Executive Summary

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Executive Summary

INTRODUCTION

The Guinean Forest, located in West Africa, is one of the world's 34 biologically richest and most threatened ecosystems (Mittermeier et al. 2005). The Upper Guinea Forest, one of the two main blocks of the Guinean Forest ecosystem, extends from Guinea into Sierra Leone and eastward through Liberia, Côte d'Ivoire and Ghana into western Togo. To date, Guinea has lost roughly 70% of its original forest cover (Bakarr et al. 2001). The underlying causes of biodiversity loss in the Upper Guinea Forest and adjacent coastal and marine ecosystems include extreme poverty, growing human population densities and weak environmental governance (Bakarr et al. 2001). However, despite its high degree of fragmentation, the Upper Guinea Forest still supports a biologically rich and diverse assemblage of species, including a high number of endemic species.

The flora and fauna of Guinea are poorly known overall and large areas of the country have yet to be surveyed. Within Guinea, only Mont Nimba is relatively well studied. The coast of Guinea is estimated to hold, at times, over half a million waterbirds, principally migrant waders (GEF 2004). Guinea's coastal zone is characterized by mangroves, sandbanks and mudflats, shallow estuarine waters and sub-humid Guinean forests. In 1999 Conservation International (CI) held a Conservation Priority Setting Workshop (CPSW) in West Africa, in collaboration with BirdLife International, Ecosyn, the Global Environment Facility (GEF), United Nations Development Programme (UNDP), World Wide Fund for Nature (WWF) and the Critical Ecosystem Partnership Fund (CEPF). The results of this workshop identified nearly the entire coastal zone of the remaining Upper Guinea Forest, particularly Guinea's coast, as a high priority area for biodiversity conservation (Bakarr et al. 2001). As the best developed mangroves in western Africa, the Guinean mangrove ecosystem provides important habitat for migratory birds and endangered species such as the West African manatee and the pygmy hippopotamus (WWF 2004) as well as key habitat for many fish and invertebrate species. Recent biological survey data are lacking, but urgently needed to identify key species and important protected areas and to prioritize conservation and management efforts in the region.

Scope of Project

Conservation International's (CI) Center for Environmental Leadership in Business (CELB) is promoting a new approach, Initial Biodiversity Assessment and Planning (IBAP), to mining and oil and gas companies where biodiversity considerations are incorporated into the very earliest stages of project decision making and planning. The IBAP approach consists of initial desktop and spatial analysis of existing biodiversity and related socio-economic data, followed by field surveys to fill in data gaps and development of a biodiversity action plan.

Alcoa/Alcan is planning to develop an alumina refinery in Guinea, and thus is conducting a sustainability assessment to ascertain the social, economic, and environmental viability of the project. CI and Alcoa/Alcan decided to partner in conducting an IBAP to inform biodiversity aspects of the project's sustainability. Following preliminary desktop and spatial analyses, CI's Rapid Assessment Program (RAP) and local partner Guinée Ecologie organized a biodiversity survey of several sites within the Boké Préfecture of northwestern Guinea in from April 22 – May 12, 2005 to more fully understand the biological diversity of this region. This was followed by a stakeholder workshop June 22-23, 2005 to discuss the results of the RAP survey, identify existing pressures on the region's biodiversity, and explore opportunities for conservation in the

area, the output of which was a preliminary Biodiversity Action Plan (BAP). This partnership was formed in the spirit of providing significant gains for biodiversity conservation and the region's communities that rely on these resources.

RAP Survey Overview and Objectives

The primary objective of the RAP survey was to collect scientific data on the diversity and status of species at a number of sites in order to make recommendations regarding the conservation and management of biodiversity in the region. Survey sites were selected within a project area that is likely to encompass Alcoa/Alcan's existing operations and infrastructure in Guinea, namely the existing mining operations near Sangaredi, the existing port facilities at Kamsar, and the connecting infrastructure corridor.

The specific aims of the RAP survey were to:

- Derive a brief but thorough overview of species diversity and integrity within the Rio Kapatchez, Kamsar and Sangaredi areas and evaluate their relative conservation importance;
- Undertake an evaluation of threats to the biodiversity within the areas surveyed;
- Provide further "on-site" training for Guinean biologists under the guidance and mentorship of experienced field ecologists;
- Provide management and research recommendations for these areas together with recommendations for conservation priorities; and
- Make RAP data publicly available for decision-makers as well as members of the general public in Guinea and elsewhere, with a view to increasing awareness of this ecosystem and promoting its conservation.

The scientific team comprised 14 international and national scientists specializing in West African ecosystems and biodiversity. The RAP team examined selected taxonomic groups to determine the area's biological diversity, its degree of endemism, and the uniqueness of the ecosystems. RAP expeditions survey focal taxonomic groups as well as indicator species, with the aim of choosing taxa whose presence can help identify a habitat type or its condition. For this RAP survey, the team studied plants, katydids (Orthoptera), crustaceans, ants, amphibians and reptiles, birds and large mammals.

Study Area

The Boké Préfecture is located on the westernmost fringe of the Upper Guinea Forest ecosystem in Guinée-Maritime, one of Guinea's four regions that includes Guinea's coastal zone (Map 1). All sites surveyed were at an elevation of approximately 30 meters above sea level. The RAP survey took place in Guinea's Boké Préfecture from April 22 to May 12, 2005, at the end of the dry season, and covered the following three sites:

Site 1: Sarabaya (Rio Kapatchez): April 23-28, 2005; 10°45.248'N, 14°26.980'W

The first RAP survey site (Site 1) contained a matrix of vegetation made up primarily of wooded grassland and a narrow band of gallery forest along the Rio Kapatchez. Additional habitats found at this site included agricultural lands (banana and oil palm plantations and rice fields). The gallery forest along the river in this area was the most diverse of the gallery forests investigated during this survey. Large trees remain, though at low densities due to tree-felling in some areas. The wooded grasslands here have been influenced in the past by farming and the vegetation is uniformly 3 m tall with a few larger trees present.

Sarabaya village is located along the Rio Kapatchez, a site including a large expanse of mudflats as well as mangroves, sand dunes, freshwater marsh and rice fields. The Rio Kapatchez has been identified as one of 12 Ramsar sites (Ramsar 2006) and one of 18 Important Bird Areas (IBA) within Guinea (Birdlife International 2006) but has no formal protection. The site has also been identified as a Key Biodiversity Area (KBA) by Conservation International (D. Knox *pers. com*.; Conservation International 2006). KBAs are places of international importance for the conservation of biodiversity. They are identified nationally using simple, standardized, threshold-based criteria driven by the distribution and population of species that require site-level conservation (Conservation International 2006). Other KBAs in Guinea are currently being identified and delineated.

The site has a large area of very soft mudflats that act as a feeding ground or a high-tide roost for many pelicans and wader species, with large numbers of wintering waders, including several thousand Pied Avocets *Recurvirostra avosetta*. The mangroves are important nesting areas for waterbird species such as Hamerkop *Scopus umbretta* and Woolly-necked Stork *Ciconia episcopus*. The extensive fresh and brackish water swamps and rice fields support a variety of nesting waterbirds, amongst which are Long-tailed Cormorant *Phalacrocorax africanus*, African Darter *Anhinga rufa*, Great Egret *Egretta alba* and White-faced Whistling Duck *Dendrocygna viduata*.

This site qualifies as a KBA based on the Congregatory Species criterion. Between 5,000 and 10,000 individuals of both the Near Threatened Lesser Flamingo *Phoeniconaias minor* and the Greater Flamingo *Phoenicopterus roseus* have been recorded in recent years. The Caspian Tern *Sterna maxima* is a breeding resident at this site and up to 1,470 breeding pairs have been recorded from this area. Additionally, more than 1,800 breeding pairs of the Little Tern *Sterna albifrons* have been recorded to regularly occur at this site. In addition to the species listed above, this site is regularly used by more than 20,000 waterbirds.

Site 2: Kamsar April 29-May 3, 2005

The second RAP survey site (Site 2), Kamsar, consisted of five localities in the Kamsar sub-préfecture. Parts of Kamsar and its surrounding area, contained within Alcatraz, were highlighted as of very high importance for conservation during the 1999 CPSW on the basis of extremely high priority for coastal marine ecosystems, high priority for mammals and freshwater biodiversity, medium priority for birds, and potential priority areas for plants (Bakarr et al. 2001).

Within this site the RAP team surveyed five localities:

Taïgbé East 29-30 April 29-30, 2005; 10°37.323'N, 14°34.061'W
Taïgbé East is a small island connected to the mainland by a bridge, made from palm trunks. There is no palm forest remaining since this has been cleared for rice plantation and peanuts. The vegetation is predominantly wooded grassland dominated by *Anthostema* sp., *Vitex doniana*, *Pterocarpus erinaceus*, *Sorindeia juglandifolia*, *Dichrostachys glomerata* and *Salacia senegalensis*. *Nauclea latifolia* and *Terminalia scutifera* are found here as large trees.

Taïgbé West April 29-30, 2005; 10°36.508'N, 14°36.232'W
Taïgbé West is a coastal island with a small area of palm forest remaining. The palm nuts from *Elaeis guineensis* are collected and the main disturbance in this area is from path cutting and a little clearance around the palm trees, but this is minimal. However, much of the island is used for agriculture and large areas have been cleared for rice plantations and tropical agriculture. The majority of the vegetation was classified as wooded grassland, there were two main types of grass growing in the area (unidentifiable due to the time of year) and one species was harvested for use as thatching material. On Taïgbé West the larger *Ceiba pentandra* trees are harvested and hollowed out to make pirogues (boats) for travel between the island and mainland

Significant mangroves of *Rhizophora harrisonii*, *Avicennia nitida* and *Laguncularia racemosa* remain on Taïgbé West and East but these are currently being degraded through the harvest of *Rhizophora harrisonii* for firewood and construction. Particularly in this area there is a very small-scale, local industry to make salt through a process of using mud from the mangroves. This process uses *Rhizophora* as the firewood source. Other habitats present include a few very small patches of seasonally humid forest and grasslands.

Kaiboutou (Kamsar SE) 1 May 1, 2005; 10°37.331'N, 14°31.353'W
Kaiboutou has a large number of plantations of *Anacardium occidentale* and due to the time of year of the survey, much of the land was being cleared in preparation for the rains and thus the planting season. The diversity in this area was considerably less than in the gallery forest and some of the other wooded grassland areas due to slash-and-burn agriculture and plantations. The dominant species were *Anthonotha crassifolia* and *Lophira lanceolata*. The only trees large trees left were *Elaeis guineensis*, *Parkia biglobosa*, *Bombax costatum; Parkia* was seen to be chopped down for planks, though introduced species used for timber such as *Gmelina arborea* and *Tectona grandis* were present.

Tarénsa (Kamsar N) May 2, 2005; 10°44.122'N, 14°33.559'W
Around Tarénsa the vegetation was very similar to Kaiboutou, the height of the vegetation is uniformly 3-4 m high with *Diospyros heudelotii* and *Salacia senegalensis* the dominant woody species. However in recently cut areas there is a high density of *Dichrostachys glomerata* and *Lophira lanceolata* is the most frequent regenerating tree species. *Parkia biglobosa*, *Pterocarpus erinaceus* and *Elaeis guineensis* are the most frequent large trees. There were patches of slightly moister ground around rivers with subtle changes in vegetation such as *Uapaca guineensis* and *Xylopia aethiopia* appearing, but these are isolated patches; some degraded mangrove vegetation is also present. One very small patch of secondary forest remains near a small, permanent pool

Table 1. Species of Conservation Concern recorded during the RAP survey in Boké Préfecture, northwestern Guinea.

Taxon	Species Name	Common Name (French/English)	Conservation Status	Sarabaya	Kamsar	Boulléré
Crustaceans	*Afrithelphusa monodosus*		CR	x		
Primates	*Pan troglodytes verus*	Chimpanzé d'Afrique occidentale / West African chimpanzee	EN	x	x	x
Primates	*Procolobus badius*	Colobe bai d'Afrique occidentale / Western red colobus	EN			x
Plants	*Afzelia africana*	Savanna Doussié/Afzelia	VU			
Plants	*Hallea stipulosa*		VU			
Plants	*Nauclea diderrichii*		VU			
Amphibians	*Leptopelis macrotis*		NT			
Mammals	*Cephalophus maxwellii*	Céphalophe de Maxwell / Maxwell's duiker	NT	x	x	x
Primates	*Cercocebus atys atys*	Sooty mangabey	NT			x
Primates	*Papio papio*	Babouin de Guinée / Guinea Baboon	NT		x	x
Amphibians	*Ptychadena retropunctata*		DD			x
Birds	*Phyllastrephus baumanni*	Bulbul de Baumann / Baumann's greenbul	DD	x		
Reptiles	*Chamaeleo gracilis*		CITES II		x	x
Reptiles	*Python regius*		CITES II	x		
Reptiles	*Varanus niloticus*		CITES II	x	x	
Reptiles	*Pelusios castaneus*		CITES III	x		

of freshwater accounting for higher humidity in the forest patch.

Kataméne May 3, 2005; 10°52.433'N, 14°22.709'W
Kataméne was the only site in this area that had significant forest remaining and this was dominated by lianas and *Ricinodendron heudelotii* and lacked a contiguous canopy. This forested area was not used by the villagers and in that respect remains untouched in the interior but some tree-cutting was observed on the edges. The surrounding area was wooded grassland similar in species composition to Kaiboutou. Remaining habitat included small patches of secondary forest, rice fields and other agricultural lands (oil palm).

Site 3: Boulléré, Sangaredi sub-préfecture: May 4-9, 2005; 11°6.558'N, 13°57.401'W
The third RAP survey site (Site 3), Boulléré, consisted of a mosaic of vegetation ranging from gallery forest to open grassland to rocky outcrops of bauxite. The vegetation was highly disturbed by agriculture due to a number of settlements in the area. The gallery forest in this area was inconsistent in quality. Some very large girth trees were seen, and the majority of species recorded were similar to those found in the gallery forest at Sarabaya, with some additional records such as *Uapaca heudelotii*, *Homalium africanum* and *Cola caricaefolia*. It also appeared to be much wetter than the forest at Sarabaya as evidenced by the high frequency of stilt rooted trees. There was considerable pressure on the gallery forest from agriculture on the banks and clearance for rice plantations thus causing the spread of wooded grassland vegetation into areas that would previously have been gallery forest. On some of the surrounding hillsides the rotation system of agriculture has left a virtual monoculture of *Dichrostachys glomerata* punctuated by some larger trees of *Parkia biglobosa* and *Parinari excelsa*.

The wooded grassland area was extensive and richer in some families than the previous sites. There are more legume species present and of a greater size; full grown specimens of *Daniella oliveri* and *Albizia adiantifolia* were found here. *Lophira lanceolata* and *Anthostema* sp. were the most abundant shrubs in regenerating areas. The density of trees was much higher in the wooded grassland of this area than at any of the previous sites and the height of the vegetation is 3-4 m, with the taller trees up to 15 m tall. The wooded grassland ecosystems and farmland surveyed at this site were heavily impacted by traditional slash-and-burn agricultural practices that clear large areas of land for cultivation. Because agriculture here is rain-fed, the burning of forests and fallow areas took place during the survey period in anticipation of the first rains (which began May 11, 2005).

SUMMARY OF RESULTS BY SITE

The RAP team visited a variety of habitats during this survey including wooded grasslands, gallery forests, mudflats, mangroves and farmbush. The team's findings confirmed that a significant portion of the surveyed area was degraded and that local communities used large tracts of land for agricultural purposes. The majority of the survey area was under cultivation and little natural habitat remained. Remaining areas of intact habitat were small, patchy and isolated. However, despite the obvious degradation, the RAP team recorded 709 species during the survey period. Six were new species records for Guinea and two were new species to science. Of the total species recorded, 16 were species of conservation concern (See Table 1). These findings indicate that although degraded, these sites do harbor important habitats and species.

Site 1 – Sarabaya:
Significant findings - Sarabaya

- There has been noticeable degradation of the area's flora through agriculture while a few richer areas of gallery forest remain along the length of the river.
- Ten species of katydids were recorded with two species being new records for Guinea and one species possibly new to science.
- The Critically Endangered freshwater crab species, *Afrithelphusa monodosus*, was recorded for the first time since its original collection in 1947, and was previously known only from the male holotype. A small series of specimens of *A. monodosus* were collected including the first adult female.
- The discovery of the freshwater shrimp *Desmocaris trispinosa* represents the first record of this endemic West and Central African genus and species in Guinea. The family Desmocariidae comprises only one genus and two species.
- 15 amphibian species were recorded.
- Seven reptile species including three internationally protected CITES species (*Pelusios niger, Varanus niloticus, Python regius*).
- In total, 145 bird species were recorded, amongst which the only species of global conservation concern, Baumann's Greenbul *Phyllastrephus baumanni*, is currently listed as Data Deficient. The site is the westernmost to date for this species and represents a range extension of *c.* 300 km.
- Evidence of 11 species of (non-primate) mammals including the Near Threatened Maxwell's duiker *Cephalophus maxwellii*.
- Three species of primate including the Endangered Western Chimpanzee *Pan troglodytes verus*.

Site 2 – Kamsar:
Significant findings – All Kamsar sites

- The Near Threatened Maxwell's duiker *Cephalophus maxwellii* from all localities surveyed at this site.
- 151 bird species were recorded in total for this site.

Significant findings – Taïgbé West

- Five species of katydids including one species that is a new record for Guinea.

Significant findings – Taïgbé East

- *Chamaeleo gracilis*, a CITES-listed reptile.

Significant findings – Kaiboutou

- *Varanus niloticus*, a CITES-listed reptile.

Significant findings – Tarénsa

- Endangered Western Chimpanzee *Pan troglodytes verus* and the Near Threatened Guinea Baboon *Papio papio.*

Significant findings – Kataméne

- Endangered Western Chimpanzee *Pan troglodytes verus*

Site 3 – Boulléré:
Significant findings - Boulléré

- Five reptile species were recorded from this site including the CITES II-listed *Chamaeleo gracilis*.
- 17 species of amphibian including one species that is new to Guinea (or possibly new to science), *Phrynobatrachus* sp., and one frog species listed as Data Deficient by IUCN, *Ptychadena retropunctata*.
- 140 species of birds including the Icterine Warbler *Hippolais icterina*, observed for the first time in Guinea. Fourteen of the 33 Sudan-Guinea Savanna biome species were found here.
- Evidence of 16 species of non-primate mammals including the Near Threatened Maxwell's duiker *Cephalophus maxwellii*.
- Eight primate species including two species listed as Endangered: West African chimpanzee *Pan troglodytes verus* and Western red colobus *Procolobus badius* and two species listed as Near Threatened: Sooty mangabey *Cercocebus atys atys* and Guinea baboon *Papio papio.*

SUMMARY OF RAP RESULTS BY TAXONOMIC GROUP

Plants. For plant results, see site descriptions above.

Ants. The RAP team collected around 6,000 ants in this RAP survey representing 85 species in 31 genera. The comparison of the three survey sites indicates that the three sites are fairly similar in species richness and composition, although a few more species were recorded at Sarabaya (Site 1). At the Kamsar site (Site 2), the comparison between sub-sites indicates that Taïgbé West, Taïgbé East and Kaiboutou have similar ant faunas while Tarénsa and Kateméne are different from each other and from the other three sub-sites. We observed a remarkable ant behavior during the survey: At Kataméne we observed symbiotic behavior between ants and termites (rather than ants predating termites which is more common).

Katydids. Fifteen species of Tettigoniidae were collected, of which one is possibly new to science, and three are new to Guinea. Species richness and abundance of individual species were extremely low due to unfavorable climatic conditions (the end of the dry season) combined with heavy anthropogenic impact on the surveyed habitats.

Crustaceans. The decapod crustaceans collected during this RAP survey from marine, mangrove and freshwater ecosystems included twenty species in 14 genera and 11 families. In freshwater ecosystems the RAP team collected two species of freshwater crabs and four species of freshwater shrimps. Notably, the rare Red-listed Critically Endangered (CR C2b) freshwater crab species, *Afrithelphusa monodosus*, was recorded for the first time since its original collection in 1947, and was previously known only from the male holotype (IUCN 2004). A small series of specimens of *A. monodosus* were collected including the first adult female. Specimens of *A. monodosus* were collected from burrows in cultivated land made into permanently moist soil each with a shallow pool of water at the bottom. The species of shrimps collected in freshwater habitats (sites 1 and 3) belonged to three families, the Desmocariidae, Palaemonidae, and Atyidae. *Desmocaris trispinosa* represents the first record of this endemic West and Central African shrimp genus and species in Guinea. This family comprises only this single genus and only two species.

Amphibians and Reptiles. At least 26 amphibian and 11 reptile species were recorded. Most of these were connected to savanna or farmbush habitat and have a distribution area that exceeds the Upper Guinean forest block or even West Africa. Only a few species were typical forest specialists. For several species our records are large range extensions; other species need further examination to determine their taxonomic status. One species might be new to science. One of the amphibians recorded is Red-listed by IUCN: *Ptychadena retropunctata* (Data Deficient). Four of the encountered reptile species are protected by CITES (*Pelusios niger, Varanus niloticus, Chamaleo gracilis* and *Python regius*). As there was no rain during the entire RAP period, the weather conditions were not favorable for investigating herpetological fauna. Further research is needed to finally comment on the herpetological diversity of the Boké region. Due to many different available habitat types, there might exist a surprisingly high diversity for lower Guinea, given the high degree of degradation in some parts of the Boké region.

Birds. During 15 days of field work in Boké Préfecture, 239 bird species were recorded: 145 at Site 1, 151 at Site 2 (five localities combined) and 140 at Site 3 (Boulléré, near Sangaredi). Of these, only one is of conservation concern: Baumann's Greenbul *Phyllastrephus baumanni*, which is currently listed as Data Deficient and was found to be locally common in farmbush at Site 1. We added two species to Guinea's published avifauna: Purple Swamphen *Porphyrio porphyrio*, at Site 1, and Icterine Warbler *Hippolais icterina*, at Site 3. Fifty species were recorded for the first time in the Kamsar and Sangaredi areas and their records represent

more or less significant range extensions. Seventeen of the 33 Sudan-Guinea Savanna biome species recorded in Guinea were found during the study.

Mammals. The mammal team confirmed the presence of 11, 12 and 16 mammals in Sites 1, 2 and 3 of Boké region, respectively. In total, this survey confirmed the existence of 18 mammals in these forests including *Cephalophus maxwellii* Maxwell's duiker, listed as Near Threatened by the IUCN. The three sites are under immense pressure from slash-and-burn agriculture, and all three are over-exploited for bushmeat. At Boulléré (Site 3), bush fires were not uncommon. Large mammals such as pigs and duikers were only rarely directly observed. The results show that sites 1 and 2 are relatively not biologically significant for conservation of non-primate large mammals. Site 3 however has more contiguous forest and offers good opportunities for conservation of larger mammals.

Primates. This RAP survey confirmed the presence of one prosimian species (Demidoff's galago *Galagoides demidoff*), six monkey species (Western red colobus *Procolobus badius,* Guinea baboon *Papio papio,* Sooty mangabey *Cercocebus atys atys,* Patas monkey *Cercopithecus patas,* Calithrix monkey *Cercopithecus aethiops sabaeus* and Campbell's monkey *Cercopithecus (m.) campbelli*) and one ape species (Western chimpanzee *Pan troglodytes verus*) for one or more sites. Four of the recorded species are Red-listed by IUCN: Western red colobus *Procolobus badius* (Endangered), recorded at Boulléré; Western Chimpanzee *Pan troglodytes verus* (Endangered), recorded at Sarabaya, Tarénsa, Kataméne and Boulléré; Sooty mangabey *Cercocebus atys atys* (Near Threatened), recorded at Boulléré; and Guinea baboon *Papio papio* (Near Threatened), recorded at Tarénsa and Boulléré.

CONSERVATION RECOMMENDATIONS

The region of the Boké Préfecture studied during this RAP survey was clearly severely impacted by anthropogenic disturbance. Most of the sites visited had been affected by slash-and-burn agriculture and resource exploitation. Regardless of these impacts, however, we still pose some valuable habitat and species conservation recommendations below.

Protection of important species and habitats

- Due to the enormous pressure exerted on this area from agriculture and a growing population, we recommend **conservation of the gallery forest areas**, particularly those in the **Boulléré** area, which **was found to provide the best-remaining and most diverse habitat for a number of species, especially large mammals (including primates)**. **This area and the gallery forest here, in particular, warrant serious consideration for some form of increased protection.** Conservation of the gallery forest will in effect **protect the sites with the highest biodiversity while preserving the watershed areas** and thus conserving the water supply. In addition, conserving the gallery forest protects critical amphibian habitat that without, certain species might not be able to survive.
- The **coastal mangrove sites also deserve increased protection**. This area harbors some of the most extensive coastal mangroves and estuaries in the region and provide indispensable ecosystems services (nursery/breeding grounds, food source, water filter, prevent coastal erosion, etc). They also provide critical habitat for birds and mammals such as monkeys and feeding grounds for large flocks of wading birds at low tide. Many of them have been considered as a high priority for conservation (Bakarr et al. 2001). Most of Guinea's mangroves are inadequately protected except for a few Ramsar sites. **A sustainable management plan should be developed that adequately protects the mangrove ecosystems and takes into account the function of the mangrove ecosystems and the ecosystem services they provide such as nursery grounds for commercially important species of crustaceans and fish**. Studies and methods to rehabilitate severely impacted mangrove areas should be explored.
- It is of **high importance to protect the region's threatened species and thus hunting should be totally banned for these species**. We recommend that **areas containing observed populations of Endangered species be removed from consideration as areas for any resource extraction**. Some areas will also require a very high level of protection to create refuge and recovery areas for particular species, from which other areas can be repopulated. Once identified, these areas will require wildlife population monitoring and protection.

Species Specific Recommendations

- The discovery of the presence of the Critically Endangered Red-listed freshwater crab *Afrithelphusa mondodus* is significant, and encouraging, but it must be noted that this species is still only known from an estimated population of less than 200 individuals, all from a single locality. **It is recommended that further surveys of the permanent freshwater marshes in the Sarabaya area (Site 1) and elsewhere in Boké Préfecture be made** to (1) establish the extent of the population levels of this species, (2) better define its distribution, and (3) describe its natural habitat in order to define and protect its ecological requirements.
- Western chimpanzees (*Pan troglodytes verus*) and Red colobus monkeys (*Procolobus badius*) are listed as Endangered on IUCN's Red List (2004). Currently there are presumably between 25,000 to 58,000 chimpanzees left in all of West Africa, with the majority living in unprotected areas (Kormos and Boesch 2003). **It is therefore of high importance to locate and map the remaining primate populations and to establish additional protected areas where these primates are**

found. Further investigations into habitats within Boké Préfecture used by all four Red-listed primates found during the survey should be conducted, including habitats used for both feeding and shelter. Once identified, these areas will require increased protection, enforcement and monitoring.

Site Specific Recommendations

Site 1: Sarabaya
Though largely degraded, the discovery of the presence of the Critically Endangered Red-listed freshwater crab *Afrithelphusa mondodus* at Sarabaya is significant and further population and distribution studies (see Species Specific recommendations) should be conducted in this area. Depending upon the outcome of such investigation, conservation options should be explored to protect this species and its habitat.

Site 2: Kamsar Area
In the study sites visited in the Kamsar region, large areas of tidal mangrove forest had been cleared for rice cultivation. While it may be too late for these particular mangroves in the heavily populated regions around Kamsar, it is recommended that consideration be given to intact sections of mangrove forests in Guinea. They should be set aside as protected areas as to avoid exposing the few remaining intact mangrove forests to the same pressures and degradation that large sections of this important ecosystem have already undergone.

Site 3: Boulléré/Sangaredi
The moist Guinea savanna ecosystems surveyed in the region around the village of Boulléré to the west of Sangaredi were heavily impacted by traditional slash-and-burn agricultural practices with large tracts of land cleared for cultivation. Nevertheless, **Sangaredi, though largely degraded (but to a lesser degree than the Sarabaya and Kamsar), still harbors significant habitat and its remaining patches of forest have conservation potential. The protection of habitat mosaics, not only specific habitat types, is highly important. It is recommended that the gallery forests along the rivers and streams be protected from burning (and perhaps be set aside as protected areas).** Gallery forests provide important shade and shelter by mitigating the negative impacts of high temperatures on the survival of aquatic organisms such as fish, crustaceans and other invertebrate and amphibians**.**

BIODIVERSITY ACTION PLAN WORKSHOP SUMMARY

In addition to the species- and site-specific recommendations highlighted by the RAP survey, stakeholders that participated in the BAP workshop identified existing pressures on the Boké Préfecture's biodiversity and explore opportunities for conservation in the area. The resultant BAP identified the overarching conservation objective of improving natural resource management in the Boké Préfecture by reducing threats to biodiversity, promoting and implementing sound production practices, educating and informing the surrounding communities and developing sustainable alternatives for communities that rely heavily on the forests and natural resources of the region (for more information refer to Biodiversity Action Plan Overview). Several milestones towards achieving that objective were identified as well:

1. Vegetation cover in the Boké Préfecture is protected and rehabilitated.
2. Sustainable and 'best practice' agricultural practices are implemented.
3. Extractive industries, like mining, adopt sustainable practices.
4. Awareness and communication about biodiversity conservation issues to local communities is improved.
5. Poaching is reduced.
6. Sustainable fishing practices are implemented.

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