examine lessons learned in designing and implementing offsets.

1. Biodiversity offsets: definition and principles

BBOP is aiming to standardize methodologies and definitions concerning offsets. They define biodiversity offsets are follows:

> *"Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity".* (BBOP 2009 p.4)

BBOP (2009) also outlines what it calls a mitigation hierarchy, which specifies that in any project:

> "*Efforts should be made to prevent or avoid impacts to biodiversity, then minimize and reduce, and then repair or restore adverse effects. After these steps, any significant residual effects should then be addressed via a 'biodiversity offset' in order to achieve 'no net loss' of biodiversity*". (**Figure 4**) (BBOP 2004).

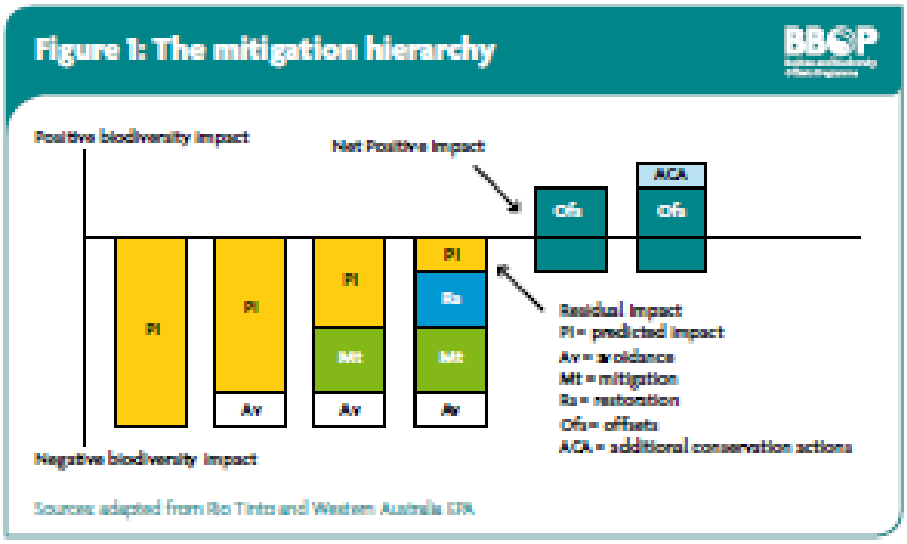

Figure 4. The mitigation hierarchy from BBOP 2004 (http://bbop.forest-trends.org/guidelines/overview.pdf)

As the definitions above indicate, offsets are mechanisms designed to address residual impacts after all efforts have been made to avoid or mitigate biodiversity impacts.

BBOP's Biodiversity Offset Design Handbook (2009) provides ten principles for biodiversity offsets that are similar to, but more precise and definite than the International Council on Mining and Minerals (ICMM) guidance:

- **No net loss:** A biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity.
- **Additional conservation outcomes:** A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations.
- **Adherence to the mitigation hierarchy:** A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimization and on-site rehabilitation measures have been taken according to the mitigation hierarchy.
- **Limits to what can be offset:** There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected.
- **Landscape context:** A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach.
- **Stakeholder participation:** In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring.

- **Equity:** A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognised rights of indigenous peoples and local communities.
- **Long-term outcomes:** The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity.
- **Transparency:** The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner.
- **Science and traditional knowledge:** The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

The Nature Conservancy's Development by Design provides an even broader approach to developing biodiversity offsets than those listed above in that they encourage ***analysis of cumulative impacts*** and ***planning at the landscape level*** before mitigation and it is this landscape level planning that drives the biodiversity offsets. The following are the guiding principles of Development by Design approach:

- Develop a landscape conservation plan (or use an existing conservation plan);
- Blend landscape conservation planning with mitigation hierarchy to evaluate conservation and development conflicts;
- Determine the residual impacts associated with development and select an optimal offset portfolio; and
- Estimate the offset contribution to conservation goals.

This type of planning for offsets at a landscape scale can lead to offset design in which multiple companies may contribute towards ensuring the protection of the same areas that have been designated by consensus as the most important areas for biodiversity conservation, or aggregated offsets. BBOP (2010) defines an aggregated biodiversity offset as:

> *"Measurable conservation outcomes resulting from coordinated actions designed to compensate for the combined residual adverse biodiversity impacts arising from more than one development project in a specific geographical area, after appropriate prevention and mitigation measures have been taken".*

BBOP provides a list of circumstances under which aggregated offsets might be most appropriate. These include:

- Where the same ecosystem or eco-region is exposed to cumulative impacts from several operators (particularly those in the same sector) at more or less the same

time. In this context, impacts on biodiversity are likely to be of a similar type, and combined investment in an aggregated offset might offer overall economies of scale, as well as several ecological advantages.
- Individual developers do not have the skills or resources necessary to deliver effective biodiversity offsets; whereas by collaborating and pooling resources, offsets would be achievable.
- There are a number of developers in the same sector and area of operation with a common set of international certification requirements and/or financing conditions to be met (i.e. help to meet a shared Performance Standard).

In summary:
- Biodiversity offsets are an emerging concept.
- Biodiversity offsets should result in no net loss and preferably a gain in biodiversity.
- Biodiversity offsets should only be used following the mitigation hierarchy and they should follow the principle of like-for-like.
- Biodiversity offset design should be a transparent and peer-reviewed process.
- Aggregate biodiversity offsets are coordinated actions designed to compensate for the combined residual adverse biodiversity impacts arising from more than one development project. Under certain conditions aggregated biodiversity offsets may be more appropriate that than offsets on a project-by-project basis.

2. Types of Biodiversity Offsets

Biodiversity offsets are generally divided into two types: mandatory offsets (i.e. required under a legal or regulatory framework) and voluntary offsets. BBOP suggests the use of the generic term ‘compensatory conservation’ for most voluntary offsets because although they might provide some form of reparation for a project’s negative impacts on biodiversity, they may not reach the “net gain” or “no net loss of biodiversity” threshold, as required by the BBOP definition of an offset. We provide examples of both types of offsets below.

2.1 Mandatory Biodiversity Offsets

Mandatory biodiversity offsets are those that are included in a number of legal frameworks around the world or which are under development. These include the U.S., Australia, Canada, Brazil, Europe, Germany, Switzerland, the U.K., France, Uganda and South Africa. The following section focuses primarily on the United States and Australia, where offset programs are the most advanced.

2.1. 1 The United States (U.S.)

The United States allows for two kinds of offsets: wetlands offsets, which ensure that there is no net loss of wetlands as a result of development projects in the United States, and species offsets, which are designed to offset the loss vulnerable species. Both types of offset mechanisms are discussed further below.

Wetlands Offsets and Mitigation Banking:
The longest-term use of biodiversity offsets (since the 1970s) is the U.S.'s system of "compensatory mitigation" under the U.S. Clean Water Act (CWA), which establishes a policy of no net loss of wetlands in the United States and requires permits for projects that involve dredging and filling of wetlands (Section 404 of the CWA). A number of other Federal laws have expanded the applicability of the no net loss policy, and a number of states have drafted similar laws, so that compensatory mitigation for wetlands loss now brings together a range of Federal and State agencies.

A wetland offset can be implemented using any of four activities: restoring a previously existing wetland, enhancing an existing wetland, establishing a new wetland or in some cases, permanently preserving an existing wetland under threat.

These activities above can be carried out using a variety of mechanisms. In most cases, the developer seeking a permit undertakes one of the above compensation activities independently[19]. However, in a rapidly growing number of cases the developer relies on a third party to implement the offset.

Relying on a third party for offsets can take one of two forms: (a) in lieu fee programs, which are state/local government or non-profit managed conservation projects funded by fees imposed on the private sector, or (b) mitigation banks, which are for the most part privately managed conservation projects (FR 2008).

Mitigation banks have grown significantly in popularity and the new Federal rule passed in 2008 on wetlands offsets expresses a preference for mitigation banks. A mitigation bank functions by protecting wetlands for which the bank is awarded a certain number of mitigation credits. The bank may then sell credits to developers seeking to offset the destruction or alteration of a natural wetland. Wetlands mitigation banks can be quite small, or in a few cases, large, high-profile projects such as the Everglades Mitigation Bank that is restoring 13,500 acres of wetlands to provide connectivity between Everglades National Park and Key Biscayne National Park in Florida. Additional examples can be found at the following link: http://speciesbanking.com/.

Conservation Banking
While a wetlands mitigation bank seeks to ensure the continued functions of a watershed under the Clean Water Act, a conservation bank seeks to help ensure the recovery of an Endangered species listed under the Endangered Species Act (ESA). A conservation bank is:

[19] Referred to as "permittee responsible mitigation".

> *"A parcel of land containing natural resource values that are conserved and managed in perpetuity, through a conservation easement, for specified listed species and used to offset impacts occurring elsewhere to the same resource values on non-bank lands"* (USFWS 2003).

Conservation banking arose in the U.S.[20] as a mechanism to help developers comply with the ESA. The ESA generally provides very strict prohibitions against causing any harm to Endangered species. However, Section 10 of the ESA does make an important exception. It states that if a species listed under the ESA is found on land that a developer wants to use for a project, and the developer's project will have an impact on a listed species, the developer may apply for a permit from the USFWS to allow the project to go forward. This permit is called an "incidental take". In this context it is important to note that "take" under the ESA does not only mean "kill" - it includes any action that harms or injures the species, including an activity that significantly alters a listed species' habitat.

A permit for an incidental take may only be granted if certain conditions are met. First, the take of the listed species must truly be incidental and not intended. Second, the permit applicant must also submit a habitat conservation plan (HCP) for the listed species. Requirements for the HCP are similar in a number of respects to the requirements for wetlands mitigation. The plan describes the project's anticipated impact on the listed species. The plan must also explain what alternatives were considered for the proposed activity, and why those alternative actions were deemed not acceptable. The plan must further detail the actions the permit applicant will take to minimize and mitigate impacts, and to offset the impacts where mitigation is not possible. The plan must also demonstrate that funding is available in perpetuity to implement the plan.

If the conditions above are met satisfactorily and the government finds that the activity will not "appreciably reduce the survival and recovery of the species", an incidental take permit may be issued and the project may go forward.

Offsets, either individual projects or conservation banks becomes an option when impacts on species listed under the ESA are unavoidable, when on-site mitigation is not practicable, or when off-site measures are preferable to on-site measures. As with wetlands, a developer has two options for species offsets. The developer may opt to attempt to establish an offset individually (the more common option), or via a third party conservation bank.

A conservation bank is a conservation area that has been established by a private landowner to protect habitat for species listed under the ESA. The USFWS determines the conservation value of the area to the species and assigns species credits to the conservation bank. The conservation bank owner may then sell species credits to developers seeking an incidental take permit.

The USFWS began approving conservation banks in the 1990s. However, there were no Federal standards for conservation banks until 2003 when the U.S. Fish and Wildlife

[20] Conservation banking originated in California and was first used to protect vernal pools with endemic freshwater shrimp.

Service issued its "Guidance for the Establishment, Use, and Operation of Conservation Banks". The USFWS (2003) guidance notes that the size, location and configuration of the proposed bank, as well as habitat quality and species use of the area are key considerations for the design of a conservation bank. Private landowners can create banks either by acquiring existing habitat, protecting existing habitat through an easement, restoring existing habitat, in some cases creating new habitat, or prescriptive management of habitat for specific biological characteristics. As with wetlands mitigation banking, the advantages of conservation banking are the greater size and viability of the offsets relative to individual project offsets, the fact that a conservation bank's HCP must be consistent with the USFWS species recovery plan for the listed species, and that conservation banks provide incentives to landowners to protect Endangered species (USFWS 2003, Carroll *et al.* 2008).

In the U.S. there are now well over a hundred conservation banks, though not all have been approved under the 2003 USFWS guidance. Some conservation banks have generated significant attention for helping to preserve Endangered species. Examples include International Paper's conservation bank for red-cockaded woodpeckers (https://www.edf.org/article.cfm?contentID=7681), those for the San Joaquin kit fox (http://U.S..speciesbanking.com/pages/dynamic/species.page.php?page_id=7418&eod=1) , and the recently created Florida panther conservation banks protecting crucial panther corridors (http://pantherconservation.com/).

2.1.2 Australia

Another country with legal frameworks for offsets is Australia. A draft national offset policy was released in Australia in 2007 (DEWR 2007) pursuant to the Environmental Protection and Biodiversity Conservation Act (1999), but has not moved beyond the policy statement stage. However, offsets policies are applied at the state and territory level in Australia, with perhaps the greatest progress in codifying requirements in Victoria and New South Wales (NSW).

Victoria

Concerned with native vegetation loss, the State of Victoria outlined a strategy for protecting its remaining native habitats entitled "Victoria's Native Management: A Framework for Action" (DSE 2002) which establishes the goal for native vegetation management of "*a reversal, across the entire landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain*" (DSE 2002). Net gain is described as "*the outcome for native vegetation and habitat where overall gains are greater than overall losses and where individual losses are avoided where possible*". The strategy for achieving a net gain (in addition to conservation) is to avoid, minimize and offset losses.

In assessing vegetation and habitat quality to determine whether to grant a permit and, if so, what to require as an offset, Victoria uses two criteria: inherent site condition (i.e. how far removed it is from "*mature and undisturbed areas of the same vegetation type*") and viability in the landscape, which relates to size and connectivity. The habitat score

and the area of the habitat being assessed are multiplied to provide a measure of habitat quality expressed in "*habitat acres"* (a perfect score corresponding to intact habitat that is also viable in the broader landscape). For more on how habitat hectares are calculated see: http://www.environment.gov.au/archive/biodiversity/toolbox/templates/pubs/habitat-hectares.pdf. The habitat hectares score becomes the basis for assigning native vegetation credits.

In recognition of the fact that much of Victoria's remaining native vegetation is on privately owned land, Victoria developed an electronic system, the BushTender mechanism, where landowners can offer to manage and improve their native vegetation at particular price. The Government of Victoria can then review the offers and provide funding to those landowners providing the best offers. In addition, the BushBroker mechanism provides an electronic system for identifying and locating credits for different habitat types, to facilitate buying and selling of those credits. Vegetation credits are also listed in a Native Vegetation Credit Register.

Thus, Victoria's offset approach does not involve banking, though there are indications that Victoria is moving in that direction given plans by the Government of Victoria to create a 10,000 hectare reserve to make offsets available for a 5,200 hectare expansion of the city of Melbourne (http://global.speciesbanking.com/program/bushbroker).

More information on how Victoria determines offsets and credits can be found in the Native Vegetation Management: *A Framework for Action*[21]*, the Native Vegetation Offsets: Conservation Significance and Like for like*[22]*, the Vegetation Quality Assessment Manual*[23] *and the Department of Sustainability and Environment: Net Gain Calculator*[24]

New South Wales (NSW)

NSW launched the BioBanking and Offsets Scheme (BioBanking) in 2008 as a mechanism to help implement the NSW Threatened Species Conservation Act of 1995. BioBanking is administered by the Department of Environment and Climate Change (DECC) in consultation with other relevant Departments via the Ministerial Reference Group, similar to the review teams for wetlands and mitigation banking in the U.S. BioBanking agreements are permanent and attach to the title of the land so that the agreements are binding on any future landowners. Project developers purchase credits from BioBanking offsets. Revenues from credit sales are deposited into the BioBanking Trust Fund, which then pays land managers fees for managing their land according to BioBanking terms and conditions.

21http://www.dpi.vic.gov.au/CA256F310024B628/0/C2E5826C9464A9ECCA2570B400198B44/$File/Native+Vegetation+Management+-+A+Framework+for+Action.pdf

22http://www.dse.vic.gov.au/CA256F310024B628/0/64DB54A684A8CDA9CA2576DA00250CCB/$File/Native+Vegetation+Offset-Fact+sheet+2+-+Conservation+significance+and+Like+for+Like.pdf

23http://www.dpi.vic.gov.au/DSE/nrence.nsf/LinkView/EBF7B20C008E24F5CA256F16001671778062D358172E420C4A256DEA0012F71C

24http://www.dse.vic.gov.au/DSE/nrence.nsf/LinkView/74DC19C326C445BECA2571AE00037FC0B32D42FB223C7345CA25712B0007130A

BioBanking provides two types of credits:

- Ecosystem credits – for all impacts on biodiversity values/ecological communities, including threatened species that can be reliably predicted to exist in a particular ecological community based on vegetation surveys.

- Species credits – for impacts on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates.

To participate in BioBanking, developers must run several assessments using the BioBanking Assessment Methodology. They must:

- Determine what impacts the project will have on biodiversity values, and whether it will be possible to "improve or maintain" biodiversity values as a result of a BioBanking project. Biodiversity values include the "*composition, structure and function of ecosystems, and threatened species, populations and ecological communities, and their habitats"*. BioBanking also identifies "red flag areas" of high ecological value (areas of native vegetation that have been over-cleared or highly vulnerable species populations where development is very unlikely to be approved. In red flag areas, only the Director General of the DECC can decide to allow the project to go forward on the basis that avoiding the particular area would be unnecessary and unreasonable. The Director General's decision must be published.

- Determine the number of credits that will be required for the development project to go forward, which is calculated as a function of "*site values (e.g. the structure and function of ecosystems), and landscape context (e.g. the values for connectivity and area of vegetation)"*. The scores for each of these factors are used to derive the change in biodiversity values over time as a result of development or conservation.

The methodologies for assessing project impacts, biodiversity values and assigning credits are discussed in detail in the following DECC publications: *BioBanking Assessment Methodology and Credit Calculator Operational Manual*[25] and the *BioBanking Calculator*[26]*:*

2.2 Compensatory Conservation Programs

The definition of an offset requires that at a minimum, no net loss of biodiversity occurs as a result of a development project and that the offset be in place preferably before development takes place. However, in many cases large scale development programs do not quantify no net loss, choosing instead to simply estimate what could qualify as a valid offset (for example providing funding for the conservation of a nearby protected area)

[25] http://www.environment.nsw.gov.au/resources/biobanking/09181bioopsman.pdf
[26] http://www.environment.nsw.gov.au/biobanking/calculator.htm

and in many cases implementing conservation measures after development begins. Because these kinds of projects are less rigorous than an offset project, BBOP uses the terminology "compensatory conservation programs". A few examples of compensatory conservation are described below.

Chad-Cameroon pipeline

One of the most notorious offset projects involves the Chad-Cameroon pipeline project launched in 2000. The 1,070 km (660 miles) pipeline was constructed to bring oil from Chad to ports in Cameroon despite widespread concerns given very high corruption levels in both countries, and social and environmental risks from the project.

After interventions by concerned NGOs, the project partners: ExxonMobil, Petronas, and Chevron as well as the World Bank worked with the Government of Cameroon to establish two new national parks to mitigate part of the environmental damage resulting from the $3.7 billion project. The oil companies subsequently contributed $1.4 million for the creation and management of a national park in the Campo Ma'an Reserve near Cameroon's Atlantic Littoral forest area, and $1.5 million for the creation and management of a new national park in the Mbam Djerem area to the west of the Deng Deng forest, to be managed via a conservation fund.

Ambatovy Project, Republic of Madagascar

http://bbop.forest-trends.org/guidelines/ambatovy-case-study.pdf

Another example from Africa of a project providing compensation for environmental damage is the Ambatovy Project, Republic of Madagascar. This project consisted of an 18km^2 open pit nickel and cobalt mine, a slurry pipeline and a hydrometallurgical plant. The mine site is in an area of high biodiversity with endemic species. The mining consortium have developed a multifaceted offsets program that includes: 1) an offset site of 11,600 hectares of Endangered forest of which 7,000 hectares consists of a multiple-use zones and 4,600 is a core zone 2) on-site conservation zones of 4,900 hectares, 3) a forest corridor to ensure connectivity with eastern rain forest, 4) support to conservation of a RAMSAR Convention-designated wetland adjacent to the mine site, 5) expanded reforestation activities along the pipeline with within the mine footprint. In terms of hectares protected, the project generated about 16,500 hectares of protection for a mine footprint of just over 2,000 hectares.

The mining project agreed to function as a BBOP Pilot Project case study and appears to have followed a number of best practices: including extensive consultation with stakeholders, adherence to the mitigation hierarchy (i.e. using offsets as a last resort to address unavoidable residual impacts), 2-year surveys of biodiversity at the project site, some permanent protection measures (some of the offset areas have been integrated into Madagascar's national park system), a transparent methodology for calculating the offset (the habitat hectares method, described further in 2.1.2 above), an offset designed to start concurrent with the beginning of mine operations, with some elements in place prior to the beginning of operations in 2010. In addition the mining consortium has made an estimate of annual management costs for the offset measures ($250,000-300,000) the

case study for the project does not indicate whether permanent funding has been guaranteed.

The IndoMet Coal Project (IMC)

The projects discussed above are examples of offsets and compensatory projects in Africa. There have been few offset or compensatory projects specifically for great apes. However, ICMM does cite one project with orangutans in Borneo. The IndoMet Coal Project (IMC) is "a high quality metallurgical coal resource within the Maruwai Basin in the Indonesian part of the island of Borneo". The project consists of seven Coal Contracts of Work (CCoW) and covers 355,000 hectares in the remote and relatively inaccessible district of Murung Raya. This area is still 87% covered by tropical rain forests and has orangutans, which are classified as Endangered by the IUCN Red List.

As part of a compensatory project, IMC has been working with the Borneo Orangutan Survival Foundation's (BOSF) Orangutan Reintroduction Center at Nyaru Menteng. BOSF cares for over 600 orangutans. In 2007, the Indonesian president ordered all orangutans held in rehabilitation centers to be released by 2015. Since 2006, IMC has therefore assisted BOSF in identifying orangutan release sites and providing logistical support, safety management and helicopter transport for four orangutan translocation projects. By 2010, a total of 149 rescued orangutans had been released into the wild.

Nam Theun 2 HydroPower Project Lao PDR

The Nam Theun 2 HydroPower Project in Lao PDR (NT2) is a $1.45 billion World Bank and Asian Development Bank funded project which began in 2005. It will generate 1,070 megawatts of electricity, most of which will be sold and delivered to Thailand. The project will dam the Theun River (a tributary to the Mekong River) flooding a 450km^2 area. The World Bank has promoted Nam Theun 2 as a model of social and environmental good practice.

An important aspect of the NT2 project is its biodiversity offset component, which involves providing management support for the Nakai-Nam Theun National Protected Area (NNTNPA) and corridors linking the NNTNPA to two other protected areas. These conservation areas were designed to provide protection of the watershed above the reservoir and constituted an important condition for project approval. The NT2 project also involved the establishment of a new agency, the Watershed Management and Protection Authority (WMPA), to manage the conservation offset area. The WMPA is responsible for better enforcement to reduce a number of threats to the area as noted in the World Bank's Project Appraisal Document. Threats include illegal hunting, illegal wildlife trade, unsustainable use of non-timber forest products etc. These activities will be funded for a term of 30 years.

The project established a review panel to monitor social and environmental impacts of the project, from project design through implementation.

3. Have biodiversity offsets and compensatory conservation programs been successful?

While BBOP has summarized a number of case studies in their document *Compensatory Conservation Case Studies* BBOP (2009) and http://bbop.forest-trends.org/guidelines/non-bbop-case-studies.pdf and ICMM has also compiled a set of case studies in their document *Mining and Biodiversity: A collection of case studies – 2010* (ICMM 2010), unfortunately, neither of these documents provides analysis of the success of the projects reviewed. BBOP (2009) noted that:

> *"It is not the intention of the case studies to pass judgment on the various initiatives and efforts of project proponents or their development partners with regard to their compensatory conservation activities".*

The only document we could find that attempts systematically to analyze the successes and failures of offset projects around the world is ten Kate *et al.* (2004). This is in part because gauging the success or failure of a species conservation project can take time, and partly because biodiversity offsets are a new mechanism. A thorough review of biodiversity offsets with concrete lessons learned from past experiences would be an important contribution to the literature on offsets.

Most information on the success of biodiversity offsets comes from analyses of compensatory Mitigation for Wetlands in the U.S.. There have been several reviews and analyses of Mitigation for Wetlands in the U.S. and the following summarizes some of the main findings:

- In 2001 the National Research Council (NRC) found that the goal of no net loss of wetlands was not being met (NRC 2001). The NRC highlighted administrative concerns: weak compliance with wetlands permits, insufficient monitoring, unclear guidance for offsets, and weak enforcement capacity. The report also noted that wetlands offsets were failing to deliver functional equivalence to the wetlands being lost: different mitigation activities (creation, restoration, enhancement or preservation) were generating different types and degrees of wetlands function, and the wetlands functions at each impact site varied greatly. The report noted the need for a watershed approach for wetlands offsets, expressed a preference for restoration of existing wetlands over attempting to create wetlands, and emphasized that avoidance was the best policy for wetlands that are difficult to restore. The report stated that mitigation banking did offer advantages, but stopped short of expressing a preference for mitigation banking.

- In 2004, the Society of Wetlands Scientists released a position paper that described mitigation banking as a sound mechanism (http://www.sws.org/wetland_concerns/docs/Wetland-Mitigation.pdf). However, they also broadly supported the findings of the 2001 NRC review.

- ten Kate *et al.* (2004) noted a perverse effect of wetland compensation mitigation, i.e. that almost 100% of wetland development permits were being granted, even in places where development should not occur because it is easier for regulators to require offsets than it is to deny permits.

- In 2005 the General Accounting Office reviewed the Army Corps of Engineer oversight of wetlands compensation mitigation and found that compliance monitoring remained weak, though oversight was better in mitigation banks (GAO 2005).

- A 2008 assessment by the Environmental Law Institute (Kihslinger 2008) found that although ratios of offset projects to lost wetlands had continued to rise - so that by 2006 it was better than 2:1 - the findings of the 2001 NRC report in terms of both administrative oversight and functional equivalence remained largely valid. Kihslinger 2008 found that mitigation banks were not faring better than other types of compensation mitigation.

- Carroll *et al.* (2008) notes that many wetlands mitigation banks were neglected after initial permitting and monitoring was complete.

- The new 2008 rule incorporates many of the recommendations provided by the reports above. Whether the new rule will remedy the administrative and technical challenges that wetlands compensation mitigation has faced over the first three decades of operations in the United States remains to be seen.

Few analyses have been done on the successes and failures of conservation banking (Bean *et al.* 2008). Assessing the success of the program in terms of the particular conservation bank and its role in assisting with the recovery and de-listing of Endangered species is difficult because recovery is a long term process, conservation banks are intended to function alongside many other mechanisms within a species recovery plan, and conservation banking is a more recent mechanism than wetlands mitigation banking. As one conservation bank commentator noted, a 50-year review might be more telling than a short or medium term assessment (Travis Hemmen, pers. comm.).

One commentary on conservation banking in the U.S. noted that permitting of conservation banks has been slow (Carroll *et al.* 2008), causing frustration among permit applicants. Indeed, permitting does appear to be becoming more stringent (Hemmen, pers. Comm.). However, slow permitting and a more stringent approach may also be a reflection of a more mature administrative mechanism that recognizes that a very deliberate approach is needed to ensure the success of the program. Government agencies appear to be focusing on two issues in particular: the accuracy of the crediting for the bank, and the risk that the bank will come under threat in the future (e.g. from power lines, as result of restrictions on title if, for example, a third party holds rights for mineral exploration etc.) (Hemmen pers. comm.).

Critics have also noted that conservation banks may not be resulting in no net loss if the areas being protected are not under threat. Others have argued that the quality of the management increases the ecological value of the area if it is in a conservation bank (Carroll *et al.* 2008). Another criticism is that conservation banks will not be effective if they are not connected to larger areas over time, and indeed create a risk of concentrating ecological values in isolated areas over time (Carroll *et al.* 2008). Concerns have also been raised that ensuring conservation in perpetuity on relatively small, privately held areas is difficult, and that there are often pressures to withdraw lands, especially from smaller conservation banks ((Carroll *et al.* 2008, Hemmen pers. comm.). Whether these concerns bear out will only become apparent over time.

Nevertheless, conservation banking has proved popular in the U.S.: there are well over a hundred conservation banks in the U.S. with several hundred thousand acres of habitat under protection. Commentators have expressed optimism that conservation banking can benefit both the species (Carroll *et al.* 2008, Wilcove and Lee 2003) and the landowners creating the banks (Fox and Murcia 2005).

Many compensatory conservation projects have been justifiably criticized for their shortcomings. This is in large part because they are poorly planned: compensatory mitigation projects are frequently added to development projects at a late stage in project development, often arising as a result of advocacy efforts by environmental NGOs working to avert environmental crisis. As a result, they frequently do not have sufficient or permanent funding, do not benefit from buy-in from all the stakeholders involved, and have not been well thought-out and so very quickly begin to encounter implementation problems. This is not to suggest that compensatory conservation projects cannot be successful, but rather that in the absence of a government regulatory framework ensuring good process, a special effort from project planner is needed to comply with best practice.

For example, for the Chad-Cameroon pipeline, financing of the compensatory conservation program was clearly insufficient to provide long-term funding for the management of the parks, and despite statements to this effect from international NGOs, the amount was not increased. The establishment foundation, Foundation for Environment and Development in Cameroon (FEDEC) was delayed so management of the park was constrained. As a result, a logging company was able to build an access road through Campo Ma'an National Park to better access its logging concession and both parks suffer from significant management problems (illegal logging, bushmeat extraction etc.). The Chad-Cameroon pipeline offset is widely viewed as a failure (pers. comm. Ray Victurine, Director Conservation Finance of the Wildlife Conservation Society March 2011).

It is too early to judge the success of the Ambatovy mining project in Madagascar. Nonetheless, the development site is of great biodiversity value and ensuring no net loss given the sensitivity of the biodiversity values at the impact site will be challenging. Surveys indicate that the site contains:

- 16 lemurs species, including Prolemur simus (IUCN CR), Propithecus d. diadema (IUCN EN), Indri indri,(IUCN EN), Eulemur rubriventer (IUCN VU), Daubentonia madagascarensis (IUCN NT), Hapalemur griseus (VU), Allocebus trichotis (IUCN DD);
- 62 bird species, including Tyto soumagnei, Anas melleri and Ardea humbloti, Sarothura watersi (all IUCN EN);
- 123 herpetofauna species, including *Mantella aurantiaca* (IUCN CR), *M. crocea* (IUCN EN), *Sanzinia madagascariensis* (IUCN VU);
- 5 fish species of which *Rheoles alaotrensis* (IUCN VU) and at least two new *Ratsirakia* species;
- 24 insects species, which are considered rare at a national level;
- 376 plants including *Asteropeia mcphersonii (IUCN VU), Leptolaena multiflora (IUCN EN), Dalbergia baroni* (UCN VU) and the 330 species of concern which are considered rare in Madagascar;
- Three structurally distinct HABITAT TYPES: zonal, transitional and azonal forests (the latter including seasonal ponds and upper watershed stream systems) and their fauna and flora communities; and
- The landscape-level habitat assemblage with the functional interaction between the zonal, transitional and azonal forests.

In addition, the pipeline bisects two large forest blocks in Madagascar – the Ankeniheny-Zahamena Corridor to the east and north of the project site, and the Analamay-Mantadia forest corridor to the southwest of the project site. The project clearly recognizes that connectivity between these two blocks is critically important to conservation in Madagascar, and does commit to undertake reforestation activities with NGO partners to link these two corridors. However, rights of way for pipelines can be difficult to control, especially for a project with an anticipated duration of at least 27 years. If the pipeline right of way acts as a barrier to reconnecting these two forest blocks it would constitute a major environmental impact.

The IndoMet Coal (IMC) project was highly controversial, and BHP, a partner in IMC was severely criticized. It was accused of lobbying for the protected status of some of these areas to be lifted so it can clear the trees and dig for coal (Sunday Times 2007). Very low survival rates have been reported in the past for orangutans following reintroduction to the wild. Russon (2009) conducted a review of over 1,000 orangutan releases and found an average survival rate of 40% (20-80%). Russon (2009) points out that there are many problems with these values, since they represent a huge variation in methods used to calculate them as well very different points in time at which data was compiled. More recent data suggests that survival rates may even be as low as 0.1%. We have been unable to find specific information on the survival rates of the IMC orangutan releases.

For the NT2 project, reports filed by the International Environmental and Social Panel of Experts (POE) indicate increasingly serious problems with the conservation offset component of NT2. The POE's latest (16^{th}) report notes:

- A mining concession appears to have been awarded to the military within the NNTNPA.
- No action has been taken to apply for World Heritage status for the NNTNPA, though World Heritage listing has been recommended by the POE since its first visit to the area.
- The WMPA has not hired sufficient staff, including senior staff, with biodiversity expertise. As a result, WMPA staff are considering road access to the NNTNPA, something that the POE has clearly stated should not happen.
- Illegal logging of rosewood and illegal wildlife trade have been exacerbated by the reservoir, which now allows poachers much easier access to the NNTNPA by boat.
- Water buffalo are being introduced to the park to graze in unsustainable levels and now need to be removed.

Many of the problems above may yet be resolved, and the World Bank is taking steps to better support the WMPA. However, the reports from the POE to date indicate that the situation in the NNTNPA, an area of world class biodiversity value, is getting significantly worse, despite World Bank claims that the NT2 project is a model of sustainability.

4. Designing and implementing biodiversity offsets: challenges for offsetting chimpanzees

Although the success of biodiversity offsets as a mechanism to achieve no net loss of biodiversity is not good, the factors that determine an offset's chances of success are becoming clearer:

- Determining the specific biodiversity elements that will be lost as a result of a development project and therefore in need of being offset (e.g. habitats, species, combinations of habitat/species etc.).
- Determining the conservation value of an offset location, i.e. how much conservation is needed off site to compensate for the impacts caused by a development project.
- Determining the appropriate location for the offset.
- Determining the timing of the offset.
- Determining who should determine what constitutes a valid offset.
- Determining what constitutes an acceptable activity.
- Determining whether offsets are appropriate for certain species e.g. great apes.

Several groups have now developed much needed guidelines for designing biodiversity offsets, such as ICMM's Good Practice Guidance for Mining and Biodiversity (ICMM 2006), BBOP's Biodiversity Offset Design Handbook (2009), TNC's Development by Design (http://www.nature.org/aboutus/development/art30709.html and Kiesecker *et al.* (2009). The IFC Performance Standards also provide some guidance about biodiversity

offsets design. We will draw on these documents for guidance, as well as lessons learned form the longest running biodiversity offsets (wetlands mitigation banking and conservation banking) to help answer the critical questions we list above. This information can start to help answer how to design and implement a biodiversity offset for chimpanzees in Guinea.

4.1 What needs to be offset: what are the biodiversity values that will be lost as a result of the development project ?

Two pieces of information are necessary to begin the process of designing an offset: the full extent of biodiversity present at the development site and the impact of project activities on biodiversity.

In many cases, companies may not know the full diversity of species that exists in their project area, so they may not have a good idea of what needs to be offset. Thorough surveys are not only necessary for conspicuous large mammals, but also for amphibians, reptiles and insects, plants, etc. as well. In tropical and subtropical areas, such surveys often reveal new species unknown to science. In addition, it is important to measure not just the species themselves, but also the extent of their habitat, given that both must be offset.

Companies might not be able to predict, even with the help of experts, exactly how effective they will be in avoiding or mitigating impacts, and therefore the full extent of biodiversity lost as a result of their activities.

In the case of chimpanzees, conducting surveys to assess habitat and population size is possible. However, as noted above, anticipating the precise impacts on a population is more difficult and will depend on a number of factors, including the potential for chimps to move to adjacent areas, the quality of those areas, and whether other chimpanzees are present, etc. Because of the uncertainty of this assessment, it is very important that assessments should not underestimate potential losses as well as the other impacts to the chimpanzees.

Most offset programs require a precautionary approach or a "margin of safety" (Salzman and Ruhl 2002, ten Kate *et al.* 2004) in their offsets to avoid underestimating their impacts. For example, in the U.S. Wetlands system, the Federal rule for wetlands offsets states that where "functional or condition assessment methods or other suitable metrics" are not available, "a minimum one-to-one acreage or linear foot compensation ration" must be used, and a greater ratio must be required if the district engineer finds that chances of success are at risk (e.g. because of the method of mitigation, such as preservation, the complexity of the aquatic resource type etc.). The Ambatovy case study above provides another example of a precautionary approach to offsetting.

In the case of chimpanzees, it is important to recognize that it is not just the lives of the chimpanzees living on the project site that must be offset, but also their future

reproductive success. Chimpanzees in the wild begin producing offspring between about 10 and 14 years old[27]. A female chimpanzee has an offspring on average once every 4 to 6[28] years and usually continues producing offspring until she dies[29] at around the age of 40 years. Even assuming that not all infants generally survive[30], this still means that a female chimpanzee produces on average about five to seven viable offspring in her lifetime, which should also be offset.

4.2 How do you determine whether the offset is equivalent to the biodiversity being lost at the project site?

Offset programs (including the IFC's Performance Standards) are based on the like-for-like principle, i.e. that the offset must protect the same values being lost at the project site. How is this determined for Endangered species? The guidance for conservation banks in the U.S. provides some principles for making this determination. Conservation banks issue credits, which are the "quantification of species' or habitat's conservation values within a bank" (USFWS 2003). The USFWS provides the following guidance on species credits:

- In their most basic form, a species credit is equal to "*one acre of habitat or the area supporting one nest site or family group*".
- *"Credit values are based on a number of biological criteria and may vary by habitat types or management activities"* including "*habitat quality, habitat quantity, species covered, conservation benefits, including contribution to regional conservation efforts, property location and configuration, and available or prospective resource values*".
- "*In general, the credit system for a conservation bank should be expressed and measured in the same manner as the impacts of the development project*" (e.g. if the project impact is measured in lost acres of habitat and number of pairs, the bank's credits should be expressed in this manner as well).
- If the bank's offset mechanism is preservation of existing values (e.g. rather than restoration or other activities) then the "*credits should be based on the values of the bank at the time the bank agreement is established*", making it important to have as accurate an estimate of population sizes as possible. However, a bank and the USFWS may make a conservative initial allocation of credits and allocate additional credits in future years if further study indicates the credit allocation was too small.

[27] At Taı¨, the average age at which females produce their first offspring is 13.8 (Boesch and Boesch-Achermann 2000), while at Bossou females as young as 9.6 years of age may produce their first offspring (Sugiyama 1999)

[28] Mean inter-birth interval is 5.9 years at Taı¨ in Cote d'Ivoire (Boesch and Boesch Achermann 2000) and 4.4 years at Bossou, Guinea (Sugiyama 1999).

[29] Richard Wrangham and Jane Goodall--followed 185 wild female chimpanzees for several decades. As they report online 13 December in *Current Biology*, only 34 mothers survived past the age of 40, but nearly half of them gave birth, and one had a baby at the age of 55. In contrast to humans, says Emery Thompson, fertility in wild chimpanzees seems to senesce at the same pace as the rest of the body (Emery-Thompson *et al*. 2007).

[30] The probability of infant survival to the age of four is 0.81 at Bossou (Sugiyama 1989) and 0.6 at Taı¨ (Boesch and Boesch-Achermann, 2000).

- A credit may not be sold until the bank is established in perpetuity and the conservation status is fully legally established.
- The USFWS notes that "*credits associated with a mitigation activity should reflect an assessment of the degree of beneficial impact of the activity on the prospects for the affected species' survival*". In theory, this could be accomplished using population viability analyses, though the information for rigorous analyses is often missing. Thus, the USFWS states that "*the units of currency may take the form of surrogates for the extent of impact on population viability, such as occupied acres or nesting pairs beneficially or detrimentally affected*".
- A system of weighted credits can be agreed upon to reflect different values (e.g. one credit for an acre of good habitat, half a credit for an acre of habitat of lesser quality.
- The USFWS may establish mitigation ratios so long as its rationale for doing so is clear and the ratios are applied consistently For example, the USFWS can decide that only one acre of good habitat in a conservation bank is necessary to offset two acres of lost habitat of lesser quality – or vice versa.
- Credits earned are implicitly contingent on the continued appropriate management of the bank to safeguard the species in perpetuity.

While the concept of weighted credits has been adopted by a number of offset programs, this concept does entail risks if misapplied. For example, the IFC's Performance Standards state that:

> *In certain situations, however, the biodiversity to be impacted by the project may be neither a national nor a local priority, and there may be other areas of biodiversity that are a higher priority for conservation and sustainable use and under imminent threat or need of protection or effective management. In these situations, it may be appropriate to consider an 'out-of-kind' offset that involves 'trading up' (i.e., where the offset targets biodiversity of higher priority than that affected by the project)".*

There is some danger in this kind of subjective determination, as top predators or crop raiders may certainly not be considered a conservation priority by local people, or even at the national level. If chimpanzees are not considered a local priority (for example because they raid crops) could the lives of chimpanzees be traded for another species that is perhaps also Endangered but less of a nuissance to people? We agree with David Brand as quoted in ten Kate *et al.* (2004) "You can't trade jaguars for tigers!"

A final but important consideration in determining the validity of an offset is that the offset must be "additional". As explained by BBOP: "*A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place*". Thus, a mining company seeking to offset the loss of chimpanzees would not just be responsible for the protecting chimpanzees in another area: the mining company would need to demonstrate that they are increasing the protection for chimpanzees that are under threat and would *not normally* be protected.

4.3 Where should the offset be located?

The new U.S. Federal rule on wetlands offsets passed in 2008 requires that mitigation should generally take place in the same watershed as the development project, and where it is most likely to replace lost functions and services. If a watershed plan exists, the mitigation activity should be consistent with the plan. In the absence of a plan, the district engineer will use a watershed approach considering such information as

> "*Current trends in habitat loss or conversion, cumulative impacts of past development activities, current development trends, the presence and needs of sensitive species, site conditions that favor or hinder the success of compensatory mitigation projects; and chronic environmental problems such as flooding or poor water quality*". (FR 2008)

For conservation banking in the U.S., with respect to location, the first consideration is whether the USFWS has established a recovery plan for the species. If so, then the conservation bank should be located within the recovery plan area (in the same way that a wetland offset should occur in the same watershed as the wetland being impacted) and must advance the plan's recovery objectives. In cases where a recovery plan is not yet in place, the USFWS strongly recommends consultation with the USFWS before a private party undertakes to establish a conservation bank. Even if the conservation bank is consistent with the recovery plan, the USFWS will also consider the potential impacts of future land uses in the area around the proposed conservation bank before approving the bank.

With respect to the size of the conservation bank, the USFWS notes that large, un-fragmented blocks with fewer edge effects are preferable. The USFWS also states that:

- "*In general it is important that banks be of sufficient size to ensure the maintenance of ecological integrity in perpetuity.*"
- "*Bank boundaries must encompass all areas that are necessary to maintain the habitat function specific to the species covered by the bank, which may include the appropriate buffer against edge effects from adjacent land use.*"

4.4 At what point in time should the offset be implemented?

According to the Wetlands Mitigation guidance, an offset should to the *maximum extent possible* be in place prior to or at the same time as the development takes place. Financial assurances must also be provided to ensure completion of the project. The offset should also be legally protected for the long term via mechanisms such as conservation easements, restrictive covenants, or title transfer to the organization managing the offset.

For conservation banking, Federal regulations for mitigation banking also require that the compensatory mitigation site be identified and secured, with a management plan in place

before the development takes place (or at least concurrent with the development) and credits are not released until specific project milestones are reached.

4.5 What would be considered an acceptable activity for an offset?

If a dozen chimpanzees are predicted to die as a result of mining activities, could that mining company invest in conservation education in an area known to have a dozen chimpanzees? Or pay for the running costs of an orphanage for a dozen chimpanzees? This is the second problem in deciding upon what is a fair and equal offset. What types of actions are considered an offset, or what type of project could compensate for the life of a dozen chimpanzees?

In their guidance note to PS6, the IFC outline a few activities that probably would not count as an offset:

> "*G92. The client would be expected to demonstrate that the offset measure has the potential to compensate for the residual impacts on the critical habitat. Actions such as awareness-raising, environmental education, scientific research and capacity building are not considered valid offset measures unless there is evidence of on-the-ground measurable conservation outcomes pertaining directly to the critical habitat. In the majority of cases, these types of activities would be considered additional benefits above and beyond compliance.*"

BBOP mentions that reducing or removing current threats or pressure could also be considered as an appropriate activity but emphasizes that the most appropriate offsets would be undertaking positive management interventions to restore an area or stop degradation.

In wetlands mitigation banking, offsets can be carried out using any four activities: by restoring a previously existing wetland, enhancing an existing wetland, establishing a new wetland or in some cases, permanently preserving an existing wetland under threat.

4.6 Who should approve the offset?

The process for approval through a mitigation bank is extensive. It begins with pre-application consultation, a public notice of the proposed project and a prospectus describing the proposed mitigation with an opportunity for public comment, and preparation of a mitigation plan for submission to the appropriate government agency. The mitigation plan must include a description of the mitigation method (enhancement of an existing wetlands, creation of a new wetland etc.), a description of the legal arrangement to ensure the long-term protection of the area, a description of the ecological characteristics of the project site and the offset site, a determination of the credits that will be provided and how the credits were determined, a work plan, a maintenance plan,

Performance Standards to determine the project's success, monitoring requirements, and a description of financial assurances to ensure that the project is completed. The Interagency Review Team of Federal and State agencies then reviews the mitigation plan and determines whether permits should be issued.

As with wetlands mitigation banking, the process for establishing and operating a conservation bank is extensive. State or local organizations are invited to participate in the Conservation Bank Review Team (CBRT) that will oversee the creation, use, and operation of the bank with USFWS. Notice of the proposed bank's creation must be provided to the public, with opportunities to the public comment at different stages in the permitting process. The bank operator must provide assurances that adequate funding will be available to cover the costs of operating, managing, monitoring, and documenting the costs of the bank, which may require a separate management plan and usually involves the creation of an endowment to manage the area in perpetuity. The bank operator must also develop a monitoring program and submit reports to the CBRT in accordance with the terms of the bank agreement.

The IFC's Guidance Note for Performance Standard 6 does provides some advice on the necessary transparency in biodiversity offset design and implementation, emphasizing that "*Partnership with relevant credible organizations/authorities with scientific expertise in offset planning, design and management is highly encouraged".* Merely encouraging companies to hire credible experts, however, is not sufficient.

In addition, "expert" is not defined by the IFC, and identifying individuals that are fully qualified to conduct assessments of potential of critical habitat and potential offset sites is not always straightforward. The GAC project in northwestern Guinea initially hired someone with little or no previous experience studying chimpanzees and was not a chimpanzee expert judged by international conservation standards, through the consultancy firm Bechtel to define critical habitat. Can one expert or one company make these decisions without external review? In the case of GAC, the critical habitat study was meant to remain confidential until funding was secured from the lenders. Proposals for offset sites to date remain confidential and are not peer-reviewed. The IFC PS6 states that *"When a client is considering the development of an offset as part of the mitigation strategy, competent experts with knowledge in offset design and implementation should be involved".* Biologists should also be involved to ensure that the offsets are real and equal. To date, the mining companies in Guinea have only employed biologists and have not consulted with experts in the design of biodiversity offsets.

Working with the government of the country is also critical in ensuring sustainability of an offset. G93 for the IFC Performance Standard 6 states that *"Government buy-in, including a legally binding commitment, is of high importance to this end"*. However, the high importance of government buy-in once again understates the issue: if government support is necessary to ensure the sustainability and permanence of an offset, then formal government commitment should be required. Ten Kate *et al.* 2004 adds that *"During our interviews, it was evident that government is seen as a key – if not the determinant – partner in the decision, even if the offset is a purely voluntary initiative".*

4.7 Are aggregate offsets preferable?

The following advantages of aggregate biodiversity offsets have been outlined by BBOP (2010) and are also reflected in a number of government policies around the world (DECC 2007, FR 2008, USFWS 2003 DFG 2010):

- Offsets are consolidated into large contiguous sites that will have much higher wildlife values, e.g. catering for species with large range sizes or which require large contiguous areas of habitat.
- Aggregated offsets can play a significant part in reducing fragmentation or promoting mobility, benefiting biodiversity at a landscape scale. This issue is particularly important in the face of climate change.
- Aggregated offsets can be delivered where biodiversity will be best conserved or restored, (i.e. on suitable land, not just where land is available in the immediate vicinity of individual development projects).
- Biodiversity benefits from pooled investment in a few locations where significant enhancement can be achieved, as opposed to lower levels of investment in several locations with lower potential for enhancement (more "bang for buck").
- Aggregated offsets can contribute more effectively to a national or regional conservation plan than ad hoc offsets.
- Aggregated offsets provide a mechanism to compensate for cumulative impacts which are individually insignificant but have a significant effect in combination.
- Conservation effort is focused on larger projects with sufficient funds for effective management.
- Biodiversity offsets are better able to deliver ecosystem services due to viable ecosystem functions and processes.

The new Federal rule on compensatory mitigation passed in 2008 (FR 2008) expresses a clear preference for mitigation banking. This is in part because "*mitigation banks typically involve larger, more ecologically valuable parcels*", and in part because of the more stringent regulatory requirements:

- Mitigation banks involve more rigorous scientific analysis and more planning because they are approved by an Inter-Agency Review Team including Federal and State agencies.
- Mitigation banks require more financial guarantees.

The stated benefits of conservation banking listed in the USFWS 2003 guidance (USFWS 2003, Carroll *et al.* 2008) are largely the same as for wetlands mitigation banking: a less piecemeal approach to conservation allowing for larger reserves and better connectivity; the efficiency of having pre-approved areas available to developers; creating private sector incentives to protect listed species; and allowing for more public/private collaboration to maintain open space etc.

The IFC also encourages the use of aggregated offsets in the PS6 Guidance Note:

> *"The client should also consider developing strategic frameworks with other companies and/or with the government, where possible, in an effort to mitigate cumulative impacts through the design of joint mitigation measures. These types of initiatives must be identified with the assistance of qualified specialists".*

The IFC Performance Standard 1 and the Guidance Note for Performance Standard 1 addresses the "need to conduct sectoral and strategic impact assessments where several projects are proposed in the same or related sector in the same country, and where impacts and risks associated with a particular strategy have both public and private sector implications". IFCs Performance Standards therefore require each project to undertake a Cumulative Impact Assessment to complete the Social and Environmental Assessment (SEA) to be prepared for each project. These cumulative impact studies are unfortunately not being done in Guinea.

Aggregated offsets are not without risk. For example, from the mining company's point of view, there may be a concern regarding how different companies will fairly and equitably contribute to the offset. From the conservationists' point of view, aggregated offsets may increase the risk that companies do not follow the like-for-like principle, because companies may prefer to simply buy into an existing aggregated offset rather than conducting a thorough assessment of what like for like would in fact require – which may likely involve a more complex set of conservation activities (BBOP 2010). Another risk from the point of view of conservationists may be that the aggregate offset might result in investment in a smaller number of locations which could increase the risk of stochastic damage, i.e. support for a smaller number of sites would increase the risk of major losses.

5. A strategic national plan for biodiversity offsets for mining in Guinea.

Conservation offsets are a still-emerging mechanism and few studies have been conducted systematically to assess their success. Lessons learned show that while biodiversity offsets provide added flexibility and private sector incentives, in the countries with the most advanced offset programs regulation of offsets is extensive and involves multi-agency reviews before approval. Thus offsets are in fact public/private partnerships requiring close collaboration between governments and project developers.

Biodiversity offset programs in the countries that have the most experience with offsets appear to be moving towards banking mechanisms rather than offsetting on a project-by-project basis. They also show that offsets are designed and implemented as part of a larger plan e.g. a species recovery plan or a watershed/catchment area plan. Does Guinea have such a plan to respond to the threat to Endangered species from mining? If not,

could a process be developed to generate such a strategy? We examine each of these questions below.

5.1 Does Guinea have a planning framework for responding to threats from mining to Endangered species?

Guinean law and policy recognizes the importance of EN species protection (please see **Appendix 7** for more a summary of relevant Guinean laws and policies). However, wildlife protection law and policy in Guinea provides only general protections for Endangered and Critically Endangered species: it provides few specifics on what measures the government should or must take to ensure the viability of Endangered wildlife in the face of development threats, and it does not require offsets.

Guinea's Environmental Code establishes a requirement for environmental impact assessments for individual projects that entail risks to the environment as a result of their size, but there does not appear to be any provision that would provide a basis for requiring a review of the impacts of an entire sector to assess its cumulative impacts on biodiversity, or a requirement for implementing offsets (the mining code defers to the Environmental Code on environmental impact assessment). Thus, there does not appear to be a legal or policy mechanism already available to generate a national offset strategy for chimpanzees or other Endangered species.

Nonetheless, Guinea has undertaken a number of national biodiversity conservation planning efforts. In 2002 Guinea released its Stratégie National de Conservation de la Biodiversité Biologique. In the early 2000s, the EU-funded Appui à la Gestion Intégrée des Ressources Naturelles (AGIR) project assessed regional and transboundary conservation opportunities. More recently, Guinea has developed a Stratégie Nationale for its national parks, as well as a programme cadre décennal (2008 – 2017) de gestion durable du réseau Guinéen d'aires protégées. IUCN also conducted an assessment of the management effectiveness of Guinea's protected areas in 2008 (IUCN 2008). Most recently Guinea developed an extensive review of its biodiversity conservation activities for its 4th national report to the Convention on Biological Diversity in 2010 (Bah *et al.* 2008).

A number of other analyses have been conducted examining protected areas in Guinea and making suggestions for further sites needing protection. Initial recommendations to develop a protected area network in Guinea were formulated by MacKinnon and MacKinnon (1986) and IUCN (1987). Robertson (2001) named individual sites with high biodiversity in Guinea through identification of Important Bird Areas (IBAs) (**Figure 9**). Bakarr *et al.* (2000) identified regional priorities for biodiversity in West Africa (**Figure 10**), and Kormos and Boesch (2003) present a consensus plan for high priorities for chimpanzee conservation (**Figure 11**).

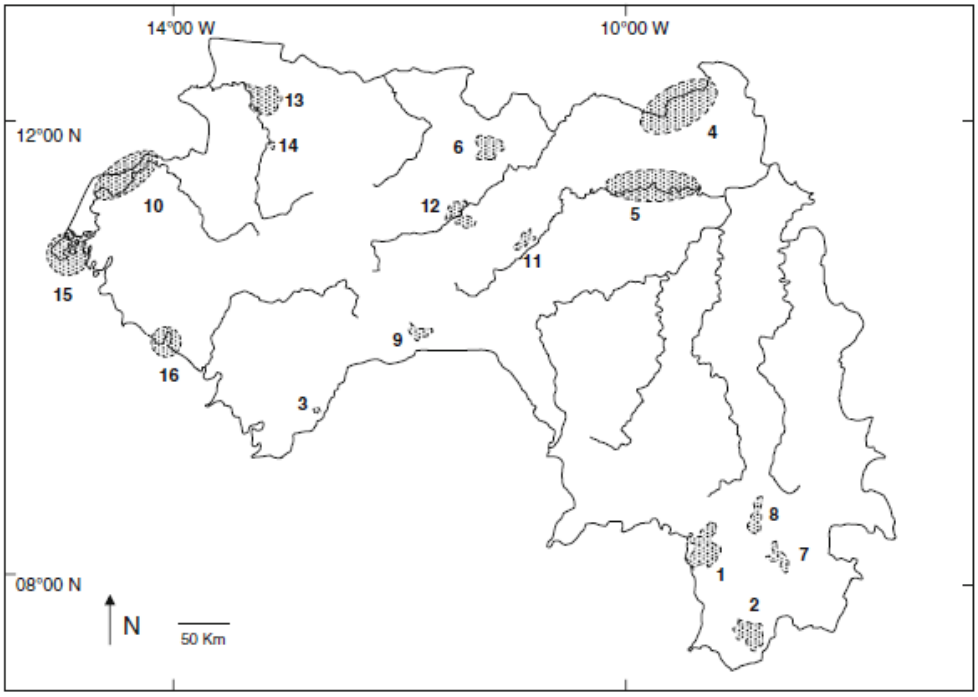

Figure 9. Important Bird Areas (IBAs) in Guinea (Brugiere and Kormos 2007): 1=Ziama, 2=Diéke, 3=Kounounkan, 4=Bakoy, 5=Tinkisso, 6=Bakoun, 7=Mt Bero, 8=(Pic de Fon), 9=Pinselli-Soyah, 10=Kogon, 11=Balayan Souroumba, 12=Bani-Dar-es-Salam, 13=Ndama, 14=Fello Digue, 15=Tristao Islands, 16=Rio Pongo

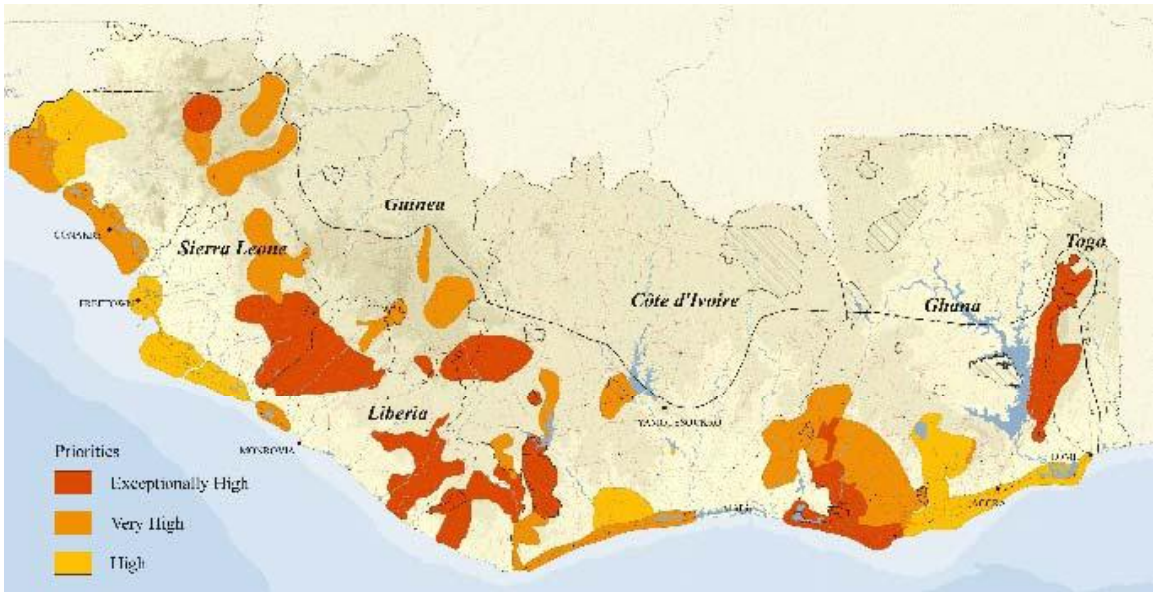

Figure 10. Results of Priority-Setting Workshop: Upper Guinean Forest Ecosystem (Bakarr *et al.* 2000)

Figure 11. Results of the chimpanzee priority setting workshop from Kormos and Boesch (2003)

While many of these plans provide a comprehensive and systematic overview of the status of conservation in Guinea, they do not provide an analysis of cumulative impacts from the mining sector on biodiversity generally, and on Endangered and Critically Endangered species in particular, or a strategy for responding to the threats presented by mining. Environmental Impact Assesments (EIAs) are being conducted at a variety of sites including the Simandou and Guinea Alumina Corporation GAC and Mont Nimba projects however, mining impacts on biodiversity have not been assessed at a national level.

Thus, a Strategic or Sectoral environmental and social impact assessment to examine the cumulative impact of mining within the country would appear very useful. This does appear to have been contemplated: a World Bank – Global Environment Facility project entitled "Mainstreaming Biodiversity in Mineral Governance in Guinea" was planned but dropped in 2009.

In addition, the World Bank conducted a review entitled the West Africa Mineral Sector Strategic Assessment (WAMSSA): An Environmental and Social Strategic Assessment for the Development of the Mineral Sector in the Mano River Union. However, WAMSSA is a very broad scale analysis which focuses mainly on risks to protected areas and priority areas identified by the West African Priority Setting process in 1999-2000. It makes no effort to assess cumulative impacts to Endangered and Critically Endangered species and as a result is of limited use in assessing actual risks to biodiversity and devising a strategy to avoid or minimize those risks. This is an especially unfortunate omission given that WAMSSA suggests concentrating and organizing mining development around hubs to facilitate operations, a decision which could increase both the intensity and the amount of mining at any given time, and therefore also increase cumulative impacts.

Unfortunately, the IFC appears unlikely to help fill this information gap. The most recent IFC Performance Standards do encourage their clients to review the cumulative impacts of their projects, but only hold clients responsible for assessing the footprint of all the facilities and roads in their area of influence, and examining impacts of their supply chain. The IFC states that sectoral analyses should typically be conducted by the public sector and would only be the responsibility of a client in exceptional circumstances. We believe that assigning the responsibility for conducting sectoral assessments almost

entirely to governments, however, absolves both the IFC and its clients too easily of responsibility, particularly for a sector such as mining where the IFC will make loans to multiple companies in a country, where the environmental impacts of the loans will be severe and widespread, including losses of vital habitat and of Endangered and Critically Endangered species, and where the governments in those countries may be unlikely to undertake a sectoral analysis without international funding and/or technical assistance.

As a result of the current lack of incentive for mining companies to coordinate their actions, mining companies in Guinea have been hiring individual conservationists, conservation organizations or consultancy firms to conduct studies to predict the effects of their mining activities on chimpanzees, and suggest ways to mitigate their negative impacts. For example:

- GAC hired Sally Lahm (from the consultancy firm Ecology and Environment), and Rebecca Kormos (consultant) for their critical habitat study for chimpanzees.
- GAC is now working with WCF to further define critical habitat, and outline necessary mitigation methods.
- Rio Tinto has hired Janis Carter for the Simandou mining activities.
- Alcoa has worked with both Conservation International and the Jane Goodall Institute in a concession in northwest Guinea.
- Conservation International (CI) conducted three rapid biodiversity surveys of (1) the Pic de Fon classified forest in the Simandou Range, (2) three classified forests in southeast Guinea in partnership with Rio Tinto.
- WCF is also working with BHP Billiton in the Mont Nimba region.
- WCF has been conducting surveys throughout Guinea in order to identify a site or sites most appropriate for a conservation program or offset for the GAC project in Boke.

But while impact studies are being conducted, mitigation activities designed, and offsets planned, these activities are unfortunately lacking in transparency - due primarily to the requirements of the mining companies - and are also lacking coordination. As shown above, developing independent projects to compensate for losses in chimpanzee numbers does not appear to be an optimal approach. Different consultants could conceivably suggest the same area for an offset. Without an understanding of cumulative impacts resulting from other projects understanding, the offsets being designed may be insufficient. Opportunities for designing synergistic/complementary projects are also being lost. For example, different companies could pool resources to design conservation programs for larger areas that would be more viable in the long term and offer better protections for chimpanzees, opportunities for designing corridors and improving connectivity might also be missed, companies could increase their efficiency by sharing experiences, avoiding redundancy etc.

5.2 How could a national plan for biodiversity offsets be developed?

The review above also indicates that designing and implementing national offset programs and ensuring the viability and effectiveness of offsets in perpetuity requires substantial capacity to monitor and sustain implementation.

Currently however, there is no entity with the capacity (financial and technical) to ensure a coordinated national response over time to the threat of mining (and other extractive industries) to Guinea's chimpanzees and other biodiversity. Given the persistent economic downturn in Guinea, the government's capacity to coordinate a cumulative impact assessment of mining at a national level, and to plan and implement a strategic national offset plan is limited. As the 4th report to the CBD states:

> *« Malgré les mesures de conservation in-situ, les plans, programmes et projets, les moyens législatifs, réglementaires, institutionnels et financiers, des faiblesses persistent telles que: i) l'absence de concertation entre les différents Départements sectoriels intéressés par un même programme ; ii) le manque de système national de coordination et d'échange d'informations. C'est à peine si chaque Département n'évolue pas à vase clos. Il n'existe pas de bilan Commun concerté qui met en exergue les causes profondes de l'état de son développement pour que les défis servent de cadre à une planification centralisée d'activités nationales avec un cadre logique de résultats stratégiques, avec les ressources programmatiques et le mécanisme concerté de suivi et d'évaluation des objectifs visés. Cependant, une telle approche permettrait l'intégration efficace, d'une part des priorités nationales identifiées dans le Document de la Stratégie de Réduction de la Pauvreté et d'autre part, sur les objectifs internationaux dont ceux du Millénaire pour le Développement (OMD), la diversité biologique, les conventions de Rio et autres, mais aussi une revue centralisée de l'efficacité des mesures planifiées. »*

As it appears unlikely that capacity currently exists in Guinea, either within government, or civil society, systematically to assess the need for offsets as a response to the threat from mining, we suggest that a donor-supported multi-stakeholder, transparent national offset planning process should be conducted in Guinea, involving the Government of Guinea, Guinean NGOs, international conservation NGOs, multilateral organizations such as the International Finance Corporation, bilateral donors and the private sector.

We suggest that this strategic planning, is preferable to a "silo" approach where mining companies decide on offsets for their individual projects in isolation. A coordinated approach would generate broad-based support for a national strategy, and would allow mining companies to combine their resources and focus their support on Guinea's protected area network and other conservation and sustainable development activities to ensure the protection of the country's biodiversity.

It is important that the proposed sites for mining offsets be transparent and peer reviewed and discussed by a range of stakeholders including the mining companies, conservationists and the Government of Guinea. Within the Government of Guinea it will also be important to encourage communication between relevant ministries concerned with mining and biodiversity and help to reach consensus for such a national strategy.

While we strongly believe that there should be a national strategy for biodiversity offsets in Guinea, we also recognize that the process of achieving consensus on locations, size/value for offsets, amount of funding, management structure etc. will be lengthy. We therefore suggest that a two-pronged approach would be most effective. This would involve launching a national planning process while at the same time moving forward with individual offsets projects, which are urgently needed and will generate critically important information and lessons learned.

In summary:

- The Guinean Government and the IFC do not provide a framework that really will allow offsets to get done systematically and with mechanisms to bring in the right expertise to make it work.
- Without a cumulative impact study on chimpanzees in Guinea, it is difficult to know how many chimpanzees will be affected in the long run.
- Stakeholder participation in offset design is critical. Although multi-stakeholder processes may slow down decision-making, our review of biodiversity offsets suggests that it is an essential component to ensure the success and sustainability of any offset.

PART III. A FINANCING MECHANISM FOR A NATIONAL BIODIVERSITY OFFSET STRATEGY

The section above outlines steps that could be taken to ensure that Guinea's biodiversity can persist in the face of the mining threat. One of the most important factors in such a strategy would be what sort of finance mechanism would be used to implement the strategy.

We suggest that designing and implementing a national conservation trust fund (CTF) is very likely necessary to ensure the capacity for translating offset strategies into action on the ground, which would include providing reliable financing for Guinea's protected areas. Guinea's protected areas have globally important biodiversity resources, but with the exception of Mt. Nimba, which is receiving international funding, the country's protected areas are chronically underfunded (IUCN 2008). There are few other sources of conservation finance in Guinea: international conservation NGOs have a limited presence, and the few Guinean conservation NGOs in operation have few financial and technical resources. Thus, there is an acute need for a long-term financing mechanism to

provide a reliable source of income and help build conservation capacity, both in the capital and in the field. Establishing an independent, technically expert multi-stakeholder mechanism with stable funding resources would also create a mechanism to conduct additional conservation planning on an ongoing basis.

On the other hand, establishing a CTF in Guinea presents challenges on a number of levels. Familiarity with CTFs and their management in Guinea is low, and initial resistance to CTFs that are independent of government agencies is sometimes high in countries not familiar with the CTF mechanism. Thus, a significant awareness raising effort in Guinea will be critically important to build government support for an independent CTF mechanism. It is also not clear that the conservation sector in Guinea is sufficiently developed so as to absorb the funding made available by a CTF, so establishing a CTF would also have to be combined with capacity building effort. An assessment of Guinean law will also be necessary to gauge whether Guinea has laws in place that would allow an independent non-governmental CTF to be established – if Guinea does not, it might become necessary for the Government to pass a law establishing this new status. Finally, establishing a national trust fund is most effective where good baseline information on biodiversity and conservation needs is available: this is often not the case in Guinea, though data on the country's biodiversity has improved in recent years. None of these challenges is insurmountable, but it is worth noting that establishing a CTF is a major undertaking, requiring several years from start to finish.

This section first provides background information on CTFs, including their origins, how they are defined, the benefits trust funds provide and some of the challenges associated with establishing CTFs. The section then briefly reviews experience with CTFs in Africa generally, before reviewing examples of individual trust funds that provide lessons learned for a CTF in Guinea.

1. Background Information

1.1 History

CTFs were first established in the 1990s, initially as a way to provide an independent mechanism to distribute funds generated by debt-for-nature-swaps in a few countries (GEF 1998). CTFs were proposed as mechanisms to facilitate the disbursement of this funding. However, it soon became apparent that effective disbursement of funds to the field would have to be a long-term proposition: capacity building was often needed before the funds could be absorbed in country, technical cooperation would be needed over the long term for project implementation, and financial oversight and assistance with financial management was also necessary (GEF 1998, Guerin McManus 2001-2002). As a result, CTFs evolved into full-fledged independent institutions working in partnership with governments and civil society to meet conservation needs. CTFs are still financing mechanisms rather than actual implementing agencies, but have become much more than mere financial pass-throughs.

CTFs have proven very popular. By the late 1990s, there were over 30 trust funds around the world, and today there are roughly twice that many, with more under development. Trust funds have raised over USD 800 million in capital, though roughly three quarters of this capital is in Latin America, where CTFs were originally launched and have spread most quickly (CFA 2008).

One reason for their popularity is that they have provided good financial returns. Between 2003-2006 (i.e. prior to the financial crisis), CTFs had returns of roughly 10% on their investments. In 2008, immediately following the financial crisis, funds on average had losses of 7% (CFA 2009). Before rebounding in 2009, with performances averaging 14%, and with three and five year returns averaging 7% and 8% respectively. However, CFA 2009 also notes that, of the 39 funds reviewed (totaling $519 million), performance in 2009 ranged from 1.0% to 27.1%, indicating that performance ranges widely and that budgeting for a fund should not be based on an assumption that the fund will yield average returns.[31] Indeed, government agencies in the United States often require endowments based on conservative rates of return (2-3%). CFA 2009 and Carroll *et al.* provide useful guidance on endowments (asset allocation, accounting for inflation, and rates of return).

Another reason for CTFs' popularity is that they provide an independent, multi-stakeholder-managed mechanism, usually including government representatives as well as donors and civil society, but remaining independent from government control. Independent status is critical for donors, who usually require assurances that the funds will be managed according to international standards. Independent status is also essential because a key objective of a CTF is to provide a reliable source of funding insulated from fluctuations in national budgets, downturns in the local economy, and corruption, adding much-needed stability and predictability to a sector which is often one of the first to suffer when budgets contract. Finally, independent status with representation from the different sectors involved in conservation on the CTF's board helps ensure that the CTF is truly a multi-stakeholder entity.

1.2 CTFs Defined and Classified

The Conservation Finance Alliance defines CTFs as "private, legally independent grant-making institutions that provide sustainable financing for biodiversity conservation and often finance part of the long-term management costs of a country's protected area (PA) system".

Guerin-McManus (2001-2002) provides the following definition: "A trust is a legal agreement in which assets are managed by one group (the trustee) on behalf of another group (the beneficiary). In the case of conservation trust funds, the assets are grants

[31] CFA 2009 also provides information on fund performance according to fund type/size in different regions, as well as assess asset allocation (fixed income, equities, cash) : http://www.conservationfinance.org/upload/library/arquivo20101101222731.pdf.

and/or other donor funds, the trustee is usually a board of directors and the beneficiary is usually the host country and/or a non-governmental organization".

As the definitions above suggest, CTFs are independent, non-governmental mechanisms. They may have substantial (but not majority) government representation on their boards of directors. While supporting government agencies and government-protected areas may be the primary or even the sole objective of the CTF, their role as non-governmental institutions is an essential, defining characteristic.

CTFs are loosely classified based on two criteria: how the CTF disburses its funds, and how the CTF defines its conservation objective.

Capitalization Mechanism

With respect to fund disbursements, CTFs fall into three broad categories: endowments, sinking funds and revolving funds (GEF 1998).

- Endowment funds use only the interest generated by the CTF's principal and preserve the CTF's principal in perpetuity.
- Sinking funds disburse the entirety of their funds, capital and interest, over a fixed period of time (e.g. a decade or two), after which they are terminated.
- Revolving funds are CTFs in which funding is renewed annually, for example via fees, taxes, lottery revenue etc.

CTFs may use a combination of capitalization mechanisms, in which case they are sometimes referred to as hybrid or umbrella funds. For example, it may be determined during the design of a new CTF endowment fund that an initial investment is needed for capacity building to prepare for future grant making. The CTF may therefore be designed to spend down a percentage of its capital over a predetermined period of time, adding a sinking component to what will otherwise be an endowment fund in the longer term. For example, the Madagascar's Fondation pour les Aires Protégés et la Biodiversité de Madagascar (Madagascar Foundation) has a 20-year sinking component designed to meet protected area management recurring costs, as well as endowment.

Conservation Objectives

With respect to funding objectives, CTFs fall into two main categories: brown funds, which focus on issues such as pollution and waste treatment and disposal, and green funds (CFA 2008) which focus on biodiversity and ecosystem services (the focus of this paper is on green funds). Green funds are further divided into two broad groups (GEF 1998):

- Parks or protected area funds, which provide funding to a specific park, to several parks including parks in several different countries, or to an entire national protected areas network; and
- Grants funds, which provide grants to government agencies or NGOs for specific projects.

As with capitalization mechanisms, CTFs may combine funding objectives, providing grants to civil society while also financing individual parks or an entire protected areas system.

2. Challenges with CTFs

Establishing and managing a CTF successfully is not always straightforward and can present many challenges.

- Governments are often suspicious of CTFs that operate outside of government control while at the same time assuming a quasi-governmental role in helping to fund government agencies and protected areas.
- The legal framework allowing for a tax-exempt, independent non-governmental organization with a flexible governance structure may not exist in some countries. In the event that the required legislation is not available, the two solutions are to either work towards the passage of a new law, which can be very time consuming process, or to establish the CTF overseas at least initially (see below).
- Developing a CTF is labor intensive and time consuming, and start-up costs are therefore high. This process involves feasibility studies to assess management and technical capacity; awareness raising to fully inform stakeholders of the trust fund concept; CTF design (articles of incorporation/deed of trust, bylaws/statutes, board structure, advisory committees etc); assessing conservation priorities and funding needs; capacity building; fundraising and proposal development with multilateral and bilateral donors, the private sector, and NGOs; and developing a strategy for the initial years of the CTF's operations etc.
- The very mention of a potentially large, new fund can immediately trigger in-fighting and competition in a country with limited resources. Once in operation, CTFs may create significant disparities between the compensation of CTF employees and the compensation of government employees, creating a source of resentment. CTFs may also create disparities in funding in various parks, which can also create tensions.
- Defining the CTF's objectives very clearly and drafting the mission and bylaws in such a way that the CTF's objectives are not diluted or diverted over time by the board, donors, government or other stakeholders is a delicate and Critically important process.
- CTFs are most effective when baseline information on conservation status and conservation needs is available, which facilitates CTF design and capitalization, but at the same time, comprehensive baseline information is often difficult to obtain.
- If the CTF is an endowment, it can lock up substantial amounts of funding (tens of millions of dollars) that might otherwise be spent immediately to address urgent conservation needs.

3. CTFs in Africa: some generalities

CTFs have spread most rapidly and generated the most funding and projects in Latin America. However, Africa now has 17 CTFs in place, with an additional five for which feasibility studies have been completed, and several more being studied (CFA 2010). The following broad conclusions can be drawn regarding the experience with African CTFs to date:

- Capitalization tends to be less than $10 million per fund, making them relatively small. This is in part because a number of earlier CTFs were only designed to finance one or several PAs rather than an entire PA system. Nonetheless, CTFs in Africa have generated over $24 million in funding to date. In addition, large CTFs in Madagascar and for the Sangha Tri-National forest complex indicate that larger trust funds are possible, at least for higher profile conservation priorities.
- Most of the funding for CTFs (70%) has come from multilateral sources, namely the Global Environment Facility (GEF), about 20% has come from bilateral sources (the French and German governments), and about 10% has come from NGO fundraising efforts (CFA 2008).
- The smaller amounts of funding obtained for CTFs in Africa relative to Latin America raises the question whether it will be possible to meet fundraising needs through CTFs in Africa. Fundraising has been a substantial challenge, in part because capacity building needs make donors reluctant to release more funding. However, the private sector, which contributes substantially to habitat degradation in Africa, is a largely untapped financial resource.
- Familiarity with CTFs in Africa is increasing, but there is still a need to raise awareness in many countries so that governments understand and are comfortable with the mechanism.
- The concept of a trust – an Anglo-Saxon common law concept – does not exist in many civil law countries, including in Francophone African countries. Thus, in many civil law countries it is not possible to establish a non-profit organization that manages funds and holds them offshore for charitable purposes, but is not under government control.

  In these cases several options are available. One option is to work with government to draft new legislation establishing a new non-governmental organizational status, usually a foundation, which allows CTFs to be managed independently and to hold funds offshore etc. Another option is to work with government to adapt existing legislation to add the necessary independence and flexibility to existing non-profit mechanisms. Although this can be a very time consuming process, it generates benefits for civil society as a whole, as well as for the CTF, which can help build capacity in country. The other alternative is to register the CTF abroad and have it operate as a foreign entity in country. This does not generate as many benefits locally, but may accelerate the process of establishing the fund.

4. Experience with CTFs of relevance to Guinea

The following section reviews experience with a number of CTFs which provide lessons learned of relevance to Guinea. The first two cases involve high-profile funds that were recently created in Francophone Africa, both with high endowment targets. The following three examples describe attempts to establish funds in response to the expected impacts of oil and gas development. The difficulties faced by these funds illustrate the importance of involving multilateral and bilateral donors with experience in trust funds, as well as government and other stakeholders as early as possible in the CTF design process, and to assess and build consensus regarding conservation priorities and funding needs as quickly as possible.

4.1 Funds in Francophone Africa

Cameroon, Central African Republic, Republic of Congo: Sangha Tri-National Foundation

The Sangha Tri-National Foundation (STNF) is one of the first CTFs established in Francophone Africa (http://foundationtns.org/index.php?lang=fr). It was registered in the UK as a charity in 2007 and became operational in 2008. The decision to register the charity abroad was taken to avoid the process of developing a new law in one of the three countries. The STNF's headquarters are located in the Central African Republic (CAR). The STNF is designed to finance conservation in three contiguous national parks in three countries: Lobéké (Cameroon), Dzanga-Ndoki (CAR) and Nouabalé-Ndoki (Republic of Congo). Together the three parks protect approximately 3.5 million hectares. The STNF also finances development projects in park buffer zones to reduce pressure on the parks. The Sangha Tri-National Foundation was established as a result of a partnership between the three governments, two international NGOs, the World Wildlife Fund (WWF) and Wildlife Conservation Society (WCS), and French and German bilateral aid agencies. The STNF has raised over €10m, with a target of roughly €30-35 million (CFA 2010) The STNF has a diversified fundraising strategy including government, bilateral and private funding, and includes the possibility of receiving fees from tourism and safari hunting. The Sangha Tri-National Foundation is a high profile fund with a strong base of support from NGO, government and donor sectors.

Madagascar: Fondation pour les Aires Protégés et la Biodiversité de Madagascar
(http://www.madagascarbiodiversityfund.org/madagascar.php?id=1&idrub=2&idacl=).
The Fondation pour les Aires Protégés et la Biodiversité de Madagascar (Madagascar Foundation) was established in 2005 to support the protection of biodiversity in Madagascar by promoting and financing new protected areas, the expansion of existing protected areas, and improved management of existing protected areas Research, ecotourism and environmental education are also permissible under the Madagascar Foundation's bylaws.

The process for establishing the Madagascar Foundation began in 2001. The impetus for the new CTF was partly due to operational challenges faced by an existing fund,

Fondation Tany Meva, which had been established in the United States as a non-profit organization with support from the U.S. Agency for International Development (IRG 2001). Madagascar's announcement of a dramatic expansion of its protected areas system in 2003 at the World Parks Congress in Durban also created a need for a funding source more focused on biodiversity and protected areas than Tany Meva (IRG 2001).

Establishment of the Madagascar Foundation required the passage of a new Foundation law (CFA 2008). The fund is a hybrid fund, with a roughly $24 million endowment from a broad range of donors, and a twenty year sinking component funded by the proceeds of a debt swap with the Government of Germany, and designed to provide €425,000 a year to meet protected area management recurring costs. A large debt-for-nature swap with the Government of France brought the endowment to $50 million. Additional funds that have been committed and are in the process of being secured will raise total funding to about $53 million. This would generate roughly $3-4 million a year, covering a substantial portion of Madagascar's $12-15 million in recurring costs for its system of over 100 protected areas (CFA 2008).

As a result of its extraordinary biodiversity, and in part because of the long-term work of international and domestic NGOs, Madagascar has benefited from sustained large-scale commitment from international multilateral and bilateral donors. As such, the Madagascar Foundation, like the Sangha Tri-National Foundation is a high-profile fund and was able to able to raise very large sums almost entirely from public sources and through NGOs.

FEDEC

As noted above, the Chad-Cameroon pipeline project funded in part by the World Bank established a Foundation for Environment and Development in Cameroon (FEDEC) as part of its Environmental Management Plan. The experience with FEDEC reinforces several key lessons learned with CTFs. One is that a realistic assessment of funding needs is essential. In the case of FEDEC, the 3.5 million USD endowment was insufficient to meet the management needs of two national parks totaling over 1 million hectares – not to mention the administrative and management needs of the fund itself. A second lesson is that provisions must be made for the CTF to continue to raise funds after its initial capitalization. While a balance needs to be struck to ensure that the CTF does not expend too much of its resources on fundraising at the expense of actual conservation activities, the CTF must nonetheless retain the flexibility to seek additional funds if necessary.

4.2 Funds Designed to Offset Extractive Industries/Infrastructure Development

Similar to FEDEC, a number of funds in Latin America have been established in an attempt to offset the biodiversity impacts of large-scale development projects. These funds were often established as a result of advocacy by environmental groups, and often

late in the project development stage and were not designed pursuant to a no net loss methodology. This section reviews experiences with some of these funds.

Camisea

The Camisea pipeline project in Peru was a $1.6 billion project which involved natural gas production in the Camisea fields in the Urubamba area, an area of extremely high biological diversity that also sheltered un-contacted Amerindian tribes. The project also involved two pipelines to the coast to a marine terminal, processing facilities. As a result of the extreme environmental and social sensitivity of the project, the project was controversial from its inception. It was opposed by many social and environmental NGOs and rejected for funding by some multilateral organizations. The project went forward because of its importance to Peru's economy and to Peru's objective to achieve greater energy independence while using a cleaner energy source.

However, the project did not adequately incorporate environmental and social safeguards, and by the time these were given due consideration, making alterations to the project's design had become prohibitively expensive. A number of incidents in the first few years of the project, including multiple spills quickly revealed the project's weak social and environmental management.

In addition, despite an agreement between NGOs and the Government of Peru, the Camisea project did not result in a CTF: a subaccount was indeed established in Peru's national conservation trust fund (PROFONANPE) as part of the Camisea project, but the subaccount did not have a conservation focus, an independent board or even a conservation advisory committee. The funds it disbursed were distributed for use by regional governments for general development purposes (i.e. in addition to proceeds from income tax and royalties that regional governments were already entitled to receive under Peruvian law).

This failure has been attributed to the Grupo Técnico de Coordinación Interinstitucional (GTCI), the interagency commission in the Peruvian Government responsible for mitigating social and environmental impacts from the Camisea project. One of their responsibilities was to work to ensure that the law approving the Camisea project included all the necessary social and environmental mitigation measures, including a Camisea CTF within the PROFONANPE but this was apparently not conveyed clearly to Peruvian legislators (personal comms, Sociedad Peruana de Derecho Ambiental).

The Government of Peru did establish 1.8 million hectares of new protected areas (Otishi National Park, Machiiguenga and Ashaninka Communal Reserves, and the Megantoni Sanctuary) when the Camisea project was approved, and Peru's PlusPetrol also committed $20 million to support the management of the Paracas National Reserve on the coast near the liquid natural gas terminal.

The establishment of the new protected areas was in fact precipitated by the GTCI and the Camisea project. However, they cannot truly be considered an offset. The lands that were gazetted as protected areas had already been reserved by the Government of Peru

for future designation before the Camisea project had begun, and studies to determine their protected area classification were already underway. The $20 million for the Paracas reserve from PlusPetrol was not technically part of the Camisea project. Nor was there any analysis suggesting that these measures constituted a like-like for exchange leading to no net loss of biodiversity (personal comms, Sociedad Peruana de Derecho Ambiental).

As a result of the lack of social and environmental safeguards, the absence of the promised conservation fund, problems with spills from the pipeline and ongoing conflicts with local communities and indigenous communities the Camisea project is widely viewed as a failure from a social and environmental perspective.

Chiquitano Forest Conservation Fund

In the late 1990s, a consortium including Transredes, a subsidiary of Shell; Prisma Energy, a subsidiary of Enron; and the Bolivian government undertook a pipeline project that would cross over 600km of Bolivia and Brazil, and bisecting the roughly 6 million hectare Chiquitano Tropical Dry Forest. The Chiquitano is a rare forest type in Bolivia and one of the last large blocks of tropical dry forest in the world. It also serves as an important part of the watershed for the Pantanal wetland.

Conservation organizations intervened late in the process: the Government of Bolivia had declared the project a priority, and the project had already complied with Bolivian legal requirements. However, no special measures had been taken to protect the Chiquitano Tropical Dry Forest. NGOs advocated for a conservation trust fund to ensure the protection of the Chiquitano, including securing roads and pipeline access to prevent colonization of the area. However, in the absence of a clear project leader, the NGO community had difficulty coming to a consensus on the appropriate strategy for developing a trust fund. Critical questions such as how much funding was needed and what the mission of the fund should be proved contentious. Enron's bankruptcy caused delays, and the multiplicity of stakeholders in the region, from municipalities, local communities with indigenous populations, ranch owners, Bolivian government forest and agriculture agencies, forestry and mining concession holders etc. also complicated negotiations. Relations between the stakeholders were often tense, and some of the NGOs initially involved in the negotiations ultimately withdrew.

Despite a contentious beginning, a plan for a conservation funding was agreed to in 1999 and the Fundación para la Conservacion del Bosque Chiquitano (FCBC) was established with five partners: Fundación Amigos de la Naturaleza, Fundación Amigos de Historia Natural Noel Kempff Mercado, the Wildlife Conservation Society, AEI Energy (which replaced Enron) and Shell. The FCBC has now been in operation for over a decade, has engaged in a broad range of conservation and sustainable development activities, from the creation of a 242,000 hectare wildlife reserve, to land titling, to enforcement on national forest lands to prevent degradation. However, despite providing initial funding, the oil companies did not establish an endowment. As a result, the FCBC depends on its capacity to fundraise – while the FCBC is functioning well and has attracted new

funding, its sustainability is not guaranteed. Nor is the FCBC specifically designed to finance a clearly defined offset strategy.

4.3 Concluding thoughts about trust funds

Each CTF has different needs and objectives, and each CTF faces different challenges. However, the discussion above suggests a few preliminary conclusions on a CTF for Guinea.

- Introducing the concept of a trust fund in a small country with extremely high poverty rates is a delicate undertaking. Keeping stakeholders fully informed without raising unrealistic expectations is a challenging but essential part of the planning process.

- Many governments unfamiliar with the concept of a CTF often resist the idea of an independent fund with substantial resources that finances government agencies and protected areas, but operates outside of direct government control. The Government of Guinea may well have a similar response, at least initially, and it is critical to allay their concerns as quickly as possible given that government support is essential for a CTF's success. An effective mechanism for overcoming government suspicion of CTFs is to have a Guinean delegation visit a CTF, preferably in Francophone Africa, and/or vice versa early in the process. "South-south exchanges" are often the best way to convey information on a new conservation mechanism.

- The mining sector in Guinea provides an obvious source of funding for a CTF: individual mining projects can be worth billions of dollars, so requesting the mining sector as a whole to invest in a CTF is not unreasonable, and several mining companies have already expressed a willingness to contribute.

- However, relying entirely on a private sector funded CTF is not optimal: a CTF with bilateral and/or multilateral funding to match at least part of a private sector contribution would provide several critically important advantages:

    - It would create a more independent fund, which is vital in a country that has only recently transitioned to a democratic government, and where civil society is weak.
    - It would leverage the technical expertise and experience of the donor community.
    - It would help ensure that the fund meets best practices as determined by the international community.
    - It would facilitate investment in capacity building in the conservation sector, which will likely need to occur concurrently with CTF design and implementation (see below).

- Baseline information on biodiversity and conservation needs is an essential component for designing a CTF – vague information on funding needs and objectives leads to an ineffective CTF.

- Lack of capacity in the conservation sector is a concern: the Government of Guinea and civil society have very limited technical, human and infrastructure resources for conservation, which will make it difficult for the conservation community to absorb the funding provided by a CTF. A CTF design phase will need to be accompanied by a capacity building phase in Guinea. This can be accomplished in a number of ways – e.g. via a bilateral or multilateral grant, via a sinking component in the CTF for capacity building, or both.

CONCLUSION

This paper argues that a unique convergence of factors creates a strong need for a national strategy to offset the impacts of mining on chimpanzees in Guinea.

Guinea has an incredible concentration of mineral resources. Mining concessions cover much of the country and mining has increased exponentially in the last decade. At the same time, Guinea also has the largest remaining population of the endangered western chimpanzee, which is present throughout the country, and other globally important biodiversity resources. Unfortunately, due to the scale and nature of mining operations, it will not be possible to fully avoid or mitigate the impacts of mining on chimpanzees, and offsets will be necessary to avoid further declines in Guinea's chimpanzee population.

However, ensuring that an offset project is designed and implemented in accordance with best practices requires considerable oversight and administrative capacity. The Government of Guinea has limited capacity for conservation management, and little or no experience with offsets. While the IFC could in principle provide this oversight function for offsets implemented by its mining company clients in Guinea, whether the IFC can play this role is very much in doubt. The IFC has considerably weakened its Performance Standards with respect to biodiversity and Endangered and Critically Endangered species, which is a major concern. The IFC also has limited experience with implementing offsets on the ground. Finally, because of confidentiality concerns, offset projects being developed by IFC clients are not transparent and mining companies receiving IFC funding are not coordinating their efforts. This is in many respects an inefficient approach and a missed opportunity to develop more viable offset projects.

A multi-stakeholder donor-funded process for developing a national chimpanzee offset strategy in Guinea would therefore fill an important gap in conservation planning. The planning that would go into developing the strategy could also serve a second critically important purpose, which is to provide the basis for developing a national conservation trust fund. A national conservation trust fund in Guinea could fund the offset strategy's implementation and help sustain Guinea's protected areas system while also providing an

umbrella for other sustainable development and environmental projects. Although generally speaking other financing mechanisms might be available for offsets, in this case the need to work at a national scale funding a number of offset sites, the need for permanent offset projects with a permanent source of funding, and the fact that offsets would likely involve protected areas all indicate that a conservation trust fund is most likely the best approach.

Although the factors above suggest that a national approach to designing offsets is needed in Guinea, it is clearly also very important that offset projects currently being designed continue to move forward. Carefully planned biodiversity offsets on a project-by-project basis may indeed result in individual offsets that result in "no net loss" of species for that project. A national planning process will be a time consuming undertaking, and conservation measures in Guinea are urgently needed now. In addition, a national offset approach would benefit greatly from the experience and lessons learned from individual projects.

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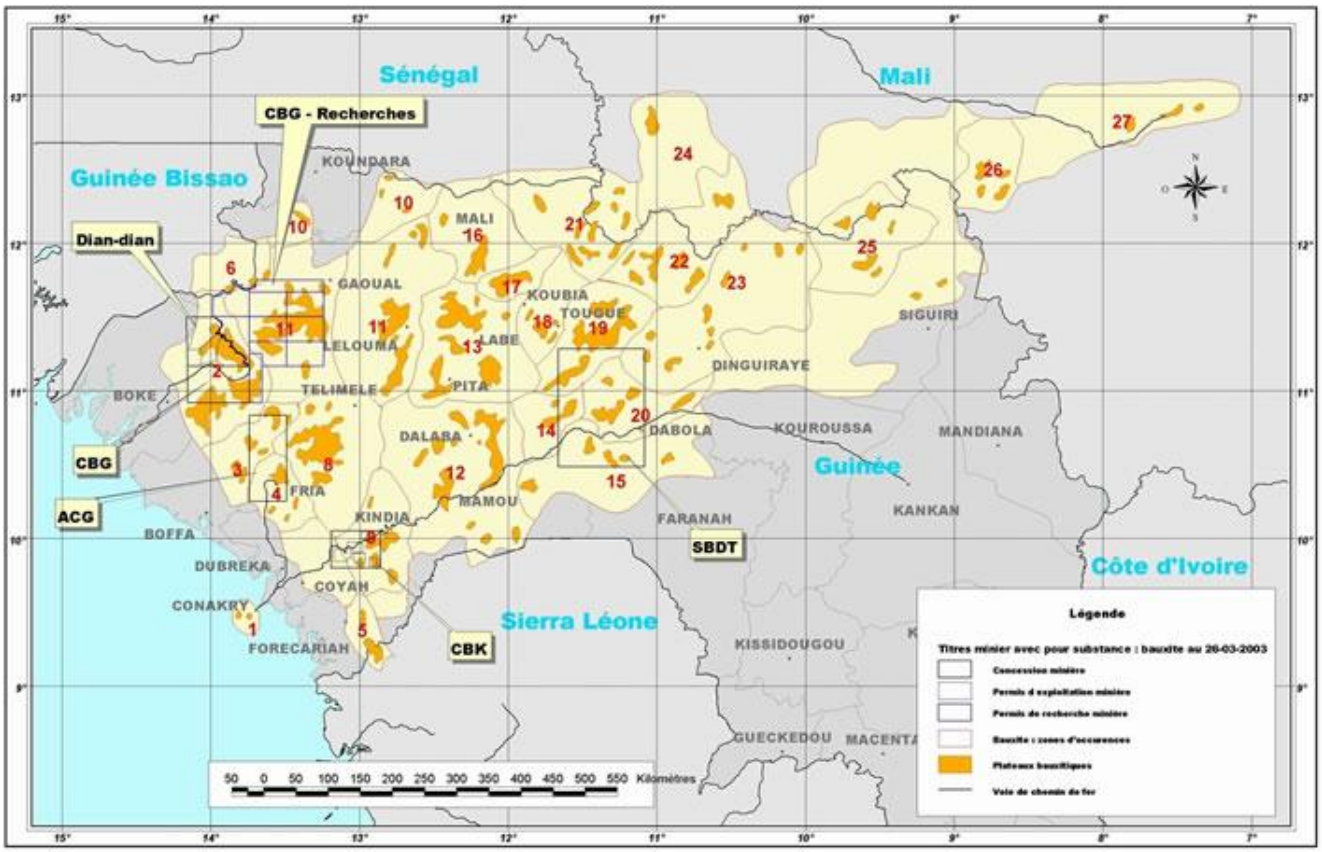
APPENDIX 1. PROTECTED AREAS IN THE REPUBLIC OF GUINEA (Bah *et al.* 2009)

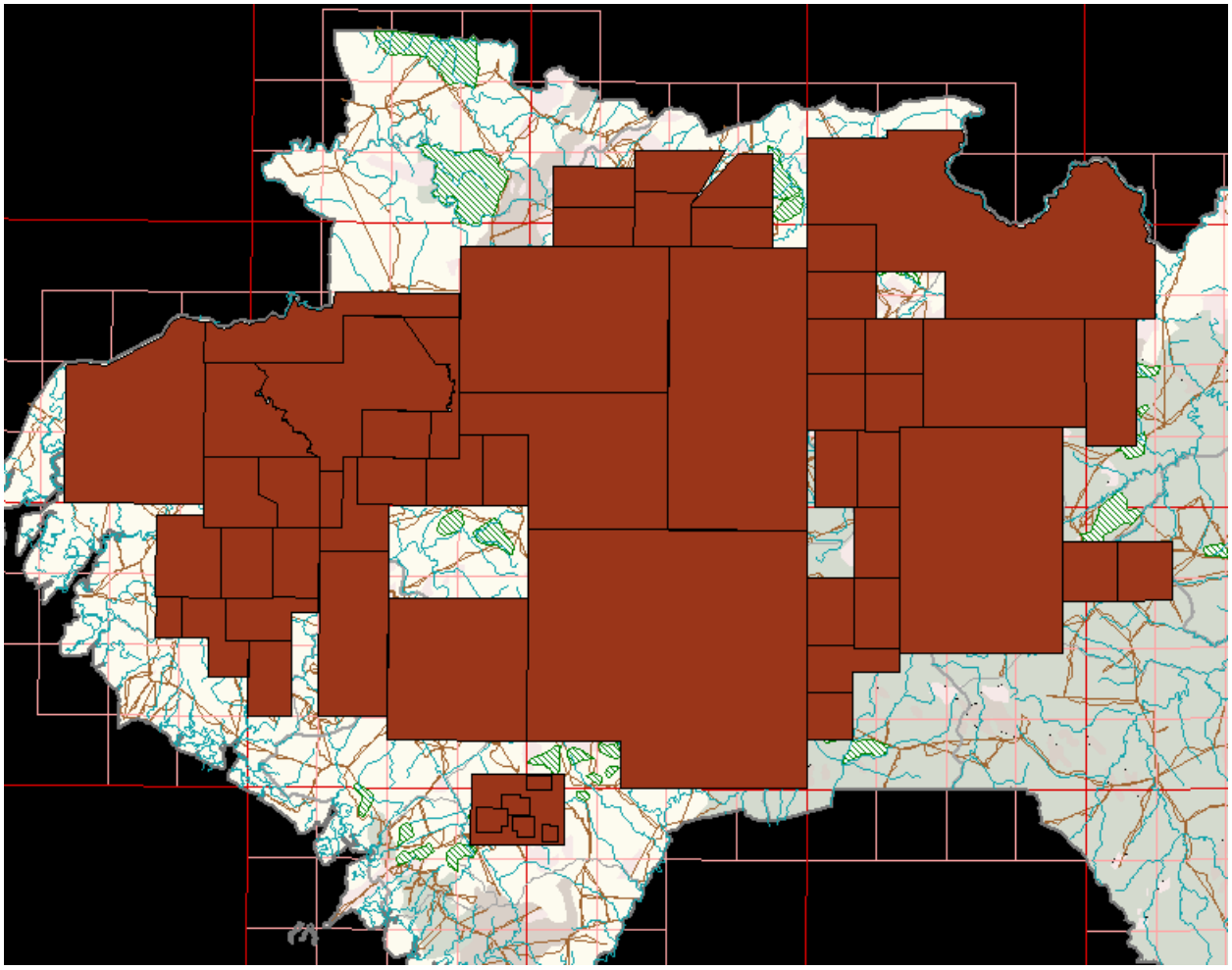
Name	**Area (ha)**
Parc National du Badiar / Badiar National Park	146,600
Parc National du Haut Niger / Haut Niger National Park	752,200
Monts Nimba / Mt. Nimba	17,130
Jardin zoo - botanique de Dubréka / Dubréka Botanical Garden-Zoo	150
Réserve de faune de Kankan / Kankan Wildlife Reserve	537,000
Réserve naturelle de Bafing-Falémé / Bafing-Falémé Nature Reserve	132,868
Forêt classée de Bakoum / Bakoum Classified Forest	*28,000*
Réserve naturelle des Rio-Cogon, Korubal et Nunez / Rio-Cogon, Korubal et Nunez Nature Reserves	800,000
Réserve naturelle de Kounoukan / Kounoukan Nature Reserve	5,032
Réserve naturelle de Forokonia (Forêt classée de la source du Niger) / Forokonia Nature Reserve	4,770
Réserve naturelle de Pincéli / Pincéli Nature Reserve	13,000
Réserve naturelle de Manden Woula – Warandougouba/ Manden Woula – Warandougouba Nature Reserve	136,000
Forêt classée du Mont Béro / Mont Béro Classified Forest	23,600
Forêt classée de Gban / Gban Classified Forest	500
Forêt classée du Pic de Fon / Pic de Fon Classified Forest	25,600
Forêt classée de Diécké / Diécké Classified Forest	64,500
Forêt classée du Ziama / Ziama Classified Forest	116,170
Zone humide de Tristao / Tristao Wetland	85,000
Zone humide Alcatraz / Alcatraz Wetland	1
Zone humide du Delta du Konkouré / Delta du Konkouré Wetland	90
Zone humide du Rio Pongo / Rio Pongo Wetland	30,000
Zone humide du Rio Kapatchez / Rio Kapatchez Wetland	20,000
Zone humide du Niger-Tinkisso / Niger-Tinkisso Wetland	400,600
Zone humide du Niger-Niandan-Milo / Niger-Niandan-Milo Wetland	1,046,400
Zone humide du Niger-Mafou / Niger-Mafou Wetland	1,015,450
Zone humide du Tinkisso / Tinkisso Wetland	896,000
Zone humide du Sankarani-Fié / Sankarani- Fié Wetland	1,015,200
Zone humide de Niger Source / Niger Source Wetland	180,400
Zone humide de Gambie-Koulountou / Gambia-Koulountou Wetland	281,400
Zone humide de Gambie-Oundou-Liti / Cambia-Oundou-Liti Wetland	527,400
Zone humide des Chutes de Kinkon / Kinkon Waterfalls Wetlands	320
Zone humide des Grandes chutes / Great Falls Wetlands	13,500
Zone humide du Barrage de Garafiri / Garafire Dam Wetland	7,900
Zone humide des Chutes de Tinkisso / Tinkisso Falls Wetland	1,100
Sanctuaire de faune des Ïles de Loos / Iles de Loos Wildlife Refuge	13,40
Réserve de faune de Bissikrima / Bissikrima Wildlife Management Area	25,000
Réserve spéciale de faune de Basse-Guinée / Special Wildlife Reserve Basse-Guinée	200
Réserve spéciale de faune de Moyenne Guinée / Central- Guinea Special Wildlife Reserve	200

Réserve spéciale de faune de Haute-Guinée / Upper- Guinea Special Wildlife Reserve	200
Réserve spéciale de faune de Guinée-Forestière / Guinée-Forestière Special Wildlife Reserve	200
Réserve de faune de Gbinia et Banan / Gbinia and Banan Wildlife Reserve	7,165
Protected Areas - total area	**1,720,999**

APPENDIX 2. MAPS OF BAUXITE DEPOSITS AND MINING PERMITS

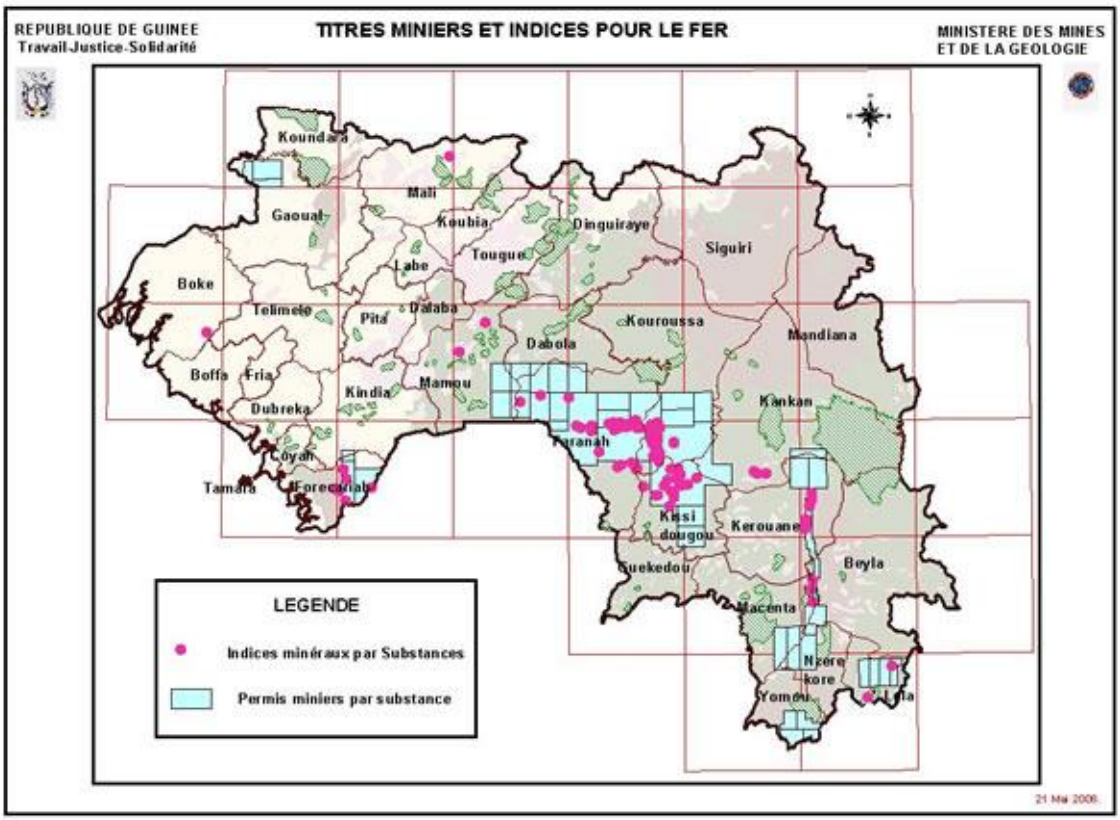


Bauxite deposits in Guinea http://www.smguinee.com/html/bauxite.html

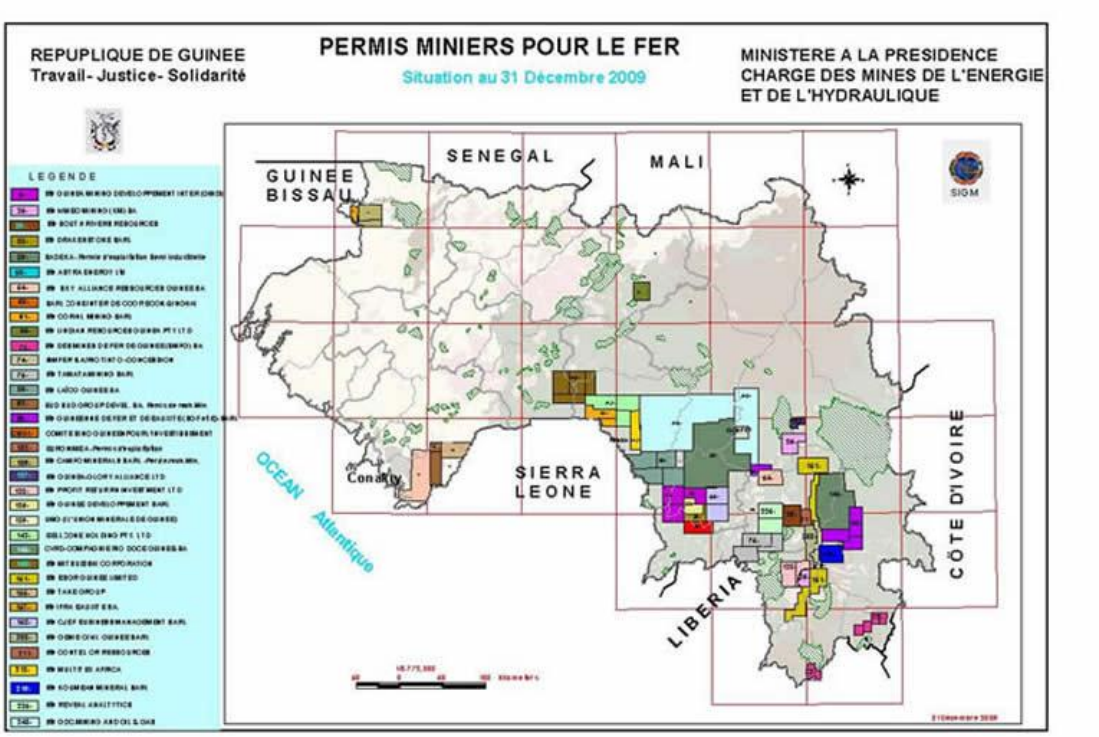


Map of bauxite mining concessions in northwest Guinea (Mario Gauthier March 2008)

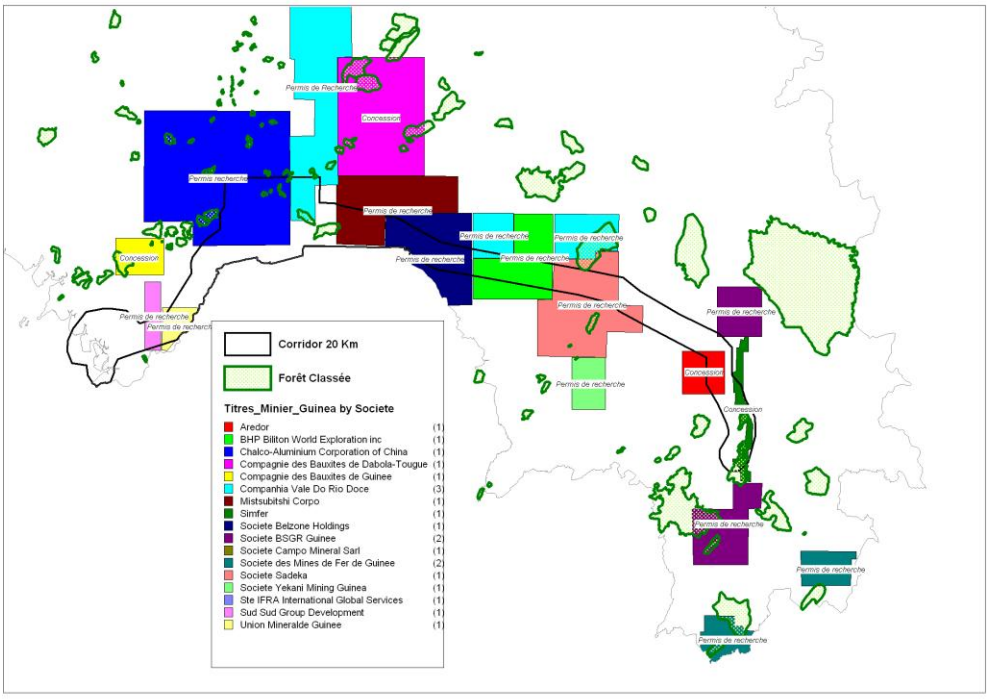
APPENDIX 3. MAPS OF IRON ORE DEPOSITS AND MINING PERMITS



Iron deposits in Guinea (http://www.smguinee.com/html/ironore.html)

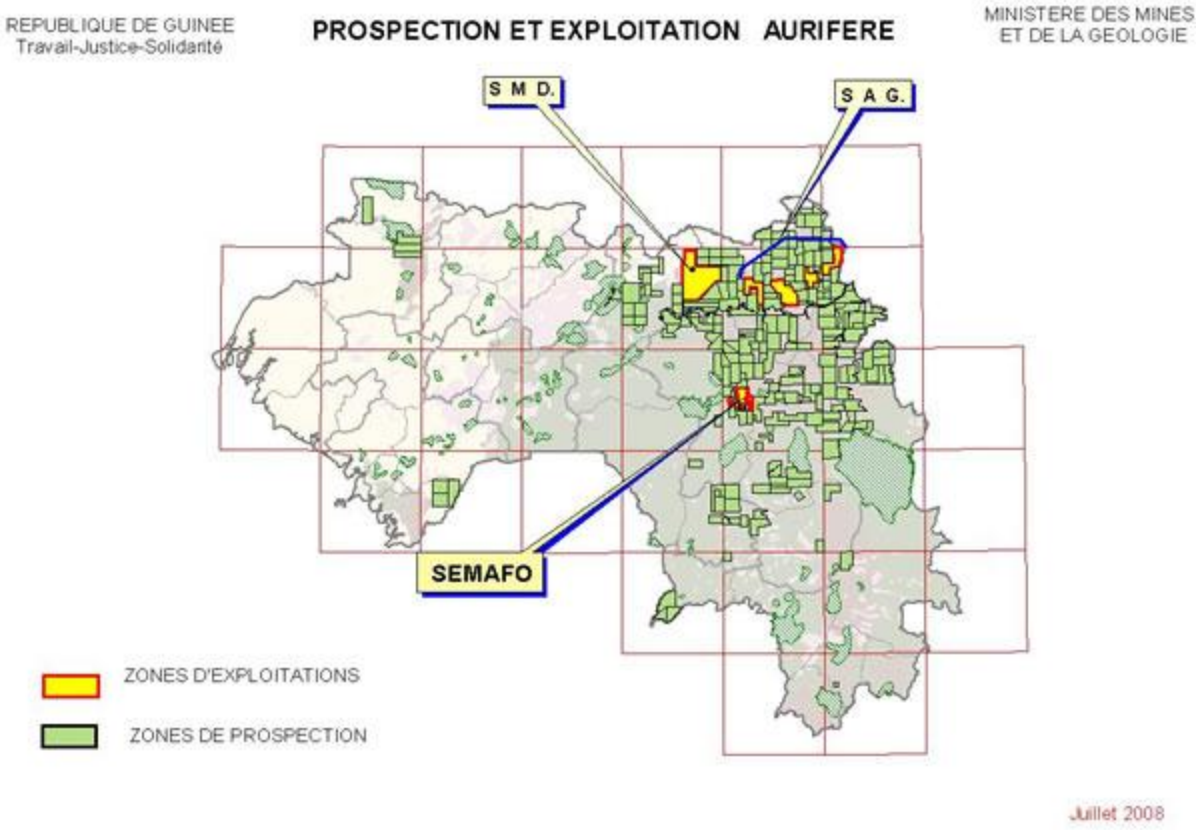


Permits for mining iron. (http://www.smguinee.com/html/ironore.html)

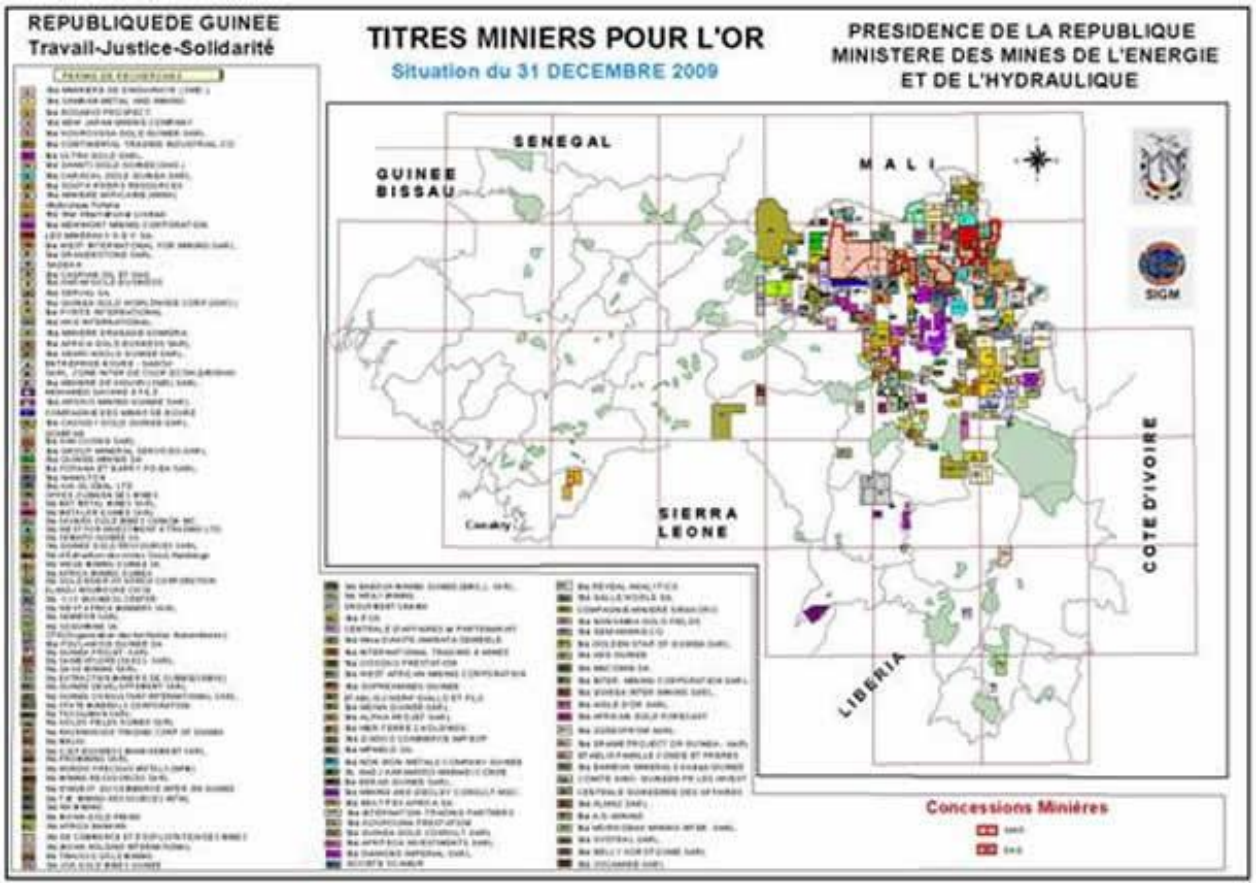


Map showing some of the mining concessions and research permits that have been allocated in the southern part of the Republic of Guinea (Mario Gauthier March 2008)

APPENDIX 4. MAPS OF GOLD EXPLORATION AND MINING PERMITS

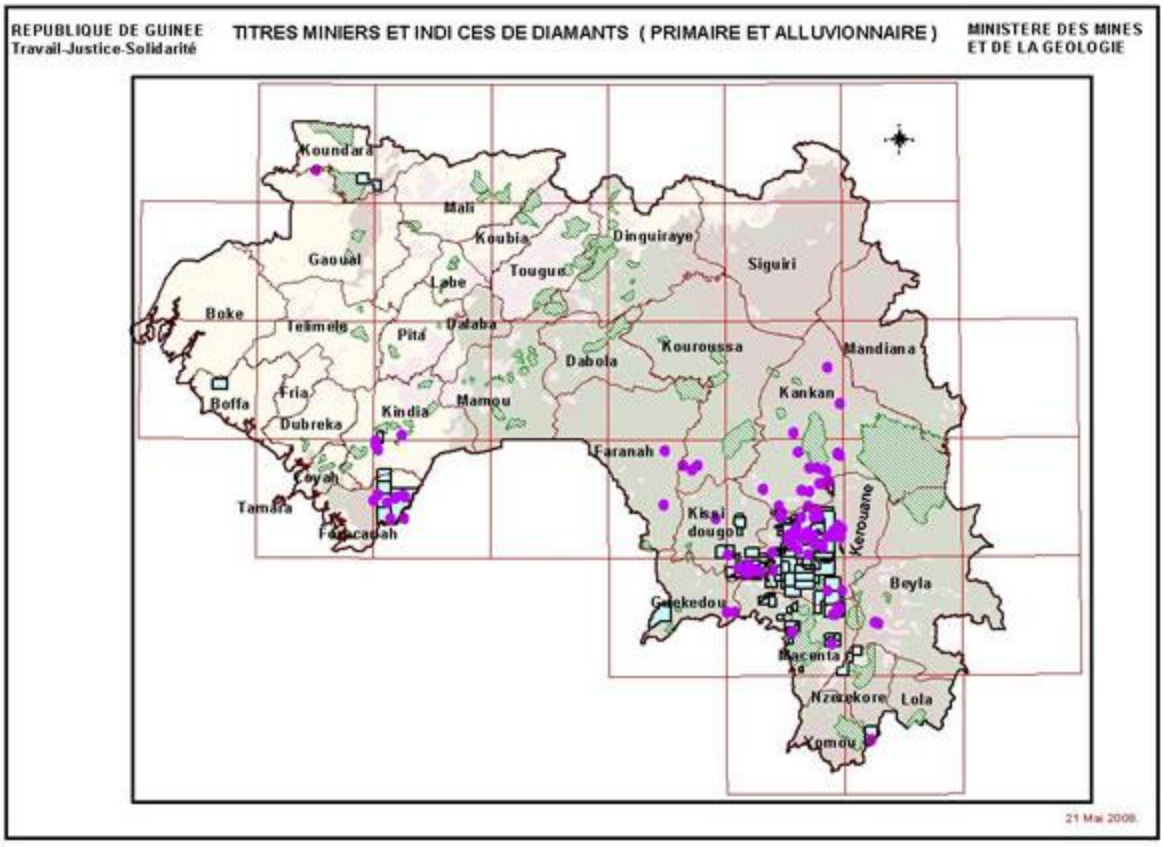


Map of Gold Exploration (http://www.smguinee.com/html/gold.html)

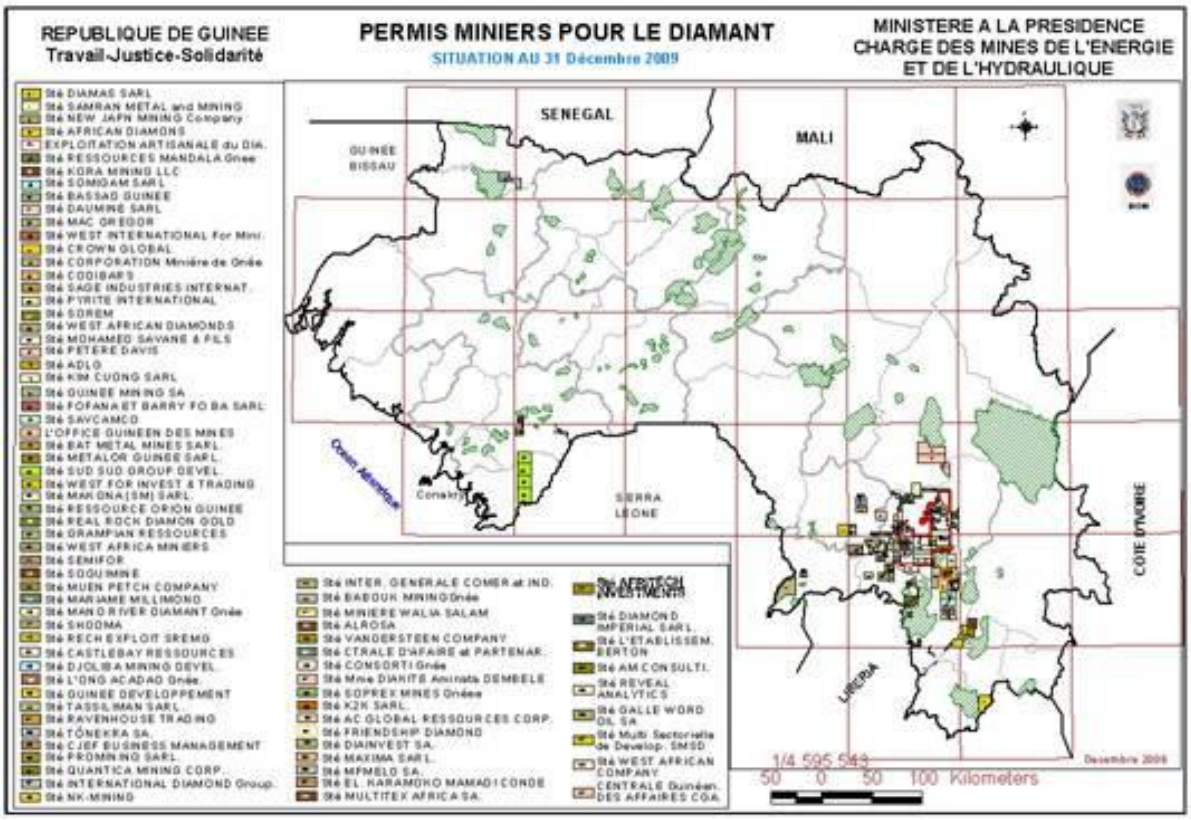


Map of mining permits for gold (http://www.smguinee.com/html/gold.html)

APPENDIX 5. MAPS OF DIAMOND EXPLORATION AND MINING PERMITS



Diamond occurrence (http://www.smguinee.com/html/diamonds.html



Diamond permits

APPENDIX 6. OVERVIEW OF BAUXITE AND IRON ORE MINING

A brief overview of the process of bauxite and iron ore mining is included below for those who are less familiar with mining activities to illustrate the impacts of mining on chimpanzees.

Bauxite, which is used for producing aluminum, is generally found several meters below the earth's surface, and as a result requires strip mining to access the ore. Iron ore, used to produce steel, is also recovered via open pit mines. Both aluminum and steel are in very high demand globally: steel is widely considered the second most important commodity for the global economy after oil.

Bauxite mining and iron ore mining start with exploration, which involves drilling to take soil samples. The exploration process can take several years. The bauxite or iron ore content of these samples are analyzed and a "mining plan" is written identifying areas for mining. Clearing and stripping occurs in the areas to be mined. It also occurs in other areas, such as those needed for the refinery complex for the ore stockpile, administration facilities, equipment park, and maintenance shops. In addition, areas are cleared and stripped for initial haul roads, initial stockpile development, and drains.

All vegetation and organic matter are removed from the mining site. Clearing usually involves using bulldozers that push the material into heaps. Stripping is then carried out to excavate and remove the "overburden" to storage piles for later re-spreading. "Overburden" is the mining term used for the material that lies above the area to be mined; most commonly the rock, soil and vegetation.

Mining frequently takes place over a very large area. The total active mining area of the GAC project in Northwest Guinea is approximately 100 hectares per year (ha/yr) with approximately 75 additional hectares cleared on an annual basis, and 75 hectares being placed into rehabilitation/restoration. Thus, activities are occurring on about 250 hectares each year. The size of a typical track and field is roughly 1 hectare, so the area that will be affected by mining activities each year is 250 times the size of a typical track. Please see photos of mining in Guinea, from the GAC project in northwestern Guinea (from the GAC website photo gallery http://www.globalalumina.com/gallery.php)

After clearing and stripping, both bauxite mining and iron ore mining conventionally uses the drill, blast, load, and haul methods. Holes are drilled and explosives are placed within the holes. Drilling produces noise, flyrock, vibrations, dust, and uses nighttime lighting. Blasting usually occurs on a daily basis. Warning sirens are usually sounded when blasting occurs.

Earthworks blasting from http://www.globalalumina.com/gallery.php

After blasting, the fragmented ore is extracted with hydraulic shovels or loaders.

Excavation from http://www.globalalumina.com/gallery.php

This material is then put into trucks (or conveyor bellows) and hauled to the "stockpile" and "refinery" area.

Overview of refinery areas and piles from http://www.globalalumina.com/gallery.php

Usually, ore from several different blasting sites is extracted at any one time. Extraction activities usually occur 24 hours per day, 365 days per year but they can be interrupted during or immediately following heavy rain until there has been sufficient surface drainage to allow the heavy equipment traffic to proceed.

The lengths of haul roads will change as different portions of the reserves are being mined. Over time, the average transportation distance usually increases. The haul roads are maintained by graders, which pass regularly over the roads to remove objects that

have spilled from trucks and to reshape the running surface. Water trucks are also used to dampen the roads to reduce dust, especially during the dry season.

Roads from http://www.globalalumina.com/gallery.php

The stockpile area is slightly sloped, and runoff from the area is collected and drained to a storm water pond. Eventually, the material is transported to the primary crusher where the ore processing begins. Aluminum refining produces highly caustic "red mud" that can negatively affect surface and groundwater quality. For iron ore, the processing usually ranges from simple crushing and screening to a standard size, to a range actions that can upgrade the quality of the iron ore products. The processed materials are stockpiled and blended to meet product quality requirements, and are then usually put onto rails cars to be transported to the coast.

Earthworks crusher operations from http://www.globalalumina.com/gallery.php

Thus, open pit mining is a hugely environmentally disruptive industrial process, frequently continuing 24 hours a day, and with only brief weather-related interruptions. As a result, mining activities can be expected to cause massive impacts on chimpanzee populations. These impacts are discussed further below.

APPENDIX 7. GUINEA LAW AND POLICIES

Guinea's constitution recognizes the right of its citizens to the preservation of their environment (Title II Article 19 of the Loi Fondamentale). The "Code de la Protection et de la Mise en Valeur de l'Environnement" (Environmental Code) provides the general principles for environmental protection in Guinea, reiterating the importance of conservation and resource protection to the people of Guinea and noting that environmental protection is an essential component of Guinea's national economic, social and cultural development strategy (Articles 4 and 5).

The Environmental Code also establishes the importance of species protection designation and environmental impact assessments. Species protection and environmental impact analysis are also addressed in other "Codes" and via a number of Décrets d'Applications, and are discussed further below

Wildlife Protection

Title 3, Chapter II, Articles 48-57 of the Environmental Code lay out provisions for protection of Guinea's fauna and flora, the establishment of national parks, nature reserves and protected forests and forest protection generally.

Guinea's "Code de Protection de la Faune Sauvage et Reglementation de la Chasse" (Wildlife Protection Code) addresses wildlife, habitat protection and protected area classification and regulates hunting. The Wildlife Protection Code reiterates the national importance of maintaining healthy populations of wildlife and biodiversity and of protecting EN species (Articles 3-4), emphasizes the need to protect a diversity of habitats to maintain healthy wildlife nationally (Article 5) and calls for the development of a national wildlife policy and a national plan for wildlife management (Articles 8-9). Articles 22-28 establish Guinea's protected areas classification. Article 47 requires that a national list for rare and EN species be established, states that listed species may not be captured or hunted unless specially permitted for scientific or conservation purposes. The remainder of the Wildlife Protection Code is devoted to provisions regulating hunting. Guinea's Code Forestier (Loi L/99/0130AN) provides the Forestry Division with the authority to impose restrictions on forest lands for the protection of rare or EN species.

Environmental Impact Assessment

Article 82 of Title 5, Chapter 1 of the Environmental Code establishes a requirement for environmental impact assessments for projects that entail risks to the environment as a result of their size, the nature of the activities undertaken, or their location in natural environments. Article 83 of the Environmental Code outlines the contents of an environmental impact assessment, including a baseline description of the project site prior to any project activity, an assessment of likely impacts, measures for mitigating, reducing, and providing financial compensation for impacts, and an analysis of project alternatives with a rationale for the preferred project design. Décret n° 199/PRG/SGG/89 provides a list of project types (including mining projects) subject to environmental impact assessments. Arrété A/N990/MRNE/SGG/90 provides the procedures for

conducting an impact assessment. The mining code does not provide any additional requirements, deferring to the Environmental Code's provisions.