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NIGERIA BIODIVERSITY AND TROPICAL FORESTRY ASSESSMENT

**MAXIMIZING AGRICULTURAL REVENUE IN
KEY ENTERPRISES FOR TARGETED SITES (MARKETS)**

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Cover photo: Harvested hardwood logs near Afi Mountain Wildlife Sanctuary, Cross River State (Photo by Pat Foster-Turley)

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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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PREFACE

This Biodiversity and Tropical Forests Assessment has been undertaken to update a previous assessment conducted for USAID/Nigeria in 2002. Assessments like this one are required by Sections 118 and 119 of the Foreign Assistance Act guidelines for U.S. government agencies working abroad. This assessment was prepared under contract 620-C-00-05-00077-00, Maximizing Agricultural Revenue in Key Enterprises for Targeted Sites (MARKETS) implemented by Chemonics International. The MARKETS staff in Abuja and Kano coordinated and assisted with the work in Nigeria.

The Biodiversity and Tropical Forests Assessment Team was composed of four members: Dr. Patricia Foster-Turley (team leader and biodiversity specialist), Prof. Enoch Okpara (policy analyst), Dr. Damian Ihedioha (environment specialist and MARKETS backstop), and Tony Bassey (biodiversity associate). It also received help from the Nigerian Conservation Foundation and others along the way.

This assessment built upon the 2002 biodiversity assessment for Nigeria, which was also authored by Dr. Pat Foster-Turley but was updated with available information from current documents and Internet resources. Most importantly, this project included four weeks of time in Nigeria, two weeks of which were spent on a 3,000 mile road journey to visit the major biodiversity and forest sites from Calabar to the Niger border and over to Kano, covering more than half of the country. During the course of this trip, team members visited a number of key places, including Cross River National Park, the Drill Ranch, the Obudu Plateau, Afi Mountain Wildlife Sanctuary, Gashaka-Gumti National Park, Yankari State Game Reserve, the Hadejia-Nguru wetlands, farms in the Kano area and many villages throughout the journey. This first-hand experience was crucial for development of the contents of this report.



Olusegun Ojo, Damian Ihedioha, and Tony Bassey scrutinize a road map during the 3,000 mile field trip conducted during this assessment. (Photo by Pat Foster-Turley)

ACKNOWLEDGEMENTS

Compiling this assessment of biodiversity and tropical forests in Nigeria involved the hard work and contributions of many people in many positions throughout the country. The assessment team — Dr. Patricia Foster-Turley (team leader and biodiversity specialist), Prof. Enoch Okpara (policy analyst), Dr. Damian Ihedioha (environment specialist and MARKETS backstop), and Tony Bassey (biodiversity associate and field site leader) — could not have accomplished this project without the help of many others. The photos in this document were contributed by Pat Foster-Turley.

The team would like to thank Mr. Nduka Okaro at USAID/Nigeria for all his work in coordinating the activities of this team and for accompanying the team to Kano during site visits to that area. Thanks, too, to the USAID MARKETS team who hosted our visit and made sure that we had all the tools we needed to perform this assessment, and especially Olesgun Ojo who cheerfully drove us around Nigeria despite the long hours and many potholes along the way.

A strong thanks is offered to the Nigerian Conservation Foundation (NCF), and most especially Prof. Emmanuel Obot for responding to our request for mapping help in this project and for donating his own time to this effort. Prof. Augustine U. Ezealor from Ahmadu Bello University, Zaria, also provided valued assistance in developing the protected area summaries. As we all learned together, information on the current extent and status of protected areas in Nigeria is sketchy, and this project points out the need for a larger effort to bring the information up to date and make it widely available to others. Many thanks for Adedamola Abideen at NCF for doing the mapping work and working closely with the team in providing the maps we were looking for.

The team is grateful to Chief (Mrs.) Halima Tayo Alao, the minister of the environment, urban housing, and development, who made herself available to meet with us at the start of the project and encouraged her staff to attend the final briefing. Mr. Haruna Abubakar, the conservator general of the Department of National Parks, and his staff are owed a debt of gratitude for facilitating site visits to a number of national parks in the country and for participating whole-heartedly in the final briefings.

Thanks are also due to a number of conservation professionals in Nigeria who provided input in the development and finalization of this project, especially Mr. Ako Amadi (CIDA), Dr. Andrew Dunn (WCS), Mr. Phil Hall (Leventis), and Mr. John Oates (WCS), who all were willing to share their knowledge of Nigerian conservation, gained over many decades of in-country experience.

We would also like to thank the many people we met with in government and NGO positions in the capital and in Cross River, Kano, and Bauchi states who took the time to meet with us and for those in various protected areas who showed us the resources and introduced us to the people in their areas.

Last, but by no means least, we would like to thank all those people we talked to and shared laughter with in all the many communities that we visited with along the way. The heart of Nigeria is beating strongly and we are grateful to have worked closely with many people alive with its spirit. Thank you one and all.

EXECUTIVE SUMMARY

Nigeria is a country rich in biodiversity, different natural ecosystems, and many people that live close to the environment. Nigeria contains a few large patches of natural lowland and montane forests, important freshwater wetlands, savannas, high-altitude plateaus, mangroves, and coastal areas under various climatic conditions, resulting in an internationally recognized abundance of biodiversity. Unique primate species like the Cross River gorilla (*Gorilla gorilla diehli*), the drill (*Mandrillus leucophaeus*), and a number of smaller guenons are found only in Nigeria and adjacent forest areas. An extraordinary diversity of butterflies, amphibians, and other species has been tallied in Nigerian habitats. Many crop species also originated here, and a diversity of land races still exists in the country.

Surrounding these remnant natural areas are villages, agricultural lands, and cities. As the most populous country in Africa, Nigeria faces extreme pressures on biodiversity and tropical forests that are mounting. Wildlife, trees, and many other plants are over-harvested and poached, and the natural environment faces increased degradation from expanding unsustainable agriculture, water pollution, air pollution, and a variety of other anthropogenic factors. Desertification and climate change add to the stress. Lack of information about the present status of most habitats and species, about the actual extent of protected areas, and about other key data makes management difficult. Policymakers, managers, and technical staff at all levels need better information and further training to better fulfill their functions related to biodiversity and forest conservation and management.

A number of NGOs, donors, universities, and technical centers in Nigeria are facing the challenges that conservation entails and working in partnership with government agencies, communities, and other key stakeholders. Many approaches have been successfully implemented in Nigeria, but much more work remains to be financed and accomplished. The private sector also has a role, but before ecotourism and other private approaches can be deemed successful, more understanding of valid conservation strategies must be embraced.

This report recommends a triage approach to the conservation of biodiversity and forest resources in Nigeria that acknowledges key resources and builds on development strategies already in place. Those protected areas with significant remaining resources need to be supported in order to maintain their status quo. Areas where significant community conservation work near protected areas has created a foundation for change — particularly Cross River State — need further support to be sustainable. Alternative livelihoods and new uses for invasive species like *Typha* grass (which is overtaking wetlands) need to be implemented in areas where communities are ready for new ideas in agriculture, like in the arid north. The National Parks Service and select states could use more capacity-building efforts, and more college students need to be trained in wildlife, conservation biology, and other fields to take on their roles in the future.

Finally, this report assesses the portfolio of USAID/Nigeria and suggests areas of possible synergy within the health, education, democracy, and agriculture portfolios. A number of USAID-specific recommendations are given that take into account past and present USAID activities as well as what is viewed as the most pressing problems facing biodiversity and forests in Nigeria.

SECTION I: INTRODUCTION

Nigeria is a country — about the size of the U.S. states California, Oregon, and Nevada combined — that contains about half of the entire population of the United States. It is a landscape dominated by people, and the population continues to grow about 2.4 percent per year (CIA 2008). The natural resources of the country do not grow similarly and continue to be degraded and depleted due to the increasing demands of people (and their associated industries) for water, food, fuel, and income. These pressures on biodiversity and tropical forests are clearly seen in the bulk of this report and summarized here.

Nigeria is a country rich in biodiversity and biodiverse natural landscapes, but the areas of ecological importance are increasingly isolated in small pockets where, for one reason or another, people have not greatly modified the landscape. In areas where there are religious edicts against consuming certain animals, as in Muslim areas surrounding Gashaka-Gumti National Park, many primates have been spared the gun. In other areas unsuitable for agriculture — like some riparian areas under a natural flooding regime, or inaccessible mountainous areas along the Cameroon border — native forests and flora still exist.

Protected areas in Nigeria harbor most of the remaining interesting biodiversity, but these areas vary in the amount of actual protection occurring on the ground. Some national parks, including Cross River and Gashaka-Gumti, have enclave villages in their midst, and all protected areas are closely surrounded by communities that continue to expand their agricultural practices in ever-increasing patches of disturbance. Roaming Fulani cattle herders still graze their animals within Yankari State Game Reserve, and no doubt others as well.

The many state forest reserves in the country were originally set up in recognition of the importance of many tree species and the associated flora and fauna around the country. Within these forests are many endemic plant species and some that are commercially valuable, like mahogany and other hardwoods. Most of these forest reserves are now mostly only protected on paper, as they continue to be subjected to official and unofficial unsustainable logging, and virtually unrestrained firewood and plant collecting. Most animals that are considered edible — which is nearly everything in many areas — have long since disappeared.

In other natural areas, extractive and industrial operations with few environmental controls have contributed greatly to habitat destruction. Oil operations in the Niger Delta region, for instance, have opened up new channels enabling salt water to intrude farther upstream. Regular oil spills contaminate the environment, and gas flaring contributes to air pollution.

Water resources in Nigeria are also under increasing threats. Many industries blatantly discharge their toxic wastes into waterways and use few controls to prevent modifying the landscape. With the large-scale removal of forest cover, erosion and resulting siltation continues to degrade waterways even further, and adds to the increasing desertification,

moving southward through Nigeria. Modified water flow regimes induced by dams and channelization have greatly modified important wetlands, like those at Hadejia-Nguru, and facilitated the introduction and spread of invasive plants like cattails (*Typha* spp.), which are overrunning the area and crowding out native vegetation as well as the fish and farmed rice traditionally used by humans.

A full state of the environment report is beyond the scope of this project, but the government of Nigeria and various NGOs are mounting efforts to detail the present environmental conditions and solutions. As recently as May 2008, the government of Nigeria sponsored a “State of the Environment” workshop in Abuja, attended by many stakeholders, and this is a good sign of the government’s concerns, which may one day lead to more positive actions to stem the widespread deterioration of natural resources.

People, and not only those in government positions, hold the key to conservation of natural resources in Nigeria. The people of Nigeria are its biggest natural resource and increasing awareness of environmental matters is beginning to happen. As more attention is given to proven sustainable development approaches and enforcement of legal frameworks protecting natural resources, the situation for Nigeria’s biodiversity and forest resources is not as hopeless as it might seem.

SECTION II: MAJOR ECOSYSTEMS

Nigeria is a diverse country with many different natural habitats, including savannas, tropical forests, wetlands, lakes, rivers, and coastal areas. Rainfall is heaviest along the coast and in the southeast, leading to the development of rainforest in this region. By contrast, the northern part of Nigeria receives much less rain and includes increasingly drier vegetation zones the further north one goes. Three different highland areas are found in Nigeria: the Yoruba highlands in the west, the Jos plateau in the center of the country, and the mountains bordering Cameroon in the east. This diversity of landscapes and climatic conditions results in a corresponding diversity in the plants and animals found here.



The Sahel savannas in the north are characterized by palms and acacias. (Photo by Pat Foster-Turley)

Savanna, Grassland and the Arid North

About four fifths of Nigeria was once savanna, but much of this land has been converted to agriculture or grazing lands. The remaining savanna lands are found in the north and central areas and are often classified into four different types ranging from north to south and based largely on rainfall amount and season: the Sahel, Sudan, Guinea, and derived savannas. The Sahel savanna, is found in the northeast and is typified by grasses, open-thorn scrub, and scattered thorny trees. The Sudan zone is found in the north, is covered by a drift of sand in many areas, and is dominated by grasses and some shrubs and trees but has been greatly modified by man for centuries. The Guinea savanna is found in the middle belt of Nigeria and is typified by open woodland with tall grasses and fire-resistant trees. The derived savanna is found further south, borders the remaining forest zone, and is continuing to spread south as more forestland is degraded into agricultural uses. Desertification is also causing the borders of the drier savanna types to move southward. These lines of definition between all the various savanna types are vague, overlapping, and continually influenced by anthropogenic factors.

Only a small amount of natural savanna has been protected in Nigeria, and the many large savanna animals often found elsewhere in Africa are greatly reduced in numbers

and range. In Nigeria, attempts have been made to preserve savanna habitats and species by establishing protected areas, such as Yankari and Lame-Burra game reserves in Bauchi State. Despite this protection, a number of other large mammals including African wild dogs, cheetah, giraffe, and a few antelope species have been extirpated, although elephants and lions can still be found. In other protected areas in Nigeria's savannas, large mammal populations are in even worse shape, and those outside of protected areas are virtually nonexistent.

Forests

Nigeria's forests fall into three basic categories: those in the drier middle and north latitudes, lowland rainforest in the southern humid zone, and coastal mangroves and freshwater swamp forests. Montane forests are also still found on the border with Cameroon, but the Guinea woodlands that once occurred on the Jos plateau have nearly disappeared. Most other forested habitats are declining at a similarly rapid rate. According to a study on land-use changes (Geomatics 1998), undisturbed forest including rainforests and savanna woodlands made up 2.9 percent of the total area of Nigeria in 1976-78 but only 1.3 percent in 1993-95. The extent of disturbed forests has similarly increased. Riparian forests also declined significantly. Only the coastal mangroves and swamp forests showed little loss in extent over the course of the study.

Lowland rainforests:

Lowland rainforest once covered much of the southern terrestrial areas of Nigeria, where an abundant rainfall regime favors the development of this ecosystem type. Unfortunately, excessive exploitation of timber, agricultural encroachment, and other anthropogenic changes have greatly reduced these forests in extent and in



Lowland rainforest as seen from the canopy walkway at Afi Mountain Wildlife Sanctuary, Cross River State. (Photo by Pat Foster-Turley)

biological diversity. Although rainforest patches still are found in southern Nigeria in a belt that runs from the western to eastern borders of the country, the largest remaining tracts of rainforest are primarily found in Cross River, Bendel (now Edo and Delta), and Ondo states (FAO 1981). The rainforest belt of Nigeria is contiguous with the rainforests in neighboring Cameroon, and many species are found in both countries. Although many

species are endemic to these forests, they cannot be considered “true endemics” because they occur in both countries.

Lowland rainforests are characterized by a great variety of plant species arranged in a complex vertical structure of forest canopies. Some economically important rainforest trees include mahoganies, African walnut (*Lovoa*), *Mansonia*, and a number of others that are increasingly endangered by illegal and legal logging activities. Many other non-timber forest products extracted from these forests have significant value as food items and medicinals, as well as for other domestic uses by local residents. A number of rare or endangered rainforest animal species, including primates, forest antelopes, rodents, and birds are overharvested as bushmeat and are exceedingly scarce and rarely seen. Increasingly monocultural plantations of rubber, cocoa, oil palm, and the like are planted within former rainforest areas, with a resulting loss of habitat and biodiversity. Other forms of agriculture also abound. Although crops can be grown on lowland forest soils, long fallow periods are necessary between plantings, leading to the destruction of ever more forest area for future crops.

Freshwater swamp forests: Freshwater swamp forests are found in southern Nigeria on the landward side of the mangrove belt, where salinities decrease beyond the tolerance of mangrove species. Swamp forests are dominated by species of *Raphia*, *Pandanus*, *Calamus*, and *Alchornea*, with a canopy that is sometimes as high as 15 meters (NEST 1991). The furthest inland swamp forests are only flooded seasonally and are characterized by climbing palms and a variety of other species that make the forest nearly impenetrable. A number of rare and endangered species still thrive in these forests, due to their inaccessibility. A few endemic primate species also thrive here. Although some non-timber forest products are collected from the same areas of the swamp forest, large tracts have been relatively untouched by commercial ventures. A bigger threat to swamp forests is the intrusion of salt water due to the development of navigational canals, primarily to enhance activities of the oil industry.



Savannas of Gashaka-Gumti National Park contain a diversity of plant and animals species. (Photo by Pat Foster-Turley)

Savanna woodlands: North of the rainforest belt in Nigeria, there is a large band of derived savanna, which has undergone large-scale anthropogenic modifications. Aside from extensive agricultural areas, this zone contains some relict forest patches with species indicative of the rainforests and others known throughout the middle savanna

belt. As one goes further north and the conditions get drier, the woody vegetation gets sparser and the trees thornier. The Guinea savanna includes areas of mixed deciduous and semi-deciduous woodlands. Further north, in the Sudan savanna, baobabs (*Adansonia digitata*) are characteristic trees while the Sahel savanna is virtually treeless (NEST 1991).

Although savanna tree species are not as valuable for timber as those found in rainforests, a few species are commercially harvested. Many other trees are cut for fuelwood by residents in these areas or cleared to make room for agriculture (Geomatics 1998).

The savanna habitats also support a good number of large mammals, such as various antelopes, elephants, lions, etc., which are all found in savannas elsewhere in Africa. These animals are increasingly scarce in Nigeria and nearly nonexistent in areas outside those few protected areas that actually receive protection.

Riparian forests: Riparian forests consist of lowland rainforest, freshwater swamp forests, and other forest types found on narrow strips bordering water bodies. Many of these forests have been spared from agricultural activities due to difficult access and periodic flooding regimes (Geomatics 1998). These forests are important to the protection of watersheds, and when they are destroyed, siltation and degradation of the watercourses becomes severe. These forests also have a role to play in the mitigation and movement of many animal species, forming corridors of connectivity between different forest patches. The riparian forests of the Jos plateau are also known to contain a unique assemblage of species, including a number of endemics plants and a few endemic birds and mammals. These forests are under intense threat, however, and only marginal amounts still remain.

Mangrove forests: Mangrove forests in Nigeria range along 708 km of coastline and extend from 16 to 90 km inland, encompassing 5,591 km² of land (Isebor and Awosika 1993). Mangroves survive in marine and brackish habitats and are replaced further inland by freshwater swamp forests. Nigerian mangroves are dominated by red mangroves (*Rhizophoraceae*) and also include white mangroves (*Avicennia*) and a few other mangrove species. The mangrove understory includes a thick undergrowth of other salt-tolerant plant species.

Mangroves provide a number of ecological services, including the habitat and nursery ground for a productive range of fish, crustacean, and mollusk species that are harvested locally and in off-shore fisheries. Local residents also use mangroves for firewood and for drying their fishing nets. In addition, they collect a number of non-timber forest products from the understory. As mangroves are cut for firewood, or to permit the construction of navigational canals, villages, and oil company operations, they are gradually being replaced by nipa palms (*Nypa fruticans*), an exotic plant species that is a fast colonizer but does not provide the extensive ecological services provided by native mangroves.

Just recently, the first protected area to include mangroves was established as a forest reserve in Cross River State. The State Forestry department has high hopes that boat and

canoe tours of this area will be attractive to tourists, which will help keep the area protected against more intrusion.

Montane forest: Montane forests contain considerable biodiversity and, due in large part to their geographical isolation and unique microclimate, many of the plant and animal species found here are endemic to these areas. In Nigeria, montane forests are found primarily on the highlands that form the southeastern border between Nigeria and Cameroon. Although some of this high altitude area consists of grassland, shrubs, and rocky outcrops, there are some patches of montane forests along the eastern, southern, and western sections, which merge gradually into lowland rainforest at the base. Two types of montane forests can be identified: the mist forests with a diversity of moss and epiphyte species and uneven canopies, and drier forests higher up, where dwarf and stunted trees occur. The Jos Plateau is another highland area that once contained tracts of montane forests. This area has been highly modified by anthropogenic factors, until now only remnant patches exist.

Although the forests of Nigeria are small in extent, compared to other ecosystems, they harbor the bulk of the globally important biodiversity of the nation. The lowland rainforests in the south contain a great diversity of primates and butterflies, many non-timber forest products of regional and global importance, and many valuable hardwood tree species. The mangroves along the coast provide spawning and nursery grounds for important fishery resources. The swamp forests further inland and the remaining patches of riparian forest on the Jos Plateau and the mountains bordering Cameroon contain a variety of endemic species of plants as well as animals. The threats to these forests are increasing, and the protective measures in place are sorely inadequate.

Freshwater Ecosystems

Nigeria is endowed with a diversity of freshwater resources, including seasonal and permanent rivers, lakes, and wetlands. However, these are all under varying degrees of threat.

Nigeria has two major rivers — the Niger and the Benue — which meet in a series of tributaries and channels to form the Niger Delta. Further north, other rivers flow into the Niger and Benue rivers and into Lake Chad. Other rivers — including the Cross, Imo, Ogun, and Osun Benin — also flow into the Atlantic Ocean. All told, there are eight main river basins in Nigeria (Ita 1994). A number of these have been dammed, diverted, polluted, or otherwise disturbed, along with their aquatic flora and fauna. Riparian marsh and swamps along river courses are also under threat. For instance, by 1990, the natural freshwater marsh and swamps along the Niger, Benue, and Hadejia rivers had nearly disappeared due to floodplain agriculture (Geomatix 1998). Freshwater swamp forests are extensive in the south, adjacent to mangrove areas. Two large lakes are found in Nigeria: Lake Chad in the northeast and man-made Kainji Lake in the west. Nigeria also has many natural and man-made lakes, reservoirs, fish ponds, abandoned mine pits, and other freshwater sources throughout the country. Many of these water features provide important breeding and feeding habitats for a diversity of bird species (Eleazor 2002b). The Hadejia-Nguru Wetlands in the northwest has been protected for many years and

includes the first Ramsar site in Nigeria. In 2008, 10 more Ramsar sites were added in Nigeria for their global wetlands importance.

Wetlands and other freshwater habitats in Nigeria, as elsewhere, are important reservoirs of fish and other aquatic food items for people. They provide habitat for a myriad of other diverse species and for the water resources themselves. Both water quality and quantity are important to all the species that depend upon these resources. Various studies in Nigeria have shown high levels of heavy metals in some rivers where industrial wastes are discharged, high levels of siltation in areas with extensive logging and farming, and other disturbances (Ita 1994). Inland fisheries in rivers are depleted due to these factors, although the fisheries in lakes and reservoirs are thought to be relatively stable due to restocking with hatchery fish and better controls (Shimang 2002). Depending on the type of fish introduced — native vs. non-native — this might also present a problem for native species. Wildlife associated with wetlands is largely in decline, with aquatic birds becoming rarer, crocodiles and some turtles virtually nonexistent in many areas, and other more cryptic species most likely declining as well.

Coastal Areas

The coastline of Nigeria is approximately 853 km long, stretching from the western border with the Republic of Benin to the eastern border with Cameroon. The coastal shore consists of barrier islands, sandy beaches, lagoons, estuaries, mud beaches, and creeks and includes the Niger Delta. Mangroves and estuaries extend from 10-150 km inland. Further inland are freshwater swamp forests and other low-lying habitats, which are all considered to be part of the coast. The coastal area is heavily populated, with about 20 percent of Nigeria's residents living in one of the nine coastal states. Offshore, the continental shelf extends from 15 km off Lagos to more than 85 km off Calabar. The Exclusive Economic Zone, established in 1978, extends to 200 nautical miles offshore (CEDA 1997).

The marine and coastal environment of Nigeria is rich in resources and species diversity. The mangroves found here are the largest remaining tract in Africa — and the third largest in the world — covering an area of about 9,723 km². The mangrove ecosystem provides a nursery and breeding ground for many of the commercial fishery species taken in the Gulf of Guinea. Nigeria's coast is said to have about 199 species of finfish and shellfish, a number of which are used commercially. The Nigerian shrimp fishery is especially strong, and shrimp are now being exported to other countries, including the United States. Artisanal fisherfolk harvest a large variety of fish, crustaceans, and mollusks from the estuaries and channels and utilize mangrove and swamp forest products for a variety of domestic uses. A variety of birds, mammals, and reptiles inhabit the mangroves and swamp forests of the coast, including a few endemic species like the Sclater's guenon and the Nile Delta red colobus monkey. Although a few species of sea turtles lay eggs on Nigerian beaches, they are rare and under threat from human predation.

The coastal area is greatly impacted by the activities of oil companies, including their destruction of mangroves to make way for drilling activities and staff housing, their

improper waste and sewage disposal, the intrusion of salt water further into freshwater areas as a result of the construction of navigable canals, the occasional oil spill, and the establishment of exotic nipa palm. Many marine resources are also harvested unsustainably both commercially and by local fisherfolk with virtually no controls. Recently, the first protected area in the mangrove belt has been established in Cross River State.

SECTION III: PLANT AND ANIMAL SPECIES AT RISK

Nigeria is a country with diverse landscapes and rainfall regimes and a correspondingly high diversity of biological niches harboring many different species of plants and animals. In global studies of biological diversity, Nigeria can be found near the top of the list, especially when it is considered as part of a region variously defined by different international NGOs as the Gulf of Guinea Forests, the Cameroon Highlands Ecoregion, the Cross Sanaga Faunal Region, or Cameroon-Nigeria Transboundary areas. No matter what this area is called or exactly how it is defined on a map, the tropical forests, montane forests, and high altitude plateaus that Nigeria and Cameroon share at their borders contain a wealth of biodiversity and many species still to be discovered.



An endangered Nigerian chimpanzee gazes from his compound at the Drill Ranch, Cross River State. (Photo by Pat Foster-Turley)

Add to this, the coastal mangrove and swamp forests with their own attendant species, the arid savannas and grassland in the north, the important freshwater wetlands, and various specialized pockets of unique vegetation, and it is easy to see why Nigeria's biodiversity has gained global attention.

Mammals

Despite international concerns about the status of the many species of plants, animals, and lower organisms in Nigeria, the actual data about what lives in this country is sketchy at best. Those organisms closest to people — the primates — have understandably received the most attention, and more is known about these handful of species than any others. Nigeria and neighboring Cameroon is home to the last few Cross River gorilla (*Gorilla gorilla diehli*), a subspecies biologically different from other lowland or mountain gorillas, and now optimistically thought to number in the low hundreds in both countries combined. Even rarer in Nigeria is the Nigerian chimpanzee (*Pan troglodytes vellerosus*), an animal that until recently still appeared in stewpots. Another large primate — the baboon-sized drill (*Mandrillus leucophaeus*) — occurs only in Nigeria, Cameroon, and Bioko, Equatorial Guinea, but due to the efforts of the NGO Pandrillus, it has been nurtured and bred in captivity, and field efforts are underway to study it further. Smaller primates in Nigeria also have their international supporters. With the support over the

years of Cercophan, an NGO based in Calabar, a number of guenon species have been better understood and protected in captivity and in their natural habitat. Three of these small monkeys — the white-throated monkey (*Cercopithecus erythrogaster*), Sclater’s guenon (*Cercopithecus sclateri*), and the Niger Delta red colobus (*Procolobus pennantii epieni*) — are endemics only found in Nigeria.

Beyond primates, though, knowledge about other mammals is scarce and spotty. Nigeria used to be home to large herds of elephants, lions, wild dogs, giraffes, and other savanna mammals that roamed widely around the country. Now giraffes and wild dogs are gone, or nearly gone, and lions and elephants are only reliably seen in a few protected areas where — even there — their numbers are said to be decreasing. With respect to other less charismatic mammals (the many bats and rats and small carnivores), no one knows the status of most of them, and some doubt whether these species still exist.

Birds

Birds, luckily, have their own fan clubs of bird-watchers and conservationists that think nothing of traveling to Nigeria to add birds to their life lists. Nigeria is a hotspot of bird diversity, and visits to the remaining patches of protected areas can yield enormous numbers of valued sightings. Birdlife International (<http://www.birdlife.org/>) has declared 27 Important Bird Areas in Nigeria where people are likely to find their target species. In 2003, Nigeria was said to be the seasonal, breeding or year round home to 906 bird species (FEPA 2003). Of these species, 12 are threatened and three — the Anambra waxbill (*Estrilda poplilpaia*), the Ibadan malimbe (*Malimbus ibadanensis*), and the Jos indigo-bird (*Vidua maryae*) — are endemic to Nigeria (Aminu-Kano 2001).

Lower Vertebrates

Nigerian fish, amphibians, and reptiles are not nearly as well-known as the birds and mammals. In Nigeria’s National Biodiversity Strategy and Action Plan (FEPA 2003), the country was said to harbor 135 reptile species, 109 amphibian species, and 247 non-marine fish species. Adding coastal and marine fish to this total yields more than 648 species (FEPA 1992), and no doubt there are other smaller, specialized habitat-associated and non-commercially valuable fish species still to be counted. Amphibians in Nigeria and adjacent areas of Cameroon are gaining more attention lately, as new species continue to be discovered in rainforest and montane forest habitats: 11 new frogs in the last decade (Conservation International 2007). Reptiles are a bit better known, especially those that are hunted for food like turtles and tortoises. There is one endemic snake (*Nahelya egbensis*) and five endemic amphibians in Nigeria.

	Total Number of Species in Nigeria*	Number of Species Threatened **	Number of Species Found Only in Nigeria
Plants	5,103*	171	?
Mammals	247*	29	3*
Birds	906*	12	3*
Reptiles	135*	3	1***

Amphibs	109*	13	5***
FW Fish	247*	21	?
Invertebrates	more than 20,000*	1	?

* FEPA 2003

** International Union for Conservation of Nature 2007. The number of species threatened includes those judged critically endangered, endangered, and vulnerable by the IUCN's Species Survival Committee.

***Aminu-Kano 2001

Invertebrates

Aside from a few economically important invertebrates, such as various prawns and mollusks, little information is available on the diversity of this large group of organisms. Various insects including ants and butterflies have been studied in certain habitats, and new species are found wherever anyone looks. For instance, researchers familiar with the butterflies in the Gulf of Guinea forests have counted more than 1,000 species in Cross River National Park alone (Larson 1997). A particularly significant collection of insects resides in the Department of Crop Protection and Environmental Biology at the University of Ibadan. The National Biodiversity Strategy and Action Plan (FEPA 2003) estimates that Nigeria has more than 20,000 insects, 77 mollusks, and 5 echinoderms but these numbers are largely suspect.



Nigerian forests and high plateaus contain an extraordinary number of butterfly species. (Photo by Pat Foster-Turley)

Plants

Due to the diversity of habitats in Nigeria and the tropical climate, there is a great diversity of plant species found in the country. There have been many localized studies of plants in Nigeria, but few sources of consolidated information. According to the 1992 country study (FEPA 1992), more than 848 algae species have been identified in the marine and freshwater habitats, more than 5,103 higher plant species have so far been identified, and less than 200 lower plant species have been identified, although the number of these plants is most definitely much higher.

Forest tree species in Nigeria are particularly diverse, and many of these have commercial importance. In Cross River State alone the Forestry Research Institute of Nigeria lists 85 endangered tree species, and many of these are endemics, found only in this region. Five of them are monospecific, i.e., the only representative of a particular genus found in the world (Oguntala et al. 1996). Nigeria's plants also include many species with traditional value as food items and medicinals as well as various domestic

applications. A number of these plants have been catalogued in various specific areas of the country.

Of special importance in Nigeria are the many crop species that originated here. Nigeria is thought to be the origin of many land races of important crops now grown worldwide, including sorghum (*Sorghum bicolor*), cowpeas (*Vigna unguiculata*), West African rice (*Oryza sativa*), yams (*Dioscorea* spp.), Bambara groundnuts (*Vigna subterranea*), Kersting's groundnut (*Macrotyloma geocarpum*), African yam bean (*Sphenostylis stenocarpa*), and winged bean (*Psophocarpus tetragonobus*) (Ng 2002). Although a number of land races of these crops still exist, some are being lost as improved hybrid species are increasingly used to fulfill farming objectives. Many of these land races are dying out in favor of more "modern" strains that are being cultivated instead. These diverse older crop strains may hold a key to human food security as environmental conditions change due to global warming and anthropogenic activities, and their inherent genetic characteristics of disease resistance and drought tolerance may become necessary to recapture.

Other Biodiversity

The microorganisms, bacteria, and viruses found in Nigeria are as little known there as they are elsewhere. The Biodiversity Country Study (FEPA 1992) estimates that there are 3,423 fungi species in Nigeria, 134 "plankton" species, more than 500 virus species, 55 bacteria, etc. Aside from the fungi, these numbers most likely do not come close to the true situation of biodiversity of these taxa.

Global Importance of Nigeria's Biodiversity and Tropical Forests

Nigeria's ample biodiversity and associated habitats are important locally and globally in many ways beyond pure aesthetics, providing valuable environmental services, present and future economic benefit and quality of life values that are difficult to quantify.

As climate change and global warming become ever more evident, the values that forests and wetlands serve in modulating temperature and protecting against storm damage cannot be exaggerated. Forests of multiple species — biodiverse ones — are more resilient to climate change, and their ecosystem services of temperature control under their canopy helps modulate the rise. Many other ecosystem services are provided by Nigeria's natural areas.

The biodiversity of Nigeria contains a number of native species, like bush mangos and oil palms, as well as a number of plants with medicinal uses. Many more useful plants are yet to be scientifically discovered and utilized. Likewise, the chemical compounds produced by amphibians, insects, and a myriad of other species in Nigeria may one day be found to have important uses in agriculture, medicine, and other applications. The various crop races of grains originating in Nigeria help feed the world.

Primates such as Cross River gorillas and chimpanzees are close relatives to humans, and we can learn much about ourselves through study of those few gorillas and chimpanzees

that remain. Once this biodiversity is lost, it is lost forever, and along with it the potential services and contributions it can make to human lives on earth in the decades to come.

SECTION IV: PROTECTED AREAS IN NIGERIA

Much of Nigeria's important wildlife and forest resources are located in protected areas, but sadly many of these areas lack real protection. The seven national parks spread around the country receive the highest levels of protection in accordance with the National Parks Services Decree, put in place in the era of military dictatorship and still in effect. A variety of game reserves are managed by different states in an effort to preserve wildlife species. States also manage innumerable forest reserves with the intention of preserving



Wildlife students from the University of Ibadan follow a ranger down a trail in Cross River National Park. (Photo by Pat Foster-Turley)

trees and other plant species along with associated wildlife. However, unfortunately most of them have not received adequate protection and are heavily degraded and wildlife depauperate. A number of specialized reserves under the stricter protection of NGOs or other agencies still contain good amounts of biodiversity, but these are generally much smaller than government reserves. Additionally, some areas have been accorded global significance through international treaties, but the protection of these areas still remains to be seen. Some protected area categories are described here. A full listing of Nigeria's protected areas, their status, habitats, and threats is provided in Annex A of this report.

National Parks and State Game Reserves

National parks in Nigeria are managed by the Department of National Parks under the Ministry of the Environment, Housing, and Urban Development, from a headquarters in Abuja and offices in each park. Until recently, there were eight national parks in this system, but Yankari recently has reverted to state management as a game reserve (see text box, next page). At present, these national parks contain good representations of most major Nigerian ecosystems, including tropical/montane forests, freshwater wetlands/lakes, and savannas.

YANKARI: FEDERAL VS. STATE CONTROL

Yankari Game Reserve, in Bauchi State, has long been considered the cornerstone of the protected areas in Nigeria: a place where lions and elephants roam the bush for visitors to easily see and admire. This park has alternated between federal control, as a national park, and state control as a game reserve — a status it has held since 2006.

The Land Use Act puts the ownership of all land in the hands of the states, and usually this means under control of the governor. Although some states are content to allow the federal agency to manage a park within state boundaries, some, like Bauchi State, are not.

It is widely believed that, in Nigeria, those areas protected under federal control as national parks have the best success protecting and conserving these resources. For one thing, people working in the federal national park system move around from park to park over their careers and are less likely to be in situations where they must arrest their own family members and longtime friends for wildlife transgressions. The federal park staff is also often comparatively better trained in wildlife conservation and related fields, and are aware of the needs of wildlife and tourists. Sometimes, this is not the case with state-run areas.

Yankari, now under state control, provides an illustration of how things can change under new management. A visit there in April 2008 revealed some disturbing facts. In less than two years since the state began managing the park, a new road has been built to the visitor area near Wikki-Warm Springs. The wide, smooth asphalt road cuts through the center of the park and encourages speeding; it is a far better road than most public highways in the country. Although it is posted with signs to drive slowly and beware of animals, it is unlikely that these rules are followed. And, just beyond the main entrance gate, within the park, a herd of cattle was grazing with their Fulani herders nearby, something that should not be permitted in an area designed for wildlife conservation.

At Wikki Camp itself, construction of a massive tourist conference center, tennis courts, individual cabanas, etc., is underway, with an apparent eye towards attracting more tourists to the park. Money made by these facilities, however, does not go back to park upkeep, and vehicles are purportedly in disrepair, thus stemming anti-poaching efforts. This has its ramifications. Purportedly nine elephants were poached in the park during the nine months between May 2007 and January 2008, along with a few crocodiles and leopards. In addition, no one was willing to put name on paper with these observations, which were heard from many sources.

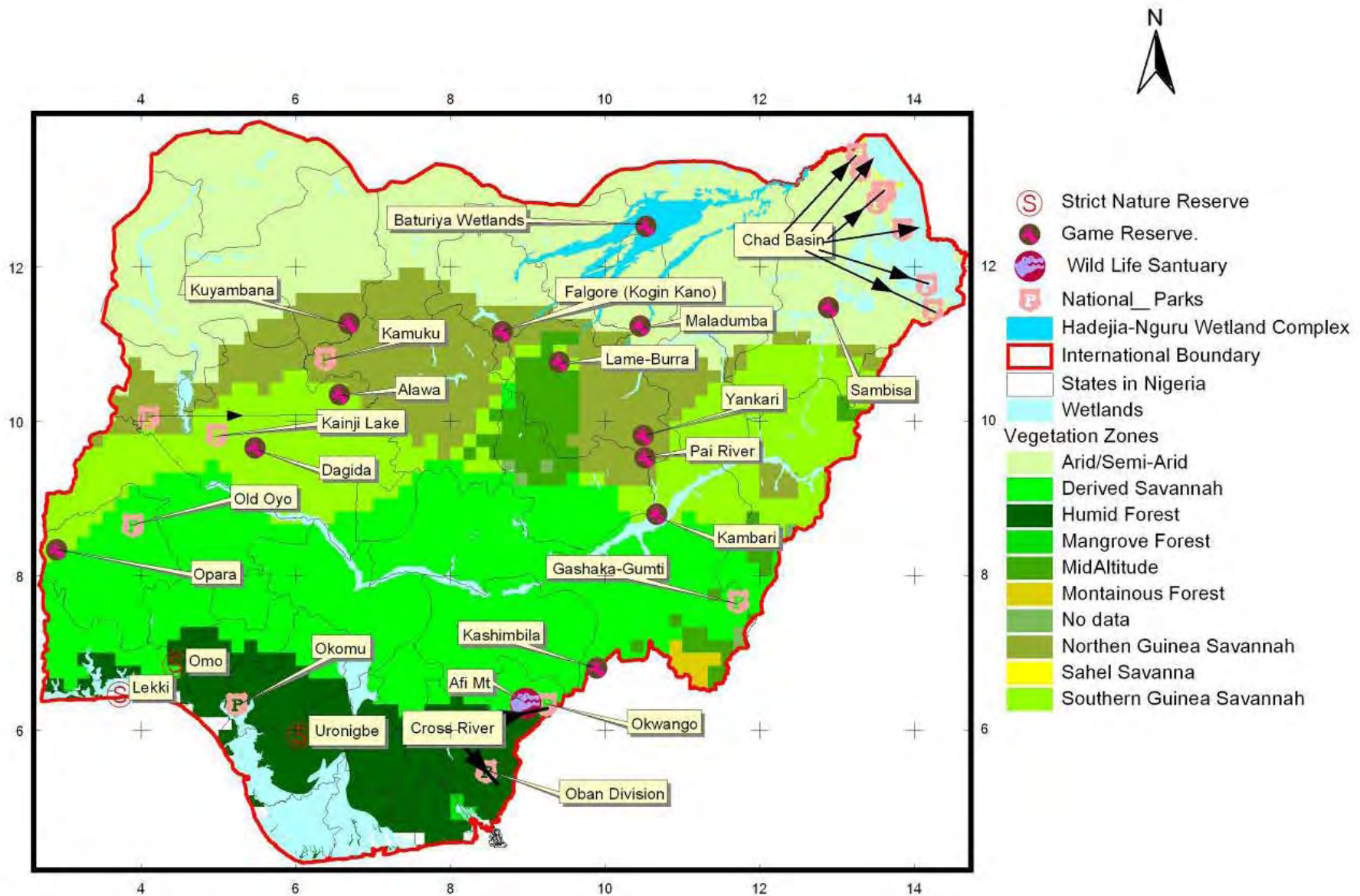
Another protected area in Bauchi State, Lame-Burra Game Reserve is similar in acreage to Yankari and was once home to large herds of elephants, giraffes, and other savanna species. Recent reports, however, indicate that the masses of wildlife are now gone, and the area is in further decline. In Bauchi State, anyway, state ownership of land, under the Land Act, may run counter to effective management of national resources, such as the last large elephant herds in the country that still call Yankari home.

Gashaka-Gumti National Park is the largest national park in size and is adjacent to Tchabal Mbabo National Park in Cameroon, forming a significant transboundary protected area known for the great diversity of its primates, amphibians, butterflies, and plant species. Cross River National Park a bit further south also protects a biodiverse set of species and ecosystems in its two sections, the Oban section and the Okwangwo section. The Okwangwo section is also one of the last remaining places to have populations of the critically endangered Cross River gorillas (*Gorilla gorilla diehli*), a subspecies distinct from its lowland and mountain gorilla cousins in other parts of Africa.

The Chad Basin National Park contains portions of the globally recognized Hadejia-Nguru wetlands. In areas along the shrinking Lake Chad, a few elephants and ostriches continue to roam. Kainji Lake National Park contains viewable large wildlife in the areas surrounding a man-made lake. Kamuku, Old Oyo, and Okomu national parks contain valuable savannas and forest habitats as well.

The International Union for Conservation of Nature (IUCN) World Database on Protected Areas (<http://www.unep-wcmc.org/wdpa/>) lists 25 game reserves in Nigeria, and these are under the varying control of a number of different states. It is widely known that many of them have lost significant numbers of wildlife over the years, driving some species to extirpation.

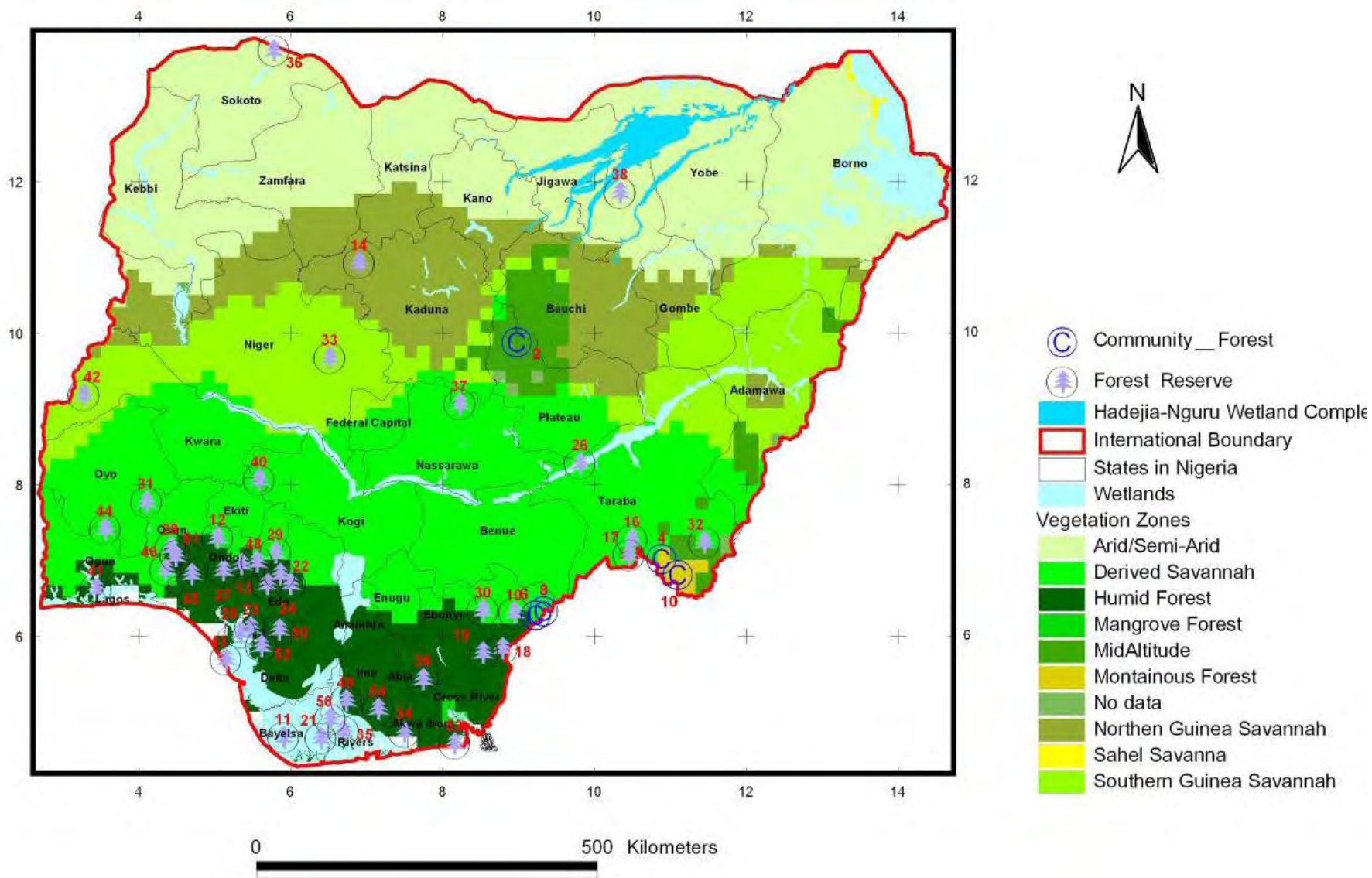
Map IV-1 shows the locations of all the national parks and the most significant of the game reserves. The Strict Nature Reserves and Afi Mountain Wildlife Sanctuary have significant protective measures in place and are also shown on Map IV-1.



Map IV-I: National parks, game reserves, and similar protected areas in Nigeria. (Prepared by the Nigerian Conservation Foundation, June 2008)

Forest Reserves

Nearly 1,000 forest reserves are included in the IUCN World Database on Protected Areas, but many of these have no forests left, and most are highly degraded due to unsustainable extraction of timber, fuelwood, economically important plants, bushmeat, and other resources. Few have any enforcement controls in place at all, and exist merely on paper. It is beyond the scope of this project to evaluate the present status of all of these reserves but those that are thought to still contain significant natural resources are listed on Map IV-2.



Map IV-2: Forest reserves and community reserves

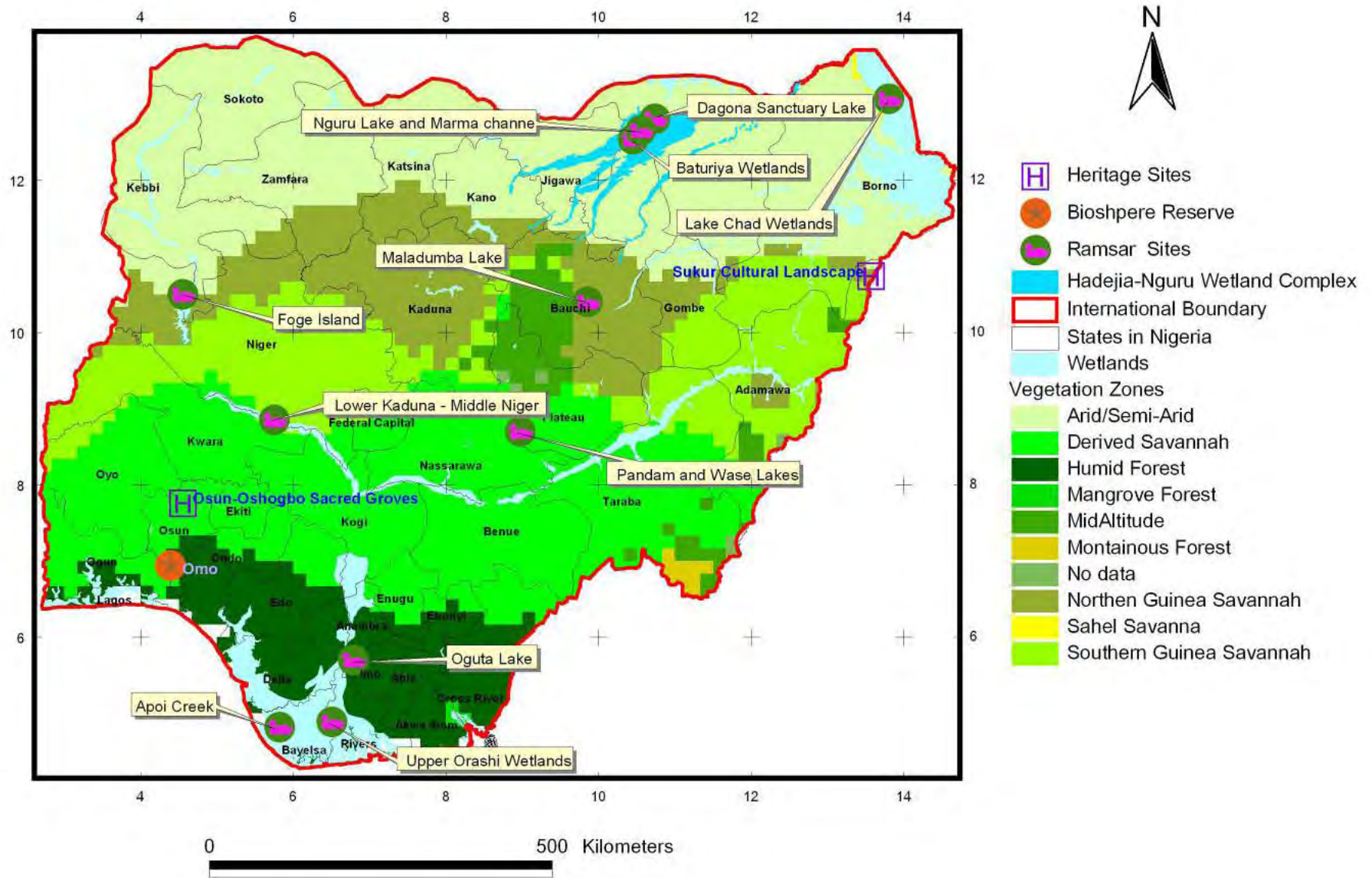
Key to Forest Reserves and Community Forests Shown on Map IV-2

Community Forests	18	Cross River North	38	Minna
2 Amurum Woodlands	19	Cross River South	39	Obot-Ndom
3 Andoni	20	Donga River	40	Ogbe
4 Buru Forests	21	Edumanom	41	Ogun River
5 Damper Sanctuary	22	Ehor	42	Okuta
6 Mbe Mountains	23	Ekenwan	43	Olague
7 Nun River	24	Ekiadolor	44	Olokemeji
8 Obudu Plateau	25	Gele-Gele	45	Oluwa
9 Finima Nature Park	26	Ibi	46	Omo
10 Afrobe/Akwabe	27	Idanre	47	Owan
	28	Ife	48	Owo
Forest Reserves	29	Ifon	49	Sombrero
10 Afi River	30	Ikirigon	50	Sapoba
11 Apoi Creek	31	Oba Hills	51	Shasha
12 Akure	32	Kurmin Danko	52	Stubbs Creek
13 Akure-Ofosu	33	Lizai	53	Ukpe-Sobo
14 Akwazanta	34	Lower Imo	54	Upper Imo River
16 Baissa	35	Lower Orashi River	55	Upper Ogun River
17 Bisaula	36	Mada River North	56	Upper Orashi River
	37	Mada River South		

Sites with Global Recognition

Nigeria designated its first Ramsar site, a wetland of international importance, in 2000: the Nguru/Marma Channel in the Hadejia-Nguru wetlands in the arid north. Surrounded by parched desert, this wetland provides water and food resources to many people in the area and serves as a refuge for native birds and a wintering ground for Eurasian migrants. In spring of 2008, 10 more Ramsar sites were listed in Nigeria. It is still too early to say how much protection this designation will afford them. These sites are shown on map IV-3.

Also on Map IV-3 are other sites that have received international recognition under different conventions. Omo Strict Nature Reserve in southwest Nigeria is accorded the status of a UNESCO Man and the Biosphere Reserve. Two sites are recognized as World Heritage sites, the [Osun-Osogbo Sacred Grove](#) and the Sukur Cultural Landscape. No information is available on the status of either one.



Map IV-3: Sites of global importance in Nigeria (Prepared by the Nigerian Conservation Foundation, June 2008)

Local Areas

In some of Nigeria's southern states, the phenomenon of "evil or sacred forests" that are revered or avoided for religious reasons has completely disappeared. Until a few decades ago, such forests remained pristine and harbored a wide array of flora and fauna, including numerous creeping reptiles, insects, rodents, butterflies, small animals, and birds. With the advent of Christianity, people rejected the so-called evil or sacred attributes of these sites, as they became mission schools, hospitals, or churches. This encroachment has been exacerbated by the needs of rapidly rising population for agricultural land for food production, the establishment of settlements and the provision of various types of infrastructure and most of these areas have lost protection.

SECTION V: BIODIVERSITY AND FORESTRY LEGISLATION



A plaque commemorates the establishment of the first Ramsar Wetlands of International Importance in Nigeria. (Photo by Pat Foster-Turley)

Concern for the conservation of natural resources in Nigeria pre-dates the emergence of Nigeria as an independent nation and has carried through various permutations to the present. Nigeria now has a number of agencies and various policy frameworks for biodiversity, forests, and other biological resources at all levels of government. Nigeria participates in many international treaties and enacts relevant national, state, and local policies and legislation.

The judiciary at the federal, state and local levels generally provides legal backing to the work of the public agencies that propose specific policies and/or legislations for the protection and conservation of biodiversity. Various nongovernmental institutions, donors, and specialists work with Nigerian conservation officials on all levels as well.

The country has a relatively sound institutional framework for implementing policies and enforcing laws that relate to biodiversity conservation. However, the personnel operating the extant institutional structure need training and retraining to attain enhanced efficiency in the performance of their duties.

International Conventions

Many environmental problems have a global basis that international treaties are designed to address. Like most countries, Nigeria has signed and ratified many of the major biodiversity, environment and natural resources conventions that foster the conservation and better management of forests, wildlife and biodiversity resources. Effective natural resources management in Nigeria also hinges on large scale environmental issues including climate change, desertification, persistent organic pollutants and others. A list of major biodiversity-related treaties that Nigeria is a party to appears in Table V-1.

TABLE V-1: INTERNATIONAL TREATIES TO WHICH NIGERIA IS A SIGNATORY

	Signature	Ratification	Depository	Website
Convention concerning the Protection of the World Cultural and Natural Heritage	16/11/72	1974	UNESCO, Paris	http://www.waado.org/environment/Environmental Treaties/Nig Environmental Treaties
Convention on International Trade on Endangered Species of Wild Fauna and Flora (CITES), 1973	11/2/74	09/05/74	Swiss Ministry of Foreign Affairs, Berne	http://www.cites.org/eng/disc/parties/
Convention on the conservation of migratory species of Wild Animals 1979 Bonn Convention, 1979	1987	-	Foreign Office of the Federal Republic of Germany	
Convention on the Law of the sea, 1982	10/12/82	1986		
Vienna Convention on the Protection of the Ozone Layer 1985	-	1988	UN Office of Legal Affairs, New York	
Montreal Protocol on Substances that Deplete the Ozone Layer	-	1988		http://ozone.unep-org/Ratification_status/
Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal, 1989	15/3/90	13/3/91	Secretary General of the UN	http://www.nasel.int/ratification
United Nations Framework Convention on Climate Change, (UNFCCC) 1992	13/6/92	29/08/94		http://unfccc.int/files/essential_background/convention/status_of_ratification/application/pdf/unfccc_conv_rat_pdf .
Convention on Biological Diversity, 1992	13/06/92	29/08/94	29/08/94	www.cbd.int/convention/parties/list.shtml
United Nations Convention to Combat Desertification (UNCCD), 1994	1995	08/07/97	08/07/94	www.unccd.int/convention/ratification.pdf
African Convention for the Conservation of Nature and Natural Resources, 1968	15/09/68	02/04/74	OAU Addis Ababa	www.africa-union.org/root/AU/Documents/Treaties/List/Africa Convention on nature and natural resources.pdf
Ramsar Convention on the Conservation of Wetlands of International Importance Especially as Water Fowl Habitat, 1971	Accession 2/10/00	2005	UNESCO	Ramsar Convention http://erc.unesco.org/cp/convention.asp

	Signature	Ratification	Depository	Website
The Stockholm Convention on Persistent Organic Pollutants, 2001	23/05/01	24/05/04		http://www.pops.int/documents/signature/signstatus.htm
The Cartagena Protocol on Biosafety	24/05/00	30/11/02		-

Nigeria's range of participation in biodiversity-related international treaties shows a mix of strong successes, inaction, and notable failures. On the positive side, Nigeria's involvement in the Ramsar Wetlands treaty has led to an inventory of Nigeria's wetlands, the establishment of a national committee on wetlands issues, and a management plan for the Nguru/Marma Channel: the first designated Ramsar site in Nigeria (FGN 2006a). In March 2008, the Nigeria portion of Lake Chad was added as another Ramsar site (http://www.ramsar.org/wn/w.n.nigeria_lakechad.htm), and nine more sites became official on April 30, 2008 (http://www.ramsar.org/wn/w.n.nigeria_nine.htm).

Nigeria's involvement in the Convention on Biological Diversity has also helped galvanize the country into conservation action. In compliance with the terms of this convention, Nigeria has continued to participate in the Conference of the Parties, produced its "Country Study Report" on biodiversity, developed a national Biodiversity Strategy and Action Plan in 1997 and revised this report to include more stakeholders participation (FGN 2006b).

Nigeria, as a country facing desertification due to both climate change and anthropogenic causes, also participates actively in the international conventions on climate change and desertification. A Climate Change Unit and focal point in the Ministry of Environment addresses these issues, nationwide awareness-raising activities have been initiated, and efforts are in progress to articulate a climate change policy. Similarly, a drought and desertification policy has been articulated to further Nigeria's National Action Programme for Combating Desertification. The government is also currently collaborating with Nigerian Environmental Study/Action Team (NEST), Ibadan, and two other international NGOs in a 4¹/₂-year project titled "Building Nigeria's Response to Climate Change." Issues related to climate change are also being mainstreamed into Nigeria's overall national planning.

Despite all the progress made so far, anthropogenic activities that deplete the ozone layer, and those that exacerbate the incidence of persistent organic pollutants, occur regularly. They include gas flaring, the importation of refrigerants that are not CFC-free, as well as the importation of used and unserviceable vehicles from western Europe and the United States, which emit greenhouse gases in the course of their operation. These activities have implications for climate change and for the health of Nigeria's ecosystem. Furthermore, the drive towards food security sometimes conflicts with the need to enforce rules and regulations on the use of pesticides and other pollutants.

With regard to the United Nations Framework Convention on Climate Change, Nigeria has not to date satisfactorily ascertained its level of greenhouse gas emissions from all sectors, nor has it fully identified mitigation options to reduce greenhouse gas emissions,

all of which are required under the convention. Currently, the Nigerian government has instructed all oil and gas producing companies in Nigeria that gas flaring will not be allowed beyond 2008. A rule is also in place disallowing the importation of used automobiles older than eight years.

Since 2008, in another major breach of international conventions, Nigeria has been suspended from the Convention on International Trade on Endangered Species of Wild Fauna and Flora (CITES). For a number of years prior to this suspension, the Kano Airport was known to be an illegal shipping point for endangered species, including parrots, chimpanzees, and even an infamous group of young gorillas (known as the “Taiping Four” after their shipping destination in Malaysia). Nigeria is currently putting in place mechanisms for compliance with CITES rules and procedures before readmission into the convention.

National Agencies and Policies

The transition of the Federal Environmental Protection Agency (FEPA) into a full-fledged Ministry of the Environment in 1999 was a recognition that “environment” should assume a ministerial status if the nation’s rich diversity of natural resources were to be managed and conserved judiciously.

Today, the Federal Ministry of Environment, Housing, and Urban Development (FMEHUD) and its associated departments are the national reference point for all matters related to the environment. The departments most relevant to the conservation of biological resources are Environmental Assessment, Desertification Control, Forestry (encompassing biodiversity), Pollution Control and Environmental Health, Erosion, Flood Control and Coastal Zone Management, National Parks Service, and the Forest Research Institute of Nigeria. Although not a full department, a special Climate Change Unit has also been created and put under the charge of the Minister for Environment.

Efforts are now underway by FMEHUD to set up a new biodiversity agency and to articulate the National Forestry Act, which will need to receive the approval of both the National Council on Environment and the Federal Executive Council before presentation to the National Assembly to enact it into law.

Other related ministries and agencies share some cross-cutting issues with FMEHUD, including the Ministry of Agriculture, Water Resources, and Rural Development; the National Planning Commission (which has responsibility to ensure the mainstreaming of environment and conservation issues into the National Economic Empowerment and Development Strategy); the State Economic Empowerment and Development Strategy; the National Council on the Environment; the Energy Commission of Nigeria; and various research institutes.

Overarching all these ministries and departments are the executive, legislative and judicial arms of government at the different levels. Though professionally qualified, the personnel that run the institutional framework for the achievement of national

conservation goals require more training and improved tools to effectively perform the duties assigned them.

Generally, Nigeria has a sound structure in place for implementing national conservation policies. This structure is made up of institutions making decisions and taking action on a diversity of cross-cutting issues related to the environment. All of them pursue the major goals of the National Policy on Environment. The system manifests a good measure of resilience because its operators have shown capacity to withstand constant changes that separate and merge ministries and their departments from one administration to the other.

State Policies and Enforcement

In order to ensure effective presence at the state level, the Federal Ministry of Environment has an office in each of the 36 states of the Federation. Each office is headed by a senior personnel designated as controller of environment. A controller liaisons closely with the headquarters of the ministry in Abuja regarding developments in the environmental sector in the state of his posting. These may include alerts on natural disasters, environmental pollution, contravention of EIA guidelines, etc.

In addition, with the creation of a Federal Ministry of Environment which absorbed FEPA into its structure, the states have responded by creating their own ministries of environment. These ministries have responsibility to ensure that state laws and regulations on the environment are adhered to.

At the state level, relevant institutions exist for the enforcement or implementation of environmental polices. There are state ministries of environment, related ministries, and parastatal organizations. An integral part of the procedures adopted by state governments is to amend (or repeal where necessary) laws inherited from the colonial administration or edicts promulgated by military dictatorships.

Many state laws on biodiversity and forestry are not enforced by the judiciary (customary and Sharia court judges, magistrates, state high courts, federal appeals courts, and the Supreme Court). They appear unrealistic since it is difficult to prevent a poverty-ridden family that owns one or two trees from felling such trees, either to sell them as firewood or to a timber merchant to perhaps break the vicious cycle of poverty. Also, in the absence of environment-friendly methods (other than composting) for reducing biomass in a plot proposed for farming, the traditional alternative is to set fire to the bush, thereby saving labor and time. The challenges of poverty are a serious constraint to the implementation or enforcement of some environmental laws, policies, and regulations. Proper local awareness campaigns need to be put in place and popularized in order to make farmers buy into the various forest regulations.

Local Level

Local government councils (LGCs) numbering 774 represent the third tier of governance in Nigeria. They were created to bring government much closer to the grassroots population in order to engender a sense of belonging in them.

The LGCs do not enact laws but can make rules and regulations that relate to natural resource conservation, provided such regulations do not run counter to those of the state and federal governments. They are equally required to ensure that laws that derive from the two upper levels of government are not compromised in their areas of jurisdiction.

Through principally the supervisory councilor for agriculture, the local government council has responsibility for enforcing all regulations that touch on forest, wildlife, and biodiversity conservation. The greatest handicap of the local council system is the dearth of technically qualified and professionally motivated manpower that can comprehend and implement the scope of responsibilities this entails.

In some instances, therefore, the local government system is promoting agriculture and forestry through seedling and fertilizer distribution. Many Nigerians, however, see local government as a weak institution, unable to deliver on their mandates. Local government is, therefore, perceived as a cog in the wheel of progress, a seemingly redundant institution, promising much in terms of the Report of the Presidential Committee on the Review of the 1999 Constitution, Fourth Schedule, Part 1, 2001, but accomplishing little or nothing in real terms.

Another layer of community governance also exists beneath the LGCs. Most rural communities have traditional or cultural governance outfits composed of elected indigenes of the community in question, including village elders, chiefs, and traditional heads who exercise control over the local population. Though not provided for in Nigeria's constitution as beneficiaries from the Federation Account, they nevertheless serve to resolve issues within their respective communities. In some cases, strong citizen involvement at this community level and cooperation among neighboring communities has been an effective way to manage nearby forests, plants, and wildlife resources.

Intertwining Functions and Responsibilities

With all the layers of government involved in conserving and managing Nigeria's forests and biodiversity, there are bound to be some overlaps, divergent policies, and enforcement issues. Conflicts abound between all tiers of government from communities on up, too many to be detailed here.

On the surface, though, there is hardly any serious conflict between the Federal Government of Nigeria (FGN) and state institutions in the management and conservation of biological diversity, wildlife, and forestry. One reason for the apparent harmony is the habit each level has of keeping to its duly assigned duties or functions in the context of the exclusive and concurrent legislative lists, enshrined in Chapter 2, Article 28 of the Nigerian constitution. Furthermore, in view of the huge financial muscle of the FGN, many states consider it wise to pursue policies and legislations that will not incur the displeasure of, and marginalization by, the FGN in its allocation of state resources.

However, the Land Use Decree vests all land within a state in the governor of that state. In other words, the federal government does not have land in the states, if not offered by

the state government, and may not establish forest estates on land proposed for another activity by the state. This causes difficulties for some national policies (such as FGN-proposed forest estates in different parts of the country) and in the designation and management of national parks. One former national park, Yankari, a keystone of the federal national park system, for instance, is now under state management, and some say Bauchi State's protection of species and habitats is weakening in favor of increased tourism dollars with a high speed roadway, big new hotels, and sport facilities in the core of the protected area.

In another potential conflict between state and federal policies, the Ministry of Agriculture, Water Resources, and Rural Development pursues a policy of promoting agricultural productivity through effective use of available land and water resources. In this regard, sometimes, at both the federal and state levels, certain elements of the agricultural policy appear to conflict with those of the Department of Forestry. For example, the Nigeria Agricultural Land Development Agency — which came online in 1992 for the purpose of mobilizing resources for accelerated production of food and fiber — engaged in massive deforestation of hitherto forested lands to the detriment of biological diversity. Thus, conflicts may not always be between levels of government but also may be inter-ministerial or inter-departmental.

SECTION VI: PRIMARY THREATS TO BIODIVERSITY AND TROPICAL FORESTS

Threats to biodiversity and tropical forests in Nigeria are similar to those in many developing countries where many people are poor, relying in large part upon natural resources for their subsistence, resources that are harvested unsustainably. In Nigeria, already the most populous country in Africa and still growing, this problem is exacerbated.

More than 70 percent of Nigerians live in rural areas where they depend upon agriculture and other natural resources for their survival (FEPA 1992). This growing rural population puts

increasing demands upon the natural habitats and plant and animal species of Nigeria,

which decrease in extent and numbers as the human population increases. Without strong environmental controls, industrial and urban wastes also add to overall degradation of air, water, and land with resultant effects on biodiversity. Continued over-extraction of natural resources, like timber and economically important forest plants also take their toll on forests in Nigeria.

In addition, every aspect of change in the overall natural and economic environment of Nigeria ultimately affects biodiversity, and in most cases, tropical forests as well. For instance, when climate change speeds desertification south, the biodiversity in these areas also changes. Cattle grazers cover more ground, and farmers require more irrigation. When more and more dams are built — impeding rivers — and more and more water is extracted for industry and agriculture and cities, this affects biodiversity too. Unrestricted use of hazardous pesticides, overuse of fertilizers, increased erosion and siltation, all are factors harming Nigeria's biodiversity. Increased food and fuel prices drive more people to extract more resources from the forests. Unregulated emissions from factories pollute the air and waterways, and this drives some fragile species towards extinction. There are many — too many — overall environmental threats in Nigeria to fully cover them in this assessment.



Bushmeat (grass cutter rat, *Thronomys* spp.) for sale on the side of the road in Benue State. (Photo by Pat Foster-Turley)

The direct threats to biodiversity and ecosystems in Nigeria, however, can be grouped into two on-the-ground conservation categories: habitat degradation and unsustainable use. In addition, two other administrative categories greatly add to the threats: institutional and management issues and lack of information at all levels. These threats are discussed below.

Habitat Degradation

Habitat degradation is visible in all terrestrial and aquatic habitats throughout Nigeria. In terrestrial habitats, a major degradation factor is conversion of natural habitats to agricultural uses. In two decades, from the 1976 to 1995, agricultural lands increased from 53.8 percent to 60.8 percent of the total land area (Geomatics 1997), with a concomitant loss of natural habitats like savannas and forests. Since then, this trend towards further agricultural land conversion is continuing, to the detriment of the natural habitats and the species within them that still remain.

Conversion to agriculture is occurring in many protected areas, in community-owned land, and in state-managed forests without serious control. Rainforest and savanna woodlands areas are most under threat from agricultural conversion. Communities in and around protected areas continue to clear land and grow crops further into the natural zones despite protective measures on paper. Until more sustainable agricultural practices are put in place, the process of slash-and-burn



A Fulani cattle herder poses in front of his herd in central Nigeria. (Photo by Pat Foster-Turley)

agriculture continues since tropical soils under cultivation can only support crops for a couple of years before being depleted, requiring new lands for continued harvests. Mangroves are also heavily harvested as fuelwood and for construction material. Although mangrove soil is not conducive to agriculture, if and when shrimp farming takes off in Nigeria, no doubt these forests also will be under threat of conversion.

Degradation of habitats and loss of species is not always as visible as out-and-out conversion, but it occurs in other more insidious ways with equally damaging results. In areas where particular species — such as hardwood trees, rattans, medicinal and food plants, and other non-timber forest products — are harvested unsustainably, not only are these species lost but also a myriad of associated plants are also lost, such as insects, fungi, etc., that require these specific hosts to meet their own ecological requirements for survival. The tree-fall gaps in logged areas also lead to the establishment of secondary growth that often cannot fully replicate the old growth that was lost. There is also the case of genetic erosion, i.e., when the largest, straightest, most vigorous trees are selectively logged, leaving the puny behind to reproduce or when only particular strains

of crop races are cultivated while others disappear. Cattle-grazing in protected areas also takes its toll.

Aquatic degradation is often less visible but no less harmful to the species that depend on this environment. Many aquatic species have very particular requirements in water quality, flow, and seasonality, all factors that are undergoing anthropogenically induced changes in Nigeria. Pollution from urban centers, industrial areas, and mining and agricultural runoffs are impacting the water quality and harming species in rivers and streams throughout the country. Over-clearing of land leads to erosion and siltation of rivers, streams, and other water bodies, which also reduces the diversity/number of fish and other aquatic species. Damming and diversion of waterways also blocks migratory routes of fish and other species and stems the flow of necessary nutrients and silt to the estuaries and deltas of the country, thus leading to lowered productivity and loss of land in these areas.

Finally, in both terrestrial and aquatic habitats, the introduction of exotic species has been a factor in habitat degradation. Although nonnative animals cause problems worldwide, in Nigeria invasive plants that have taken over once-productive and diverse habitats are of greater concern. In coastal areas of Nigeria, exotic nipa palm (*Nypa fruticans*) was introduced from southeast Asia in the early 1900s for erosion control. Since that time, nipa palm has proliferated and out-competed native mangroves. Mangroves have an extensive root structure that creates sheltered habitats for many species of fish, mollusks, and crustaceans, and the fallen leaves continually replenish the soil. In areas where mangroves have been replaced by nipa palms, these nurturing features are lost to the ecosystem.

A parallel situation is developing in arid northern Nigeria with the spread of invasive cattails (*Typha* spp.) throughout the wetlands of Hadejia-Nguru and other streams and irrigation canals. Although cattail species (known locally as “Typha grass”) are found around the world, it is only in the past decade that they have become an overriding environmental nuisance in Nigeria. Changes in water management regimes, new dams, and irrigation projects — combined with water level fluctuations due to drought — have provided perfect growing conditions for this invasive species. When *Typha* grass proliferates, nothing else can grow. The shorelines of the water bodies are nearly impassible to wading breeding and migratory shorebirds, native plants are crowded out, and biodiversity of all types is modified. Not only does biodiversity suffer, but cattail-infested areas are also difficult for cattle to access. Rice does not grow easily in them, and the many people who have always made their living in these marginal areas find it harder to catch fish in them.

Although the examples above are all plants, introduced animals can also be a problem. Governmental attempts to stock lakes and reservoirs with fish often do not consider whether these fish are native or not. In many places in the world, such non-native species have totally crowded out native species to the point of extinction.

Unsustainable Use

In Nigeria, unsustainable use of biodiversity and forest products is the norm. Most people in rural areas depend in part on extraction of resources from the wild. As population increases, extraction increases until there are no resources left to harvest. Even more troubling is the widespread over-extraction of forest products purely for profit.

Nigeria's tropical forests are particularly hard hit. According to the United Nations Food and Agricultural Agency, Nigeria has the highest deforestation rate in the world (FAO 2005). Between 2000 and 2005, Nigeria lost 55.7 percent of its primary forests due to logging, agricultural expansion, and fuelwood collection. One only needs to look at the timber market in Calabar — the port of shipping for tropical hardwoods from southern forests — to get an idea of the magnitude of this problem. Although forestry officials have rules that must be followed by large-scale timber extractors, it is difficult to assess if indeed, they are followed. On a more local level, it is difficult to drive along any road near forests in Nigeria — protected or not — without seeing stacks of fuelwood for sale.

Unsustainable use of other plant species in addition to timber is also a problem in Nigeria. Certain non-timber forest products — such as rattans (for making furniture), *Prunus* (a cure for prostate cancer), and other medicinal plants — are all being overharvested due to market demand. Even the vegetable delicacy *afang* (*Gnetum* spp.), a component in many Nigerian soups, must now be imported from Cameroon. Many non-timber forest products are harvested using unsustainable techniques — like uprooting them, peeling off all the bark, or cutting down a tree to get the rattan vine — when more sustainable techniques would be possible.

Another problem in unsustainable use in Nigeria is the hunting of animals, both by locals who either eat or sell the protein to others as an income generator or by large-scale poachers who act purely for profit. In many villages, any species is suitable game, although in many areas conservation-awareness efforts seem to be extending some protection to gorillas, chimpanzees, and smaller primates. In most cases, this awareness comes too late, as the animals have already disappeared.

Poaching of larger animals is still a problem in Nigeria, and feeble enforcement teams in most protected areas can do little to halt it. Reports of elephant poaching are still heard today, and elephant ivory is still for sale in the village shops on the grounds of the Abuja Hilton Hotel, despite the obvious international and national illegality of this material. The trade in endangered species is also said to be quite high in Nigeria, especially trade to foreigners of animals like baby chimps and parrots as pets. Because of continued evidence of these sorts of transactions throughout Nigeria, it is presently under sanctions from CITES, the international wildlife trade agreement.

Institutional and Management Threats

Legislation: Laws on biodiversity conservation do not enjoy the same priority as laws on revenue derivation and allocation, financial crimes, corruption, drug abuse, and the

electoral system, to name a few on the front burner. In the last five years for example, the country registered no laws on biodiversity conservation or related matters.

One of the most effectively enforced laws on biodiversity conservation, the National Parks Services Decree, dates to the time of military dictatorships, when laws were passed by fiat, sometimes at the insistence of civil servants who controlled various arms of government. The same is true of the Environmental Impact Assessment Decree of 1992.

The present democratic regimes are much slower and more lethargic about laws that facilitate the conservatism of biodiversity. The fairly comprehensive Draft National Forestry Act, put together in 2001, is yet to go through the processes of becoming a law. This act is designed to provide for the conservation and sustainable management of the nation's forests, wildlife resources, and rich biodiversity and to conform to international processes and initiatives on global forests and environment. However, it is still working its way through the mill.

Recently, however, a bill to establish an agency to handle all ecological issues in Nigeria was debated in the Senate (Ojeifo 2008). Among other things, the bill provides for a yearly compilation for the president of a comprehensive report on the status of ecological problems of the country, to cover issues like gully and coastal erosion, land degradation, flooding, drought, and desertification. In addition, a public hearing on a bill to establish the National Climate Change Commission was held on May 15, 2008. Hopefully, recent activities like these illustrate increasing environmental concern by the present government.

Enforcement: No matter what laws and policies are on the books about biodiversity and natural resource conservation, Nigeria still has major difficulties in enforcing them. The laws are unknown to most, there are few trained and qualified people in the field to enforce them, and oversight at all levels is sorely lacking, making way for “entrepreneurial opportunities” to make money throughout the system.

In most cases, immediate needs come foremost and rules in place from higher up are disregarded. Traditional management systems that worked well under less human population pressure are breaking down too in many places. Community forests are no longer inexhaustible sources that can be endlessly tapped. Where once it made sense, in a time of plenty, for any individual to clear a patch of community forest and plant crops there and own the land individually, now this practice is leading to the loss of major forest areas with resources that were once the entire community's assets.

Lack of Available Information

Finally, in order to effectively manage natural resources, there must be accurate data on the distribution and abundance of the resources involved, the amount harvested from year to year, the ecological parameters of sustainability for each, and other relevant factors. In Nigeria, such information is often lacking, or if it does exist, it is impossible to locate. During the course of putting together this report, the author found data unavailable or nonexistent from the highest levels of the government on down. For instance, there

appears to be no data on the real extent of protected areas, the existence of actual forests within any of the thousand or so forest reserves, and the species still contained within them. Even visiting the various government agencies in Abuja and in a few of the states, this author was able to locate few documents with viable information that could be disseminated. In a number of cases, the government officials asked the team for information that we expected to get from them.

The Internet is a tool that could be used more widely to enhance knowledge and understanding about the biological resources of Nigeria. Some seminal documents are already posted, but others that form the cornerstone of ecological work in this country — like the 1991 NEST report on the “State of the Environment” — are now basically gone. Few hard copies exist, and there is no electronic version for all to refer to.

The lack of information may be the most severe threat, all in all, to the biodiversity and tropical forests of Nigeria. With no knowledge of what laws exist, no real understanding of what these resources are, and no clear idea of where these resources are headed, there is no way to manage them effectively.

SECTION VI: ORGANIZATIONS INVOLVED IN CONSERVATION EFFORTS



Villagers outside Yankari State Game Reserve greet the biodiversity assessment team. (Photo by Pat Foster-Turley)

Efforts to conserve Nigeria's biodiversity and tropical forests are undertaken by a number of NGOs and government agencies, often with donor support. However, this subset of the environmental sector receives less attention from donors than natural resources areas related to water quality, pesticides, soil erosion, and other matters beyond the scope of this report. Far more donor resources spent in Nigeria address the monumental issues of health, education, poverty, and democracy than any natural resources needs. Given this non-focus, most biodiversity-directed programs in Nigeria are under-funded and lack sufficient resources in trained manpower, information, and modern equipment to be very effective at addressing the major threats that are escalating daily.

Donors

Donors in Nigeria follow the Nigerian governmental priorities, especially those outlined in the 2004 [National Economic Empowerment and Development Strategy](#), and unfortunately, the environment is not one of the highlighted focal areas. The Canadian International Development Agency (CIDA) is the single donor in Nigeria with a stated environmental mandate. Most of its support goes to capacity-building and policy efforts of federal and state governments in the natural-resources sector. CIDA is also pioneering a model forests concept for Cross River State. The United Kingdom's Department for International Development (DFID) has also supported community work around protected areas in Cross River State. Previously, more donors were involved in similar efforts here.

However, now that USAID's SPACE program has ended, many gaps in this work remain that no donor has yet stepped in to fill.

Other donors manage to squeeze in biodiversity or forest conservation activities under a broader mandate. For instance, the World Bank, through its Global Environment Facility "Local Empowerment and Environmental Management Project," is working with the Department of National Parks and Bauchi State in Nigeria to develop capacity for protected area management components (among other activities). Similarly, DFID has a large water-quality program, which has some biodiversity ramifications but no biodiversity focus.

Some regional activities supported by donor agencies also have components in Nigeria. For instance, the United Nations Environment Programme (UNEP) through the Global Environment Facility (GEF) is funding the Wings over Wetlands program, a joint program with Wetlands International, Birdlife International, the Ramsar Convention, and other groups to conserve African-Eurasian migratory birds. Efforts under this program include invasive species control, community participation, and alternative livelihoods work in the Hadejia-Nguru wetlands. UNEP's support for the development of country strategies required under the Convention for Biological Diversity has also aided Nigeria. The United Nations' Food and Agriculture Organization also has program elements aimed at poverty alleviation that may divert communities from unsustainable resource extraction in environmentally sensitive areas.

A variety of nongovernmental foundations increasingly play a larger role than government donors in supporting biodiversity and forest-related conservation activities. Some of these foundations are the nonprofit and public relations arms of various industrial giants, such as multinational oil companies. Other private foundations in the United States and Europe also play a role in supporting conservation activities in Nigeria. The U.S.-based Ford and MacArthur foundations are visible in providing NGO support in various conservation activities throughout Nigeria. Various zoological parks around the world support the species-specific work of Cercopithecus and Pan troglodytes and some other initiatives as well. With non-profit status and overseas publicity, various NGOs in Nigeria also are able to accept individual donations and memberships that help support their work.

Nongovernmental Organizations

Despite the relative lack of donor contributions in the biodiversity and forestry sectors in Nigeria, a wealth of NGOs are working in this sector. An early player in this field is the Nigerian Field Society, established in 1930, and known for the publication of the *Nigerian Field Journal* twice yearly ever since. In 1980, the Nigerian Conservation Foundation was formed and has grown — through partnerships with the World Wildlife Fund and Birdlife International — into Nigeria's strongest and most active conservation NGO. A number of other NGOs have also proliferated throughout Nigeria. Various international NGOs, including Wetlands International, the Wildlife Conservation Society, and others also have ongoing programs in the country. Many other smaller local and regional NGOs have also proliferated around the country. Activities of these NGOs range

from environmental education to community development work to species and habitat-focused programs, and most involve a myriad of stakeholders and partners.

The roles of these organizations enhance public understanding of current environmental issues. They also enhance the capacity of legislators to design appropriate pro-conservation policies and legislations (where necessary). For example, some NGOs advised against the creation of a Desertification Commission (like the Niger Delta Development Commission), which if it had gone through could have undermined the integrity of the Federal Ministry of Environment and might have politicized environmental management in the country. The process was halted at the committee level of the National Assembly. Thus, NGO and civil society actors help sharpen both policy and legislative instruments for natural resource conservation.

Many of the major NGOs working in areas related to biodiversity or tropical forests are listed in Table VI-1. Most of these organizations maintain Web sites, and the links provided in the table will lead to further information about each of them. Together, these NGOs have a major civil society role that may well turn out to be the most effective mechanism to ensure the sustainability of wildlife and ecological resources in Nigeria.

TABLE VI-1: SELECT NGOS WORKING IN BIODIVERSITY CONSERVATION IN NIGERIA

Organization	Web Site/Contact	Description	Location	Comments
A.P. Leventis	http://www.aplori.org/mainaplori.htm	Biodiversity research and scholarships	Lagos and Jos	A. P. Leventis Ornithological Research Institute (APLORI), Univ. of Jos
Birdlife International-Africa	http://www.birdlife.org/regional/africa/work.html	Important bird areas, bird surveys and training	Cambridge UK global office, Kenya regional office	Partners with NCF in Nigeria
Cercopan	http://www.cercopan.org/	Studies and conserves rare primates by working with communities and ex situ efforts	Calabar	Recently reintroduced some Mona monkeys back into the wild
Development in Nigeria	http://www.aradin.org/	Community conservation action in Cross River State	Calabar and Obudu	Project of African Research Association
Environmental Rights Action (Friends of the Earth)	http://www.eraction.org/	Legal and advocacy role in environmental protection	Lagos, Port Harcourt, and Yenagoa	Legal proceedings against oil companies, introduction of genetically-modified species, etc.
Nigerian Conservation Foundation	http://www.ncfnigeria.org/	Education, mapping, surveys, studies on many biodiversity issues of concern.	Lagos head office, and other offices throughout the country.	Partners with World Wildlife Fund, Birdlife International and other NGOs
Nigerian Environmental Action/Study Team	www.nestinteractive.org	Research and publications on environmental issues	Ibadan	Published landmark 1991 study: "Nigeria's Threatened Environment"
Nigerian Environmental Society	http://nesenviron.org/about.htm	Environmental education and policy work	Lagos main office with 16 branches throughout Nigeria	Environmental "watchdog" for Nigeria, works closely with govt.

Organization	Web Site/Contact	Description	Location	Comments
Nigerian Field Society	http://www.nigerianfield.org/	Offers field trips and education programs	Multiple branches: Lagos, Abeokuta, Abuja, Benin, Ife-Ife	Publishes Nigerian Field twice/year
Pandrillus	http://www.pandrillus.org/	Captive breeding of endangered drills and field conservation efforts	Calabar and Buanchor	Operates Drill Ranch in Cross River State and a sister organization in Cameroon
Savanna Conservation	No website, contact Muyiwa@wwlkad.com	Works to preserve savannas and against desertification	Kaduna	Recently managed Yankari Game Reserve
Wildlife Conservation Society	www.wcs.org	Studies and conservation of rare species and habitats in Nigerian forests	Calabar and New York	Nigerian office has produced many important studies, surveys and reports on Nigerian species

Universities and Technical Centers

Universities also have a role to play in Nigeria's conservation efforts. Faculty members at many Nigerian universities have long been involved in academic studies of wildlife, plants, and other natural resources in various parts of the country. A few of these universities have well-established environmental programs, some with a wildlife and conservation orientation. Notable in this area is the University of Jos; it hosts the A. P. Leventis Ornithological Research Institute, which trains many students in conservation-related fieldwork around the country. The University of Ibadan is another institute of higher learning that has a strong wildlife program with a field component. At the University of Calabar, the Oceanography Institute trains many students in marine biology and environmental education. Other good examples also exist around the country.

A number of specialized institutes exist in Nigeria, and some of these have biodiversity elements within their mandates. The International Institute for Tropical Agriculture (IITA) in Ibadan, for instance, has a large seed bank that stores genetic material from many crop species and engages in research in biodiversity of crop land races. Other plant biodiversity conservation projects are conducted at the Forestry Research Institute of Nigeria in Ibadan (which also does some *in situ* conservation work), the Cocoa Research Institute of Nigeria, the Rubber Research Institute of Nigeria in Benin, the Nigerian Institute for Oil Palm Research, the National Cereals Research Institute in Badagdi, the National Root Crop Research Institute in Umudike, the Institute for Agricultural Research in Samaru, the Institute of Agricultural Research and Training, Moor Plantation in Ibadan, the National Horticultural Research Institute in Ibadan, and the National Centre for Genetic Resources and Biotechnology.

In many other countries, zoological parks and aquariums also house professional institutes that have a biodiversity research and conservation mandate. In Nigeria, however, most zoological parks are poor and lack capacity to reliably keep animals alive, let alone work in the field to study and conserve them.

On paper, Nigeria also has a number of linkage centers in Nigerian institutes and universities that were established in 2001 as part of the activities undertaken in support of the Convention for Biological Diversity. The Linkage Center for Forests, Conservation, and Biodiversity at the University of Agriculture in Abeokuta is designed to focus on coordinating data and research relevant to biodiversity conservation. Other such sites in the country include Linkage Centers for Arid Environments (in Maiduguri), for Freshwater Environments (in Minna), for Highlands/Montane Environments (in Jos), for Delta Environments (in Port Harcourt), and for Marine and Coastal Environments, in conjunction with the Nigerian Institute for Oceanography and Marine Biology (in Lagos). Little information is available, however, on how well these centers have done in fulfilling their mandates.

The Commercial Sector

Nigeria has thriving businesses that exploit natural resources and work in close proximity to communities, where often their operations have strong ramifications on the well-being

of local people. Unfortunately, few of the larger corporations involved have given sufficient attention to their relationship to communities or made substantive positive contributions to society. However, among the many negative examples are a few in which companies and organizations seem to be showing greater concern for people, biodiversity, and the environment.

Oil companies: In Nigeria, multinational companies engaged in the extraction of oil reserves on- and offshore in the Niger Delta region have brought strife, pollution, resource degradation, and a resulting loss of quality of life to many long-term residents of this once-rich natural environment.

The positive contributions that these companies do make are a matter of controversy. Two of the largest oil companies in the region — Shell and [Chevron/Texaco](#) — state on their Web sites that they are actively involved in programs to promote sustainable development and to provide health/education services and other benefits to local people. Shell also provides first-year college scholarships for local youths, and Chevron founded the Biotechnology Center of the Federal University of Technology in Yola. A third multinational oil company, Exxon/Mobil, has recently announced the provision of insecticide-treated mosquito nets as malaria control for local citizens and also provides grants to NGOs Pandrillus and Cercopan in Calabar.

Despite these much-touted efforts, the Niger Delta region remains in turmoil, and the environment is under constant barrage from residues released during oil-flaring, oil spills, and large-scale habitat destruction to allow construction of oil pipes and other infrastructure. In May 2008, Friends of the Earth/Nigeria announced a lawsuit filed in the Netherlands against Shell by four Nigerian plaintiffs from Niger Delta villages for oil-extraction-related damage caused to the environment and reductions in their fishing catches and farming crops.

At this point, any offerings that the oil companies are making to the communities seem to be just drops in the bucket compared to the widespread damage they are doing to the environment, the biodiversity, the tropical forests, and the people in the region.

Cement plant in Cross River National Park: The United Cement Company of Nigeria has constructed a major cement plant on the border of Cross River National Park that will eventually produce 2.5 million tons of cement a year. This facility is on already degraded land, but it will no doubt become worse as the production continues. The impacts on nearby biodiversity are expected to be large. The company is showing signs of “greening” up their operations. They have been receptive to various NGOs (most notable Cercopan, with its work on small threatened monkeys) that have approached them for support of biodiversity conservation for Cross River National Park and of particular species conservation efforts. Unfortunately, as of yet, the company is not liaising with the Cross River State Forestry Commission, which manages the forest reserve adjacent to its facility.

Leventis companies in Nigeria: The Leventis family of corporations has a variety of businesses in Nigeria but the most conspicuous is as the sole bottler and distributor of Coco-Cola products there. This company and its associated organizations have also made strong efforts to help people in Nigeria through a handful of foundation offshoots. The Leventis Foundation Nigeria was officially established in 1988 to train small-scale farmers throughout the country in environmentally sustainable as well as productive farming practices. In March 2008, A.G. Leventis also announced a fellowship program for Nigerian students in association with the Harvard University School of Public Health. Another Leventis project is the establishment and support of the A. P. Leventis Ornithological Research Institute (APLORI), an academic establishment that supports graduate training for students of biodiversity, wildlife, and sustainable development.

Cocoa producers: The Sustainable Tree Crop Program — supported in part by the World Cocoa Foundation, individual cocoa companies, and recently USAID/Nigeria (through the Sustainable Practices in Agriculture for Critical Environments program or SPACE) — has developed a farmer field school program for small-scale cocoa farmers in Cross River State. The purpose of this program is to teach farmers environmentally sustainable cocoa production techniques that also increase their income from these crops. Cocoa is widely grown at the edges of important natural rain forest areas in southern Nigeria, and increased clearing of land to promote more cocoa acreage is a real threat to the integrity of some remaining forest patches. If these efforts are successful, the theory is that farmers will be content with the income from their existing parcels and will not convert more acreage within protected lands. Although SPACE funding has ended, the project continues under other funding sources.

Nigeria is one of the world's major producers of cocoa and Nestlé Nigeria participates in the Harkin-Engel Protocol developed by governments, NGOs, and chocolate industry partners to support a cocoa farming certification system that ensures sustainable practices are followed.

Tourism: Ecotourism is often viewed as the holy grail of biodiversity and tropical forest conservation. If people from the country and around the world are attracted to a location because of its wildlife and natural attributes, the money they spend there should help preserve the resources. As long as the visitors themselves, or the facilities built to hold them, do not unduly disrupt the environment, this strategy works successfully in many locations around the world.

Nigeria, sadly, is different than most destinations in this regard. So far, there is no green certification of hotels there, and most facilities lack even the basics of 24-hour power, water, and waste-water treatment plants, or even disposal capabilities for solid waste aside from tossing it over the back fence. Even the main lodging complex in Yankari State Game Reserve lacks reliable power for the air conditioners installed in new hot concrete structures with no natural air ventilation. Plastic and other garbage is tossed over the bank below the restaurant in plain sight. This availability of garbage and table scraps attracts a larger than normal number of baboons and warthogs that wander freely through the lodging area causing potential risk to tourists' health and safety. With no apparent

concern for the environment or wildlife, the construction of a large conference center, tennis courts, and more lodging is underway.

The facilities and infrastructure in some of the other protected areas is more primitive but less harmful to the environment. In many places, though, the problem for tourists is obtaining access. Without a four-wheel drive vehicle and an experienced driver, the most natural protected areas are difficult to get to over deeply rutted, inadequate roads. In Cross



Olusegun Ojo photographs elephants in Yankari State Game Reserve. (Photo by Pat Foster-Turley)

River State, at the Afi Mountain Wildlife Sanctuary, ecologically sensible lodging is available at the NGO Drill Ranch, and a modern new canopy walkway extends from tree to tree through the forest. However, although the walkway has been built for more than three years, it is still not open to visitors. Access to the area and further completion of accompanying facilities seems to be the hold-up.

The Protea Hotel Ranch Resort at the Obudu Cattle Ranch on the Obudu Plateau is one facility in Nigeria that meets international standards of lodging, meals, and amenities; although it is not touting itself as “green” in the way it manages its resources. This facility includes a nature reserve with hiking trails and a functioning cattle ranch. Unfortunately, though, the nearby airport has closed and its location, far away from any Nigerian city centers, makes it difficult to get to for most in-country or international tourists with travel time constraints.

The Nigerian Tourism Development Corporation continues to promote Nigeria as a wildlife and ecotourism destination and various state and federal agencies are also hoping for more proceeds under this paradigm. There still is much work to be done before tourists will flock to Nigerian protected areas in the droves necessary to bring in the revenue needed to support these protected areas.

SECTION VII: CONSERVATION APPROACHES



Protected areas in Nigeria hold much of the remaining biodiversity and tropical forest resources. (Photo by Olusegun Ojo)

In Nigeria, like most developing countries with donor and NGO assistance, a variety of conservation approaches have been applied, some successfully, some still too early to tell. The three main approaches discussed here — protected area management, community conservation work, and education and training — are most critically needed in Nigeria if the resources are to be conserved both for present and future generations.

Protected Area Management

Protected areas in Nigeria were discussed fully elsewhere in this document. Most protected areas in this country lack staff, training, equipment, and other basic tools they would need before they can be managed effectively. More research needs to be done to define the status of the resources these parks still contain. Especially needed at this time are updated maps and data on the status of all so-called protected areas. In compiling this report, initial steps were taken, but a view of the bigger project is needed to ascertain what resources still exist and where.

A number of donors and NGOs are working with relevant agencies to beef up their efforts, but more work is still needed. Capacity needs to be enhanced both on the ground and within the higher ranks of the agencies operating these protected areas. Efforts to promote tourism in some areas are going forward without appropriate vision and foresight to ensure both success and protection of resources. Protected areas now contain the bulk of biodiversity and forest resources, and if these resources are not to be lost entirely, great efforts are needed, and soon.

Community Conservation Work

Many conservationists believe that the best hope for protecting and conserving natural resources is to involve communities in this work. Communities near protected areas and any other remaining wild areas in Nigeria rely on these resources for their existence and it is to their advantage to conserve them for future uses. In Nigeria, this work is strongly supported by a number of NGOs and donor-assisted projects working in various habitats and with different communities throughout the country. A number of versions of community conservation work have shown utility in different areas.

Community-based natural resources management (CBNRM) is predicated on the idea that when communities are given more knowledge about the resources under their control, taught effective and sustainable management practices, and trained in institutional management structures, they can democratically manage these resources in a sustainable way on their own. A number of NGOs working in the Cross River area have been engaged in CBNRM for years now, with some notable successes in the areas of public enlightenment.



Members of the biodiversity assessment team pose with the Garko Women Farmers Association. (Photo by Pat Foster-Turley)

Sustainable agriculture is a variation on this approach based on the idea that if communities are given more knowledge and tools to grow better crops on their land that command higher prices, they will be less inclined to clear more land and further degrade

still-natural areas. The MARKETS program of USAID/Nigeria, for instance, is working with communities in northern Nigeria to grow different strains of their old staple, sorghum, so they can command a higher price from malt distilleries.

Alternative livelihoods is a further refinement of sustainable agriculture, which strives to give people other ways to make money that will limit their time and inclination to over-extract from the wild. For instance, a GEF-supported project is working with communities around Yankari State Game Reserve to package drinking water and to sell it for profit. Another angle on this approach is to engage people in removing invasive species, like nipa palm in the south and Typha grass in the north, while providing them with uses for these harvests. The Nigerian Conservation Foundation has had such a program in place for nipa palm in southern Nigeria, which involves training people to use these plants for crafts products they can sell, much as people do in the southeast Asian countries where nipa palm has evolved along with people.

Education and Training

A number of projects in Nigeria are aimed at boosting education, awareness, and training of people of all ages in environmental and conservation matters. The Nigerian Conservation Foundation (NCF) has long played a role in helping to shape and implement environmental education programs in the country. One environmental education approach that seems to be more effective is the development of extracurricular conservation clubs in many schools that are taught by trained teachers who have been provided appropriate educational material by NCF. Besides NCF, many other NGOs also include environmental education as one component of a fuller conversation-based program.

Training college students provides the greatest hope for the near future (see text box on next page). The Leventis Foundation, Chevron, and others support college scholarships for students in environmental studies, wildlife biology, or conservation. There is now also an environmental education certificate and B.A. degree program at the University of Calabar, and a couple of other universities, that are providing teachers with appropriate knowledge and skills to work with schools and NGOs as demand for these programs increases.

STUDENTS AND VOLUNTEERS: AN IMPORTANT ROLE IN CONSERVATION

During the course of doing research for this report, the team made brief site visits to a number of protected areas throughout the country. Everywhere, we found young people studying wildlife.

In Cross River National Park, we met a team of students on the practicum year of their studies at the University of Ibadan. These four wildlife students were spending time in all the national parks around the country to gain first-hand experience. Over a shared dinner, we all had a chance to share our hopes and dreams for the future of Nigerian species and special areas. The following day, we hiked up the path together with national park staff while the students filmed a documentary and interviewed us all about conservation concerns.

Another day in Yankari State Game Reserve, we encountered a research vehicle from APLORI of the University of Jos with a team of students on board. They were a mix of Ph.D. and masters students variously studying lions, birds of prey, and small mammals for their research projects. As with the Ibadan students before them, their commitment was obvious.

In the Primate Research Station high up a road that is impassible by vehicle during the rainy season, we found another group of students, a mixed group from both British and Nigerian colleges. Each was studying some aspect of the baboons and chimpanzees found in the area, but they worked together as a team with plans to stay through the rainy season to continue their work, while disconnected from the rest of the world below.

At the Drill Ranch, we met young people from the United States, both vets and zookeepers, volunteering their efforts in the field. Similarly, at Cercopan in Calabar, more young people from the United States and the United Kingdom volunteered to fill integral roles on the staff.

The sight of all these students actively engaged in wildlife conservation activities in Nigeria bodes well for the future. Ultimately, it is this generation that holds the key to the continued existence of the wildlife and wild places still in Nigeria.

SECTION VIII: AREAS OF CRITICAL IMPORTANCE

In Nigeria now, if significant biodiversity and forests are to be conserved, Nigerians and others need to take a triage approach. Those few areas that still contain considerable resources need to focus on first saving them from the widespread destruction that has already degraded most other areas. Areas where strong NGO and government actions are already in place and successful need to be further shored up. Areas of international significance for global biodiversity need further protection. Finally, biodiversity of organisms with



Children use a boat to gain access to water from the cattail-choked shores of the Hadejia-Nguru wetlands. (Photo by Pat Foster-Turley)

particular economic and social value need to be managed for the future. Sad to say, much of Nigeria's biodiversity and forests are already doomed, but present efforts can still save the important tips of the iceberg for future citizens of Nigeria and the world. Some of these places and species that have critical importance are singled out here.

Although there are endless conservation projects in Nigeria that could be proposed, the recommendations in this report center around the geographic areas the principal author considered of critical importance.

Cross River State

Cross River State is one of the most conservation-oriented states in Nigeria. Through a number of government, NGO, and community arrangements, it has established a variety of protected areas managed in unique ways. The federal Cross River National Park, the Cross River State Forestry Commission's Afi Mountain Wildlife Sanctuary, the Mbe Mountain community area, and the mostly privately owned Obudu Plateau all protect

significant biodiversity using a variety of approaches. Cross River State is known to be a hotspot for primates, with 22 species, and also for butterflies, with more than 1,000 species identified so far. Of particular interest in this area is the Cross River gorilla (*Gorilla gorilla diehli*), which has a population of less than 250 individuals broken up into two areas and thus is the most severely threatened of any gorilla subspecies in the world. This state is also home to the drill monkey (*Mandrillus leucophaeus*), which is only found here and in nearby areas in Cameroon and Bioko Island in Equatorial Guinea.

Also of key importance in Cross River State is the Calabar-Cross River Estuaries and Mangrove Forest Reserve, created in 2005 to protect about 250 km² of mangrove habitat. Although this area is relatively small, as of now it is the only protected mangrove area in Nigeria and provides hope for some species that are otherwise beyond conservation help in most of the strife-ridden Niger Delta area.

Conserving Cross River biodiversity has been an initiative of the Nigerian Conservation Foundation, Wildlife Conservation Society, Pandrillus, Cercopan, and other partners for a number of years. A bit more donor help now could keep the momentum going. There are also numerous government and private ecotourism ventures being planned or underway in this state that could also use further assistance and capacity building to ensure that they incorporate key concepts of environmental sustainability and natural resources management.

Gashaka-Gumti National Park

Gashaka-Gumti National Park is the largest protected area in Nigeria, and it is adjacent to another large protected area in Cameroon, the Tchabal Mbabo National Park, forming a large transboundary area of global importance. The park includes montane forests and grasslands, lowland forests, and savanna in a continuous transition, a rare occurrence in West Africa. This diversity of habitats has led to a diversity of plant and animal species, and the montane area in particular includes many endemics. The area is especially endowed with amphibians, with at least 60 endemic species found to date. Up to 18 percent of the plant species are also endemic to this area, although they may be found in both Nigeria and Cameroon and are therefore not “true endemics.” Elephants and other species also use this area as a corridor for migration. World Wildlife Fund (WWF) in partnership with the Nigerian Conservation Foundation has supported community conservation and research efforts in this major park for many years. The Wildlife Conservation Society (WCS) has also completed long-term surveys of the biodiversity in this area. Due to the protected nature of both Gashaka-Gumti and Tchabal Mbabo National Park in Cameroon, this area is well situated for further conservation action.

Hadejia-Nguru Wetlands

The Hadejia-Nguru wetlands is a floodplain complex on the southern edge of the Sahel savanna in northeastern Nigeria. The Hadejia and Jama'are Rivers that supply this flood plain originate on the Jos Plateau and flow seasonally into Lake Chad. This area has long been noted for its importance to both year-round native birds and Eurasian water birds that travel over the Sahara Desert to these wetlands to spend their winters. The area also has at least 89 species of freshwater fish, many with important economic value, and is important for rice cultivation and other crops. Due in large part to this international attention, the Nguru Lake and Marma Channel complex in the Hadejia-Nguru Wetlands was designated as Nigeria's first Ramsar site in 2000.



Hassan Hassan, Ramsar Wetlands Coordinator, and Abdullahi Aboulhameed of Chad Basin National Park inspect cattails in the Hadejia-Nguru Wetlands. (Photo by Pat Foster-Turley)

This area is under threat from water diversions and flooding due to dam construction, from grazing livestock, and from agricultural expansion. Within the past decade water level changes due to drought, damming, and other anthropogenic manipulations have encouraged the growth of invasive cattails, which have taken over the wetlands (see box next page), reducing wildlife habitat, fish catches, rice crops, and cattle access to drinking water. A number of NGOs — including NCF, RSPS, and IUCN — have been collaborating with the state government and local communities to help conserve this area. Stakeholder groups gather often to work out problems. This area has suitable conservation infrastructure and global importance and is ripe for further assistance.

TYPHA GRASS: PROBLEMS AND OPPORTUNITIES

In recent years, people in the arid north of Nigeria have been worried by a proliferation of tall marsh plants called “Typha grass” (*Typha* spp.) in the region but known as cattails elsewhere. In the Hadejia-Nguru Wetlands, Typha grass problems have jumped to the top of stakeholder concerns. Shore birds have no place to stand, and other native plants are being crowded out because the bank sides are full of cattails. People’s fish catches have decreased alarmingly: their nets are ineffective in cattails, and the fish hide out of reach. The rice fields, too, have been taken over by cattails, reducing this crucial crop in a time of overall food scarcity. Even the itinerant Fulani cattle herders despise Typha grass because their cattle cannot easily get through them to the water source to drink. In addition, cattails are thirsty plants, reducing the water flow and levels. Not only biodiversity, but also the wellbeing and livelihoods of people are being severely impacted by this invasive weed.

However, there just may be an answer to this problem that combines alternative livelihoods with Typha grass control and addresses the loss of forests besides. Technology has been developed in Mali to turn Typha grass into charcoal for use in cooking instead of unsustainably harvested fuelwood. Typha grass can also be used in paper production and for other medicinal and domestic uses.

If the Typha grass can be cropped by people and made into charcoal or sold for other uses, they can earn money and have an alternative fuel source that won’t increase the depletion of the last remaining forests. If this cropping can be timed around the winter months when birds flock to the wetlands, the shorelines will be open to them once again. And, with continued efforts to control and use cattails, the old balance of nature can be in some way restored, and the native biodiversity along with it.

Similar approaches sponsored by the Nigerian Conservation Foundation with invasive nipa palm in the south have proven to be successful. Maybe the time is right to turn to cattails.

National Parks Service

The National Parks Service of the federal government has the greatest responsibility in managing and conserving the last large biodiverse areas in Nigeria. National park staff are dedicated but still lack key resources — including sufficient vehicles, radios, weapons, and other equipment — they need to successfully manage these resources against the escalating pressures they face. Staff at all levels would welcome further training to enable them to fulfill their mandates. With the bulk of the remaining wildlife, biodiversity, and forest resources in Nigeria contained within these seven parks, they need as many resources as possible to enable them to succeed.

Select State-Protected Areas

States manage the vast majority of protected areas through their state game reserves and state forest reserves, and many of these areas are deteriorating rapidly. Select states with particularly important reserves and remaining wildlife are in dire need of capacity building efforts. For instance, in Bauchi State, at least two protected areas have long been touted as major reserves for savanna flora and for well-known large African mammals, including lions, elephants, and at one time even giraffes. However, the biodiversity and landscapes of both Lame-Burra and Yankari Game Reserves have now eroded, especially in recent years. Bauchi State has imported giraffes and other animals for potential release but now holds those that have survived the move in enclosures at Somu Game Reserve. With federal protection removed from the former national park, Yankari, and with increased state focus on tourism, but without environmental safeguards, the situation is bound to get worse.

Training and awareness efforts regarding protected area management, sustainable ecotourism, and other programs are sorely needed in this state and in others as well. Even Cross River State could use further donor support to develop further capacity and protective measures aimed at better management of the key protected areas and biodiversity that makes this state the gem of conservation focus. Protected areas in much of Nigeria would benefit from more trained staff and more adequate equipment to better safeguard the fragile resources that remain.

Sustainable Eco-Tourism

The federal government of Nigeria and most state governments are looking towards increased tourism as an income-producing activity, one that has worked well in other African countries. There is also a movement underway to privatize protected areas, with a special interest in ecotourism. Unlike many other places, though, there seems to be no mandate for environmental sustainability and no demonstration of a solid understanding of the principles of sound ecotourism. With only a few exceptions, solid waste and sewage is disposed of haphazardly and facilities in fragile natural areas are overbuilt with no concern for their impact on the environment. Work is needed to train relevant agencies and tourism companies in appropriate ecotourism approaches and to help them to better market their eventual successes.

Other Critical Areas and Species

Depending on one's perspective, there are many other critical areas and species needing conservation efforts in Nigeria, and all cannot be highlighted here. Some of the areas are too difficult to work in, other areas or species are so depleted that it will take outlandish resources to resurrect them. One example of the former is the Niger Delta, a world-renowned area with extraordinary biodiversity and natural resource potential. But the oil company presence and resulting unrest has made the area too dangerous to work in. Various "charismatic megavertebrate" species in Nigeria — like elephants, lions, and wild dogs — all face difficulties throughout their range in Africa but are receiving better help and have better chances for long-term survival in other countries that have stronger conservation efforts in place. In Nigeria, wild dogs and cheetahs are all but gone, and lion and elephant populations are severely reduced. The best hopes for these species in Nigeria is to focus on saving the remaining national and state parks that still contain them and hope for the best.

SECTION IX: USAID'S ROLE IN BIODIVERSITY AND FOREST CONSERVATION

USAID/Nigeria's portfolio is divided into three major areas: "Investing in People," "Peace and Democratic Governance," and "Economic Growth," with a variety of subsectors under each. Environment is not specifically listed anywhere in this program, but it exists nonetheless, embedded in some sectors. Biodiversity and forestry conservation is hidden even deeper down, if it exists at all. Interviews with program officers involved in each of the programmatic areas revealed a few areas of possible synergy for future programs.

Synergies with Existing USAID Programs

Health: Much of the health budget of the Nigeria mission goes to HIV/AIDS work, and much of this money supports treating people afflicted with the disease. Along these lines, the nutrition of affected persons is a concern. Already, the MARKETS program has begun to look how it might achieve synergies with health programming through supplying high-protein nutritional powders made from cowpeas. From a biodiversity and tropical forests perspective, alternative sources of protein for afflicted individuals in communities near critical areas may also reduce the need for continued extraction of bushmeat from the forests. Similarly, the attention given to maternal and child-care issues in the health portfolio might also involve increased protein sources and less reliance on forest products.

Excessive population growth is a key element driving the degradation of remaining forests and biodiversity in Nigeria. Where effective family planning programs are in place, these effects lessen. Family planning efforts in communities around protected areas could be a strong biodiversity contribution of the health program.

Democracy: Work with civil society organizations and NGOs can include various Nigerian groups that have an environmental perspective and work to empower communities to effectively manage their own natural resources. Nationally based NGOs could also be supported to develop stronger advocacy for environmental issues.

Education: The education program of the mission is centered on basic education at the elementary school level for both students and teachers in select states. The focus is on literacy and numeracy, and apparently the Nigerian curriculum is already challenged by the requirement that each child learn four languages. Even within this constraint, materials with a conservation theme could be used for such learning. After-school clubs such as those promoted by the Nigerian Conservation Society would be a good add-on, especially in communities around protected areas, should further funding be forthcoming.

Agriculture: The most obvious synergies between biodiversity and tropical forest conservation and current mission programs lie within the agricultural area. MARKETS already has a natural resources perspective and works closely with communities in areas where agricultural expansion threatens biodiversity and forests. Among the sites already

targeted and performing under the MARKETS mandate are agricultural areas in the north in and around the Hadejia-Nguru Wetlands and across to Kano, all areas where invasive Typha grass is viewed as a problem. This program could apply its established marketing techniques to encourage farmers to crop this invasive plant, implement technology already developed elsewhere to turn the plant into charcoal and possibly paper products, and develop further uses for this material.

In addition, MARKETS is already working with a number of agricultural universities and programs that could be encouraged to do more work on the important land races of crop species in northern Nigeria. An increasingly diversified gene bank of traditional land races and adaptive sorghum breeding programs could be encouraged. The establishment of a scholarship to engage a graduate student in studies of land races of sorghum, etc., in conjunction with ICRISAT and or IITA would also advance the conservation of important crop strains.

Specific Recommendations for USAID

Although a broad consideration of areas of critical importance to biodiversity and tropical forest conservation efforts in Nigeria and recommended conservation actions is presented in Chapter VIII, each donor involved in the country has its own perspective and portfolio and is better placed to tackle certain issues.

The following specific recommendations for USAID intervention arise from the research and field observations discussed in this report along with an evaluation of the present USAID program in Nigeria. These recommendations build on past USAID initiatives and provide guidelines for possible biodiversity and forest initiatives that USAID might be best placed to pursue in the years to come.

These recommendations are presented in two groups, according to the financial resources required and the time frame that USAID is able to commit to biodiversity and tropical forest conservation activities. Suggested Level 1 activities are relatively small initiatives that dovetail with existing USAID programs, require a modest amount of funding, and could begin soon. Level 2 activities are those that can best be undertaken with more substantial financial resources, preparation, and overall time commitment.

Level 1 Recommendations: Requires Modest Investment

Recommendation 1A: During research on protected areas for this study, a serious gap was found in the state of knowledge about the current status, condition, and extent of protected areas in Nigeria. Further work needs to be done in conjunction with Nigerian NGOs and the government to ground-truth the present size, biodiversity features, and extent of degradation of all protected areas in Nigeria, to map these areas, and to disseminate this information widely to facilitate better management practices. This effort would also help illuminate areas for most effective future USAID investment.

Recommendation 1B: Resources are needed to fund NGO efforts to maintain community conservation work already begun in Cross River State. Momentum gained

under USAID's SPACE program will be lost unless at least some funding is directed to continue community meetings in affected areas among existing partners. Without continued seed money, most of the positive gains made under the SPACE program will be gone with nothing to show for them.

Recommendation 1C: Removal and economic use of invasive Typha grass should be addressed and facilitated in the Hadejia-Nguru wetlands and in drainage ditches throughout the arid north. Farmers could be linked to programs that harvest this invasive plant and could implement the technology already developed elsewhere to turn the plant into charcoal and possibly paper products and to develop further markets for this material. This twist on MARKETS' work in northern Nigeria could help reduce deforestation pressures, while enhancing biodiversity, fishing, and rice-growing opportunities for communities.

Recommendation 1D: The status of Nigerian crop land races needs to be further studied and strategies implemented to save rare land races with both *in situ* and *ex situ* efforts. Scholarships to Nigerian agricultural students would help greatly in this regard, as would the development of close associations with the crop biodiversity research programs at International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and IITA. Techniques promoted by MARKETS might also be creatively used to enable farmers to obtain more money from the cultivation of rare land races of sorghum, rice, and other crops, which would also help provide a more diversified gene pool for future development of improved varieties.

Level 2 Recommendations: Requires Significant Investment

Recommendation 2A: Building on an initial ground-truthing and mapping project focusing on Nigerian protected areas, an expanded information gathering and dissemination project should be undertaken. In collaboration with government, NGO, and research partners, current inventory data on forests, wildlife, fisheries, land use, climate changes, range conditions, etc., needs to be compiled from existing sources or collected anew in cases where no data exist. Dissemination of this information in user-friendly form on the Internet would greatly serve the government, NGOs, and private conservation communities and ultimately would benefit the natural resources in Nigeria.

Recommendation 2B: Of all areas of Nigeria, Cross River State contains the strongest mix of key biodiversity and ecosystem features, a storehouse of active NGO entities, and a government conducive to conservation. Further community work in sustainable agriculture, alternative livelihoods, and other related projects is still needed in many places near protected areas in Cross River State. Funding support for globally important species found only in this state — like Cross River gorillas, drills, and economically and medically important plants — is also justified on a case-by-case basis.

Recommendation 2C: With more agencies looking to the private sector for conservation contributions, ecotourism endeavors receive increasing attention. In Nigeria, there is little governmental understanding of appropriate tourism infrastructures and operations that enhance biodiversity and forest resources instead of degrade them even further. A

number of NGOs in the country, however, have gotten it right. Support is needed to develop partnerships between NGO, government tourism/protected-area entities, and international ecotourism specialists. Further capacity-building efforts are also necessary to train and equip tourism managers to operate in environmentally sound ways.

Recommendation 2D: With information from an initial project defining/mapping the extent, biodiversity, ecological assets, present condition, and specific threats to all protected areas in Nigeria, specific targets of opportunity may be found. Protected areas hold the remaining critical reserves of biodiversity and tropical forests in Nigeria. Efforts to support a protected area of particular conservation value — through collaboration with government agencies, NGOs, communities, and private-sector ecotourism entities — would be a valuable undertaking.

SECTION X: CONCLUSIONS

Effective biodiversity and forest conservation in Nigeria faces many challenges as the threats to ecosystem integrity are strong and growing stronger in the face of population growth and unsustainable practices. But many people in Nigeria have strong commitments to the environment, and more trained students and professionals with an interest in the environment are being added to the field every year.

It is not too late to protect and conserve some of the remaining strongholds for biodiversity and some of the last large patches of tropical forest if stronger financial support is made available and more decisive actions are taken soon by all those with a stake in the outcome: an environmentally safer, biologically richer Nigeria for now and the future.

The process of performing this USAID Biodiversity and Tropical Forest Assessment has involved many people and many parts of the nation. Although a lot of problems have been identified, the solutions are there too. It will just take a lot of hard work to make needed progress happen in the diverse dimensions of Nigeria.

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ANNEX I: CHART OF PROTECTED AREAS IN NIGERIA

Protected Area	Key Habitat	Important Species	Major Threats	Comments
<p>Name: Cross River National Park Location: Cross River State Year Gazetted: 1991 Status: National park (federal government) Official size: 4,000 km²</p>	Moist tropical rain forest	Cross River gorilla, Drill monkey, <i>vellerosus</i> chimpanzee, Preuss' guenon, Red colobus monkey, Sclater's guenon, Angwantibo, Grey-Necked Picathartes, Xavier's Greenbul	<ul style="list-style-type: none"> - Large-scale illegal logging and clearing of forest for plantation agriculture and farmlands - Uncontrolled hunting of wildlife - Insufficient funding for park protection and monitoring activities - Continuous increase in the population of the six enclave communities and that of other communities that surround the park 	<ul style="list-style-type: none"> - One of only two sites in Nigeria where Xavier's Greenbul has been recorded - Home to a third of Africa's total number of primate species - Site contains breeding populations of Grey-Necked Picathartes
<p>Name: Afi Mountain Wildlife Sanctuary Location: Cross River State Year Gazetted: 2000 Status: Wildlife sanctuary (state government) Official size: 100 km²</p>	Moist tropical rain forest	Cross River gorilla, Drill monkey, <i>vellerosus</i> chimpanzee, Angwantibo, Grey-Necked Picathartes	<ul style="list-style-type: none"> - Illegal logging and clearing of forest for agriculture - Unsustainable hunting of wildlife - Inadequate funding of sanctuary protection and monitoring activities - Rapid increase in population of communities around the sanctuary that has resulted in uncontrolled encroachment into it 	<ul style="list-style-type: none"> - Site adjoins one of Africa's biggest winter roosting sites for migrating European barn swallows at Ebok Kabaken, Boje - Home to Africa's big three primates (gorilla, chimpanzee, and drill monkey) - Known to harbor the most viable population of Cross River gorillas - Contains breeding populations of Grey-Necked Picathartes
<p>Name: Obudu Plateau Location: Cross River State Year Gazetted: Nil Status: Community land/State Forestry Commission Official size: 400 km²</p>	Escarpment forest and montane grasslands	Preuss' guenon, three "vulnerable" bird species: White-Throated Mountain Babbler, Green-Breasted Mountain Bush Shrike, and Bannerman's Weaver	<ul style="list-style-type: none"> - Rangeland burning by nomadic Fulani herdsmen - Unsustainable firewood collection for cooking and warming homes - Forest clearing for farming - Forest clearing for establishment of new settlements - Erosion due to loss of vegetation cover on steep slopes 	<ul style="list-style-type: none"> - Montane forests play important water catchment role, protecting vital rivers and streams that feed major tributaries of the Benue and Cross River systems - Considered as an Endemic Bird Area site in Nigeria - Giant eland reported in the area in the past
<p>Name: Gashaka Gumti National Park Location: Taraba and Adamawa states</p>	Rain forest, savanna	Chimpanzee, Roan antelope, hippopotamus, Mountain	<ul style="list-style-type: none"> - Clearing of forested areas - Illegal settlements and farming 	<ul style="list-style-type: none"> - Recognized as an important Endemic Bird Area in the region

Protected Area	Key Habitat	Important Species	Major Threats	Comments
<p>Year Gazetted: 1991 Status: National park (federal government) Official size: 6,670 km²</p>	woodlands, escarpment forests, and montane grasslands	Reedbuck, elephant, leopard, African buffalo, lion, crocodile	<ul style="list-style-type: none"> - encroachment inside the park - Unsustainable hunting and fishing - Illegal grazing by Fulani herdsmen - Six official enclave villages within the park 	<ul style="list-style-type: none"> - Largest park in Nigeria - Two fish species new to science recently discovered in the rivers of this park - Giant eland reported in the area in the past
<p>Name: Yankari Game Reserve Location: Bauchi state Year Gazetted: 1957 (as Bauchi Native Authority Forest Reserve) Status: Game reserve (state government) Official size: 2,250 km²</p>	Sudan savanna-type vegetation	Elephants, lions, hyena, water buck, African buffalo, warthog, Western Hartebeest, hippopotamus, Red river hog, crocodile	<ul style="list-style-type: none"> - Poaching remains a major threat to large mammals in the reserve - Illegal fishing occurs in the rivers and numerous ponds and pools during the dry season - Grazing of livestock in the reserve by Fulani herdsmen 	<ul style="list-style-type: none"> - Ostrich last recorded in the reserve in 1975 - Mammal species considered to be extinct in the reserve include hunting dog, cheetah, giraffe, Western Kob, Korrigum, and red-fronted gazelle.
<p>Name: Chad Basin National Park Location: Borno and Yobe states Year Gazetted: 1991 Status: National park (federal government) Official size: 2,258 km²</p>	Sudan Sahelian-type vegetation	Ostrich, Roan antelope, Secretary bird, giraffe, elephant, Red-fronted gazelle, hartebeest	<ul style="list-style-type: none"> - Desert encroachment - Illegal grazing of livestock resulting in habitat destruction in the park - Illegal fishing in the lakes and ponds - Poaching of large mammals - Unsustainable levels of fuel-wood collection in the park - Unsustainable levels of guinea-fowl egg collection 	<ul style="list-style-type: none"> - Giraffes are considered extinct in Nigeria but occasionally re-enter from adjacent protected areas in Cameroon - Important wintering site for Palearctic migrant birds - Considered the only place in Nigeria where ostrich and giraffe might be seen
<p>Name: Hadejia-Nguru Wetlands Location: Yobe, Jigawa, and Bauchi states Year Gazetted: Nguru Lake and Marma channel complex (58,100 ha); designated Ramsar site in 2000 Status: Collaborative project area between federal government, three state governments, NCF, IUCN, RSPB (area protected by five forest reserves, a wildlife sanctuary, and Ramsar site) Official size: 3,500 km² (two forest reserves — Zurgun Baderi and Gorgoram as well as Dagona Wildlife</p>	Sahel and Sudan-Guinea-savanna type vegetation made up of Savanna scrub that includes acacia woodlands, sandy ridges, “tudu” lands, and riparian forests (known as “kurmi”), and the seasonally	377 bird species recorded for this area. Two species of global conservation concern are the Pallid Harrier and Great Snipe.	<ul style="list-style-type: none"> - Dam constructions for agricultural irrigation. Two big dams, Tiga and Challawa, located upstream have interrupted natural flood regimes, diverted flood waters in the wet season, and released damaging flood surges during the dry season - Increased human population and rising demand for land has resulted in cultivation of lands previously considered marginal - Fuel wood demand from surrounding settlements has 	<ul style="list-style-type: none"> - Designated Ramsar Site in 2000. Important wetland site for both breeding species and for wintering and passage of Palearctic waterbirds - Fulani herdsmen damage vegetation by “looping” trees, and grazing livestock in the area - Chemical control of Quelea birds often kills non-target species

Protected Area	Key Habitat	Important Species	Major Threats	Comments
Sanctuary — form part of the Chad Basin National Park)	flooded marshes.		resulted in serious depletion of forest	
Name: Kainji Lake National Park Location: Kwara and Niger states Year Gazetted: 1975 (first created as Borgu Game Reserve). Upgraded to national park in 1979 Status: National park (federal government) Official size: 5,830 km ²	Sudan-Guinea savanna. Riparian forests occur on the banks of the larger watercourses	Elephant, Kob, hartebeest, Roan antelope, hunting dog, Mountain reedbuck, Red-flanked duiker	<ul style="list-style-type: none"> - Deforestation of savanna woodland areas - Uncontrolled grazing of livestock - Uncontrolled fires - Unsustainable levels of fishing by large number of artisanal fishermen 	<ul style="list-style-type: none"> - Nigeria's oldest national park - Important wintering ground for Palearctic migrant waterbirds
Name: Okomu National Park Location: Edo State Year Gazetted: 1999 Status: National park (federal government) Official size: 124 hectares	Lowland rain forest	Forest elephant, African buffalo, White-Throated monkey	<ul style="list-style-type: none"> - Large-scale illegal logging - Expansion of the large rubber and oil-palm plantations near the park - Uncontrolled increase in population of the 45 villages in and around the park 	<ul style="list-style-type: none"> - Largest block of lowland rain forest in western Nigeria - One example of public-private partnership in the promotion of ecotourism in a protected area
Name: Kamuku National Park Location: Kaduna State Year Gazetted: 1999 Status: National park (federal government) Official size: 112 hectares	Guinea savanna with some transitional Sudan savanna elements	Elephant, Roan antelope, Mountain reedbuck, hartebeest, Ground hornbill	<ul style="list-style-type: none"> - Poaching of wildlife - Uncontrolled grazing of livestock in the park - Expansion in population of pastoralist settlements on the edge of the park 	<ul style="list-style-type: none"> - Successful local community-based conservation project by a national NGO was in part responsible for its upgrading to a national park.
Name: Old Oyo National Park Location: Oyo State Year Gazetted: 1991 Status: National park (federal government) Official size: 2,512 km ²	Savanna woodlands with interspersions of riparian forests along river banks and streams	Kob, African buffalo, bushbuck	<ul style="list-style-type: none"> - Poaching of wildlife - Encroachment by Fulani herdsmen and their livestock into the park 	<ul style="list-style-type: none"> - Site of ruins of Oyo Ile settlement - Other heritage relics include the city wall, the Great Agbaku cave, and the reservoir
Name: Omo Forest Reserve Location: Ogun State Year Gazetted: Uncertain In 1977, 460 hectares constituted into a biosphere reserve Status: Forest reserve (state government) Official size: 132,000 hectares	Rain forest	Forest elephant, White-throated monkey	<ul style="list-style-type: none"> - Illegal logging - Poaching of wildlife - Afforestation with exotic species (25% of the Reserve replanted with Gmelina) - Uncontrolled expansion of human settlements in and around the reserve 	<ul style="list-style-type: none"> - 460 hectares of forest block carved out from Omo Forest Reserve to constitute a Strict Nature Reserve and Omo Biosphere Reserve

Protected Area	Key Habitat	Important Species	Major Threats	Comments
Name: IITA Forest Reserve Location: Oyo State Year Gazetted: 1997 Status: Private forest reserve Official size: 150 hectares	Lowland rain forest	15 species of plants of plant conservation concern (including an Entada species that produces the longest fruit in West Africa)	- Isolation of the reserve forest due to disappearance of forest patches in the adjoining areas	- Forest patch is surrounded by derived savanna habitat making the reserve somewhat isolated.
Name: Mbe Mountain Location: Cross River State Year Gazetted: Nil Status: Community Land/State Forestry Commission Official size: 10, 000 hectares	Tropical rain forest	Cross River gorilla, Red-eared monkey, chimpanzee, Drill, Grey-necked Picathartes	<ul style="list-style-type: none"> - Large-scale illegal logging and clearing of forest for plantation agriculture and farmlands - Uncontrolled hunting of wildlife - Poorly organized and funded protection and monitoring activities by community-based organization - Rapid increase in population of communities around the sanctuary has resulted in uncontrolled encroachment into the sanctuary. 	<ul style="list-style-type: none"> - Strategically situated between Afi River Forest Reserve and Cross River National Park – Okwangwo Division - One of only three range areas in Nigeria for Cross River gorillas - Part of contiguous forest block between Afi River Forest Reserve to Takamanda Forest Reserve in Cameroon
Name: Ngel-Nyaki Game Reserve Location: Taraba State Year Gazetted: Forest reserve 1967; converted to game reserve in 1975. Status: Forest reserve (state government) Official size: 4,500 hectares	Montane type forest surrounded by montane grassland	Buffalo, chimpanzee, Bannerman's weaver, Crossley's ground-thrush	<ul style="list-style-type: none"> - Clear cutting and burning by farmers - Illegal hunting in the reserve - Encroachment into the reserve by Fulani herdsmen 	NCF has proposed that the reserve be incorporated into the nearby Gashaka Gumti National Park.
Name: Afi River Forest Reserve Location: Cross River State Year Gazetted: 1930 Status: Forest reserve (state government) Official size: 383.32 km ²	Tropical rain forest	Cross River gorilla, Red-eared monkey, chimpanzee, Drill, Grey-necked Picathartes. Elephants are reported occasionally in the southern flank of the reserve.	<ul style="list-style-type: none"> - Large-scale illegal logging and clearing of forest for plantation agriculture and farmlands - Uncontrolled hunting of wildlife - Inadequate funding of protection and monitoring activities in the reserve - Rapid increase in population of communities around the reserve has resulted in uncontrolled encroachment into the reserve. 	<ul style="list-style-type: none"> - In 2000, an area of about 90 km² was carved out from the reserve to constitute the Afi Mountain Wildlife Sanctuary. - Western-most habitat range for Cross River gorilla

Protected Area	Key Habitat	Important Species	Major Threats	Comments
<p>Name: Pandam Wildlife Park Location: Plateau State Year Gazetted: 1972 Status: Wildlife park (state government) Official size: 22,400 hectares</p>	<p>Sudan-Guinea savanna with gallery forest in riparian areas</p>	<p>Roan antelope, African buffalo,</p>	<ul style="list-style-type: none"> - Illegal grazing of livestock - Indiscriminate bush-burning by Fulani herdsmen - Poaching of large mammals - Lakes in the area have been over-fished. - Ever expanding human population around the area has resulted in enormous pressure on natural resources. 	<p>Management plan developed for the area is yet to be implemented.</p>
<p>Name: Amurum Woodlands Location: Plateau State Year Gazetted: Nil Status: Community land Official size: About 300 hectares</p>	<p>Dry scrub savanna interspaced with gallery forests, patches of grassland with rocky outcrops and farmlands</p>	<p>Best known as home to the nationally endemic Rock Fire finch and its brood-parasite the Jos Plateau indigobird.</p>	<ul style="list-style-type: none"> - Small size of the site and its close proximity to urban town of Jos - Fuelwood collection, cattle grazing, and land clearing for farming present serious threats to this small and fragile habitat. 	<p>Site of the A.P. Leventis Ornithological Research Institute affiliated with the University of Jos</p>
<p>Name: Ebok Kabaken Location: Cross River State Year Gazetted: Nil Status: Community land Official size: Uncertain</p>	<p>Hilly location covered with tall grasses surrounded by lowland forest</p>	<p>Over 1 million European barn swallows use the site as winter roost. Other uncommon bird species that have been recorded here include Chestnut & Red-Cheeked Wattle-eyes, blue-headed Wood Dove, chocolate-backed Kingfisher, Red-rumped Tinkerbird, and Red-tailed Bristlebill.</p>	<ul style="list-style-type: none"> - Clearing of the forests in the low-lying areas and the grasslands of the hill slopes for farming is on the increase, and threatens biodiversity richness of the area. - In the past, local people hunted the swallows for food, and 100,000 to 200,000 birds were estimated to have been caught annually. 	<p>The Dybowski's Dusky Twinspot caught and ringed here, is probably Nigeria's most southerly recorded instance of this species</p>
<p>Name: Apoi Creek Forest Location: Bayelsa State Year Gazetted: 2008 Status: Forest reserve (state government); Ramsar Site no. 1751 Official size: 29,213 hectares</p>	<p>Tidal freshwater, lowland swamp-forest composed mainly of marshes, mangrove forests and fresh water swamps</p>	<p>Red Colobus monkey</p>	<p>Digging of canals for transport of timber</p>	<ul style="list-style-type: none"> - Lies within Apoi Forest Reserve - Important nursery and spawning ground for fish

Protected Area	Key Habitat	Important Species	Major Threats	Comments
Name: Baturiya Wetlands Location: Kano State Year Gazetted: 2008 Status: Game reserve (state government); Ramsar Site no. 1752 Official size: 101,095 hectares	Natural wetland of Sudan-Saharan region	Wide range of resident and migratory water birds: the Yellow billed stork, Knob-billed goose, and African Grey Hornbill	- Over-exploitation of resources through hunting, fishing, grazing, woodcutting	<ul style="list-style-type: none"> - Large population of more than 10,000 inhabitants living in the surrounding villages depend on the wetland's resources for their livelihood. - Game reserve now proposed as a national park to reinforce the present management system
Name: Dagona Sanctuary Lake Location: Yobe State Year Gazetted: 2008 Status: National park; Ramsar Site no. 1753 Official size: 344 hectares	Large, natural, seasonally flooded oxbow lake in the section of Hadejia-Jamaare River floodplain	Site supports more than 25 bird species and is one of the most important sites in the Hadejia-Nguru wetlands for wintering Palearctic and inter-African migrant water birds.	<ul style="list-style-type: none"> - Overgrazing by livestock - Damage to vegetation by Fulani herdsman "looping" branches of trees - Over-exploitation of fisheries resources. 	The sanctuary is under protection as part of the Chad Basin National Park.
Name: Foge Islands Location: Kebbi State Year Gazetted: 2008 Status: National park; Ramsar Site no. 1754 Official size: 4,229 hectares	Wetlands in the Guinea savanna woodland	Supports more than 180 species of birds and also a remnant population of mammals, such as western hartebeest, waterbuck, hippopotamus, and green monkeys.	<ul style="list-style-type: none"> - Overfishing and the use of small mesh sized nets to fish - Declining trends in rainfall are leading to long-term low water conditions. 	<ul style="list-style-type: none"> - Site is managed under the national park management system, and further management measures include those put in place by the Kainji Lake Research Institute against overfishing. - Mammals trapped by the creation of the lake.
Name: Lake Chad Wetlands Location: Bornu State Year Gazetted: 2008 Status: National park; Ramsar Site no. 1749 Official size: 607,354 hectares	Complex of freshwater marshes that includes grasses, sedges, floating macrophytes, and shrubs	Important habitat for a great variety of Palearctic migrating water birds, including the vulnerable Marbled Teal.	<ul style="list-style-type: none"> - Recession of lake waters due to climatic influence and upstream dam construction, and the consequent continuing desiccation of the wetlands. - Damage to natural vegetation due to extensive agriculture around the wetlands 	Lake supports some indigenous fish species and is economically important, providing water, fish, and other resources to the surrounding populations.
Name: Lower Kaduna-middle Niger Flood Plains Location: Niger State Year Gazetted: 2008 Status: Community land; Ramsar Site no. 1755 Official size: 1,860 hectares	Site consists of pools, lakes, shifting river courses, and sand banks and is inundated annually by	Important breeding area for the Rosy bee-eater and supports a significant number of bird species that are restricted to the Sudan-Guinea Savanna biome.	Extensive cultivation of rice and sugar cane on the floodplains for commercial purposes encourages degradation of the riparian forest.	Release of water from Shiroro dam upstream is reported to destroy the Rosy bee-eater colonies on several occasions.

Protected Area	Key Habitat	Important Species	Major Threats	Comments
	floodwaters.			
Name: Maladumba Lake Location: Bauchi State Year Gazetted: 2008 Status: Forest Reserve (State Government) Ramsar Site no. 1756 Official size: 1,860 hectares	Vegetation is typical of the natural wetlands of the Sudan savanna biome	Supports a large number of migrant bird species such as the Grey Heron, White-necked stork, Green Fruit pigeon. Lake has a high diversity of fish	Rapid siltation of the lake due to extensive agriculture, fishing and grazing in and around the lake.	Lake has a high diversity of fish species and thus plays an important role as a source of protein for the local population and enhances the local economy.
Name: Nguru Lake and Marma Channel Complex Location: Jigawa State Year Gazetted: 2000 Status: Community Ramsar Site no. 1039 Official size: 58,100 hectares	Sahelian flood plain and lake	This wetland is reported to hold about 20% of the fish variety of the Lake Chad Basin and about 1% of all fish caught in inland freshwater bodies in Nigeria; the "disc Tilapia" is thought to be endemic to this area.	<ul style="list-style-type: none"> - Extensive grazing, agriculture, and fishing are increasingly causing pressure on both ground and surface water - Invasive Typha grass is taking over farmers' fields, blocking river channels, and undermining fisheries in the area. - Some 200,000 people depend on this site for their livelihoods. The human population keeps expanding thereby overstretching resources. 	The IUCN-Hadejia Nguru Wetlands Conservation Project maintains research facilities and an information center and encourages ecotourism with boat rides.
Name: Oguta Lake Location: Imo State Year Gazetted: 2008 Status: Community Ramsar Site no. 1757 Official size: 572 hectares	Freshwater lake surrounded by swamp forest.	The lake contains 258 species of phytoplankton in 107 genera and 40 fish species. Small scattered populations of the endangered Sclater's guenon occur in some relict forests south of the lake.	Overfishing is stressing the lake and sewage and sedimentation aided by deforestation are threats,	<ul style="list-style-type: none"> - The lake is annually flushed by floodwaters through an active outlet which helps mitigate some problems. - The Oguta Lake Watershed Protection Project is involving local communities to promote sustainability
Name: Pandam and Wase Lakes Location: Nasarawa Year Gazetted: 2008 Status: Wildlife park (state government); Ramsar Site no. 1758 Official size: 19,724 hectares	Freshwater lake surrounded by swamp forest	Lake supports large numbers of resident and migrant birds, with about 217 birds species recorded in the area. It also supports large flocks of White-faced Whistling Duck during the dry season and provides a breeding ground for the Long-toed Lapwing.	Unregulated human activities such as livestock grazing, bush burning, farming and harvesting of wild resources are a key threat to this habitat.	A management plan has been developed for the wetland and the adjoining Wildlife Park but is yet to be implemented.

Protected Area	Key Habitat	Important Species	Major Threats	Comments
<p>Name: Upper Orashi Forests Location: Rivers State Year Gazetted: 2008 Status: Forest reserve (state government); Ramsar Site no. 1759 Official size: 25,165 hectares</p>	Fresh water swamp forest	Home to the critically endangered Sclater's guenon and endangered White-throated guenon, Red Colobus monkey and Heslop's pygmy Hippopotamus. The site is a roost for the Grey Parrot and also hosts a significant number of water bird species.	Non-implementation of the sites management plan, ethnic militancy, insecurity, and poaching and uncontrolled logging are all related, serious problems.	The reserve is the remnant of a small centre of endemism in the central Niger Delta.
<p>Name: Buru Forests Location: Taraba State Year Gazetted: Status: Community forest Official size:</p>	Moist rainforest but with open savanna – like formations on disturbed hillsides	NTFPs such as <i>Brachystegia</i> sp. <i>Tetrapleura tetraptera</i> , and <i>Ricinodendon heudelotii</i> Over 190 bird species and the only site known for the rather uncommon <i>Smithornis sharpie</i> Buffalo and Chimpanzee.	Trade on baby chimpanzees, illegal hunting and logging, expansion of cocoa farms	Now under the management of the community with technical support from NCF. The chimpanzee trade route has been closed, there is increased family income from management of NTFPs.
<p>Name: Lame-Burra Game Reserve Location: Bauchi State Year Gazetted: Lame Forest Reserve Bauchi, first constituted in 1922, and the Burra West Forest Reserve, Ningi, constituted in 1925 Status: Game reserve Official size: According to the World Database on Protected Areas, it is 2,020 km². However, our estimate based on map analysis is that Lame Reserve zone is approx. 1,649.62 km², Burra West Reserve zone is 693.67 km² and the Corridor zone about 454.09 km² between the two reserves</p>	Northern Guinea Savanna; other key feature of the reserve is its massive inselbergs that provide a microhabitat of seasonal wetland that support a flora of soft rarities including the Nigerian national plant <i>Costus spectabilis</i> .	Lion, side-striped jackal, zorilla, spotted hyena, aardvark, warthog, western hartebeest, Grims duiker, Klipspringer, Senegal Galago, Roan antelope, Baboon	Overgrazing, charcoal production	Management plan recently developed by NPS with GEF funds.

Protected Area	Key Habitat	Important Species	Major Threats	Comments
<p>Name: Maladumba Game Reserve Location: Bauchi State Year Gazetted: Constituted in 1957 (vide the Misau Native Authority Malla Dumba Forest Reserve Order, 1957) Status: Game reserve Official size: 47km²</p>	<p>Sudan savanna, albeit highly degraded. Common woody plants include Diospyros mespiliformis, Anogeissus Leocarpa, Acacia kamerunensis, Acacia nilotic, Acacia seyal, Prosopis africana, Tamarindus indica, Burkea. africana, Strychnos spinosa, Balanites aegyptiaca, Combretum molle and Grewia mollis</p>	<p>Senegal Galago, baboon, giraffe (reported), lion, Roan antelope,</p>	<p>Overgrazing</p>	<p>Management plan developed in 2006.</p>
<p>Name: Sukur Cultural Landscape Location: Adamawa State Year Gazetted: 1999 Status: UNESCO World Heritage Site Official size: Uncertain</p>				<p>Sukur is located in the northeastern part of Nigeria. It is mainly praised as an exceptional cultural landscape, with its palace, terraced fields, and village. It has survived unchanged for many centuries.</p>
<p>Name: Osun-Oshogbo Sacred Groves Location: Osun State Year Gazetted: 2005 Status: UNESCO World Heritage Site Official size: Uncertain</p>				<p>The sacred grove, which is now seen as a symbol of identity for all Yoruba people, is probably the last in Yoruba culture. It testifies to the once widespread practice of</p>

Protected Area	Key Habitat	Important Species	Major Threats	Comments
				establishing sacred groves outside all settlements.
Name: Lekki Nature Reserve Location: Lagos State Year Gazetted: 1990 Status: Nature reserve Official size: 78 hectares	Low-lying seasonally flooded swamp forest and a coastal grassland habitat on higher ground	The globally threatened Hartlaub's duck and the gray parrot; Guinea-Congo biome-restricted species (African Pied, White-crested and Piping Hornbills, Hairy-breasted and Yellow-spotted Barbets); species that are rare or uncommon in Nigerian, (the White-tailed Ant-Thrush and Nkulengu rail); Mona Monkeys thrives in the site, as do some Blue Duikers, Nile Crocodiles, Monitor Lizards and Marsh Mongooses.	Urban development	

ANNEX II: INDICATIVE LIST OF PROTECTED AREAS IN NIGERIA

S, NO	MAP NO.	PROTECTED AREA	MANAGEMENT STATUS	STATE	COMMENT
COMMUNITY FOREST					
1	01	Afrobe/Akwabe Forests	Community land	Taraba	Large rainforest forest block on hill slopes that shields the Donga River catchments. Forest is managed by the community and NCF
2	02	Amurum Woodlands	Community Land	Plateau	Site of the A.P. Leventis Ornithological Research Institute. Home to two endemic birds of Nigeria, the Rock Firefinch <i>Lagonosticta sanguinodorsalis</i> and Jos Plateau Indigobird <i>Vidua maryae</i> .
3	03	Andoni (including Taylor Creek and Biseni Forests)	Community land (Proposed as F.R.)	Rivers	Home to Niger Delta Forest Elephant <i>Loxodonta africana cyclotis</i> . Living Earth Nigera Foundation (LENF) project area.
4	04	Buru Forests	Community land	Taraba	NCF project site. The project is essentially community based and community driven in a participatory manner
5	05	Damper Sanctuary	Community land	Nasarawa	Proposed as Game Reserve
6	06	Mbe Mountains	Community land	Cross River	SPACE Project area. Home to the endangered Cross River gorilla.
7	07	Nun River	Community Land	Rivers	Proposed as game reserve
8	08	Obudu Plateau (including Becheve Nature Reserve)	Community land	Cross River	CR State tourist destination. Part of the Cameroon Mountain Endemic Bird Area. Home to several Afrotropical Highlands Biome-restricted birds, and some IUCN red-listed bird species.
9	09	Finima Nature Park	Community land managed by the NDWC with funds from the NLNG	Rivers	One protected area that includes the largely unprotected Nigerian coastline
FOREST RESERVES					
1	10	Afi River	State government	Cross River	Near major European Barn Swallow winter roost site. Home to the endangered Cross River gorilla.
2	11	Akure	State government	Ondo	Dry forest sub-type managed by the state
3	12	Akure-Ofosu	State government	Ondo	Dry forest sub-type managed by the state
4	13	Akwazanta	Taraba State, NCF & Community	Taraba	Rainforest forest block on hill slopes that shields the Donga River catchments. Forest is managed by the community and NCF
5	14	Apoi Creek	State government	Bayelsa	Important due to the presence of endemic species and IUCN red data species (Scatters guenon, chimpanzee, Niger delta red colobus, Niger delta elephant, Manatee, royal python). Human population pressure is high. Threats include; Hunting, logging, farming, alien invasive species (<i>Nypa fruticans</i>)

S, NO	MAP NO.	PROTECTED AREA	MANAGEMENT STATUS	STATE	COMMENT
6	15	Baissa	State government	Taraba	State managed forest reserve. Currently seriously logged.
7	16	Bisaula	Taraba State, NCF & Community	Taraba	NCF- & community-managed forest in the Donga river catchments
8	17	Cross River North	State government	Cross River	State managed forest reserve but proposed for inclusion as part of Cross River National Park Oban Division
9	18	Cross River South	State government	Cross River	State managed forest reserve but proposed for inclusion as part of Cross River National Park Oban Division
10	19	Donga River	State government	Taraba	State managed forest in the Donga river catchments
11	20	Edumanom	State government	Bayelsa	Shelters the endemic Sclater's guenon and IUCN red data species such as Chimpanzee, olive colobus, Niger delta red colobus. Last known site for Chimpanzees in the Niger Delta
12	21	Ehor	State government	Edo	
13	22	Ekenwan	State government	Edo	Rainforest with a wide range of ecotypes varying from fresh water swamp forest to secondary forest regrowth
14	23	Ekiadolor	State government	Edo	
15	24	Gele-Gele	State government	Edo	Rainforest managed by community based forest management committees with technical support from NCF. Threatened by uncontrolled logging.
17	25	Ibi	State government	Taraba	Wetland savanna woodland
18	26	Idanre	State government	Ondo	Hill ridge forest with artifacts of ancient settlement. Forest is managed by the state mainly for tourism
19	27	Ife	State government	Osun	
20	28	Ifon	State government	Ondo	State-managed game reserve with technical assistance from NCF. Home to the Ibadan Malimbe, which is endemic to Nigeria
21	29	Ikirigon	State government	Cross River	State-managed forest reserve. Good example of riparian forest
22	30	Kagoro-Nindam	State government and community land	Kaduna	Area comprises 4 F.R. & some communal land near Kagoro. Under severe threat from subsistence farming.
23	31	Lizai	State government	Niger	
24	32	Lower Imo	State government	Rivers	
25	33	Lower Orashi River	State government	Rivers	Wetland forest. There is generally open access to the resources of the wetland. Recently, however, the area has witnessed intense conflicts. Most were related to oil and gas exploitation activities but loss of livelihood due to loss of renewable natural resources (fish stocks etc.) is also important factors in these

S, NO	MAP NO.	PROTECTED AREA	MANAGEMENT STATUS	STATE	COMMENT
					conflicts.
26	34	Mada River North	State government	Nassarawa	
27	35	Mada River South	State government	Nassarawa	
28	36	Minna	State government	Niger	
29	37	Obot-Ndom	State government	Akwa Ibom	
30	38	Ogbe	State government	Kogi	
31	39	Ogun River	State government	Ogun	
32	40	Okuta	State government	Kwara	
33	41	Olague	State government	Delta	
34	42	Olokemeji	State government	Ogun	Savanna woodland reserve. Native vegetation almost completely replaced by monocrop of exotic species
35	43	Oluwa	State government	Ondo	
36	44	Omo	State government	Ogun	State forest reserve with remnant herds of elephants. Forest is an Important Bird Area managed by NCF with contribution from Paignton Zoo
37	45	Owan	State government	Edo	
38	46	Owo	State government	Ondo	
39	47	Sombrero	State government	Adamawa	
40	48	Sapoba	State government	Edo	
41	49	Shasha	State government	Osun	Shasha Forest Reserve in (Osun State) is contiguous, on its southern border, with Omo Forest (in Ogun State). Originally 120 km ² , 30km ² in the northern portion of the reserve has been de-reserved for oil palm plantations and cocoa farms
42	50	Stubbs Creek	State government	Akwa Ibom	State-managed coastal wetland forest
43	51	Ukpe-Sobo	State government	Delta	Fresh water swamp forest replete with oil pipelines belonging to SPDC – Shell
44	52	Upper Imo River	State government	Imo	
45	53	Upper Ogun River	State government	Oyo	
46	54	Upper Orashi River	State government	Rivers	Wetland forest. One of the few known Grey Parrots (<i>Psittacus erithacus</i>) roost occur in the wetland. 91 bird species have been recorded including the endemic Anambra Wax Bill. Includes the Ikodi Grey Parrot roost
47	55	Uronigbe	State government	Edo	Rainforest managed by community based forest management committees with technical support from NCF.
48	56	Ukpon River	State government	Cross River	Rainforest contiguous with the CRNP Oban Hills Division and provides the CRNP northwestern boundary with some buffer against agricultural expansion. There are good opportunities here to build upon existing community and park conservation strategies
49	57	Umon Ndealichi	State government	Cross River	State-managed production forest reserve. Under severe threat from

S, NO	MAP NO.	PROTECTED AREA	MANAGEMENT STATUS	STATE	COMMENT
					illegal logging and extensive shifting cultivation agricultural practices.
GAME RESERVES					
1	58	Falgore	State government	Kano	Savanna woodland contiguous with Lame-Burra Games reserve. It has been recommended that the recent management plan developed for Lame-Burra be extended to the management of Falgore in a transboundary collaboration between Bauchi and Kano states.
2	59	Lame-Burra	State government, national park service	Bauchi	Management plan recently developed by NPS with GEF funds
3	60	Maladumba	State government, national park service	Bauchi	Management plan recently developed by NPS with GEF funds
4	61	Ngel-Nyaki & Kurmin Danko	Taraba State, NCF & Community	Taraba	Ngel Nyaki created forest reserve 1967. Made game reserve 1975. Both reserves form one contiguous forest block. Taraba State government now manages both as one forest block
5	62	Pai River	State government	Plateau	
6	63	Pandam Wildlife Park	State government	Plateau	Guinea forest and savanna biomes. Manatee populations are present.
7	64	Wase Bird Rock Sanctuary	State government	Plateau	The inselberg is occasionally used as breeding ground by pelicans. Sudan savanna type vegetation.
8	65	Yankari	State government	Bauchi	Created 1957. Upgraded to national park 1991. Reverted to game reserve 2006. Holds the largest herd of African Savanna elephants (<i>Loxodonta Africana</i>) in West Africa.
NATIONAL PARKS					
1	66	Cross River	Federal government	Cross River	Created by Decree 36 of 1991
2		Chad Basin	Federal government	Borno & Yobe	Created by Decree 36 of 1991. Important for Palearctic migrant birds.
3	67	Gashaka Gumti	Federal government	Taraba & Adamawa	Created by Decree 36 of 1991. Home to a large population of chimpanzees.
4	68	Kainji Lake	Federal government	Kwara & Niger	Created 1975 with legal backing of Decree 46 of 1979
5	69	Kamuku	Federal government	Kaduna	Created by Decree 46 of 1999
6	70	Old Oyo	Federal government	Oyo	Created by Decree 36 of 1991
7	71	Okomu	Federal government	Edo	Created by Decree 46 of 1999. Stronghold for White-throated Monkey, an endemic Nigerian monkey.
STRICT NATURE RESERVES					
1	72	Lekki	Private	Lagos	NCF-owned and -managed facility. Increasingly becoming an ecological island in the face of increasing urbanization in Lagos.
2	73	Omo	Private	Ogun	Lies within Omo Forest Reserve
3	74	Urhonigbe	Private	Edo	64 hectares within Uronigbe Forest Reserve. Stronghold for the nationally uncommon Red River Hog.
WILDLIFE SANCTUARY					
1	75	Afi Mountain	State government	Cross River	Created from part of Afi River Forest

S, NO	MAP NO.	PROTECTED AREA	MANAGEMENT STATUS	STATE	COMMENT
					Reserve. Home of the endangered Cross River gorilla. Option for gorilla-based tourism being explored by State Forestry Commission and Sanctuary partners.
WETLANDS OF INTERNATIONAL IMPORTANCE					
1	76	Apoi Creek Wetlands	FGN, state, & local government, IUCN	Bayelsa	Created from part of Apoi Creek Forest Reserve
2	77	Baturiya Wetlands	FGN, state, & local government, IUCN	Kano & Jigawa	Proposed as National Park. Important for Palearctic migrant birds. Important for Palearctic migrant birds.
3	78	Dagona Sanctuary Lake	FGN, state, & local government, IUCN	Yobe	Lies within Chad Basin National Park. Important for Palearctic migrant birds.
4	79	Foge Island	FGN, state, & local government, IUCN	Kebbi	Lies to extreme north of Lake Kainji National Park
5	80	Lake Chad Wetlands	FGN, state, & local government, IUCN	Bornu	Lies within Chad Basin National Park. Important for Palearctic migrant birds.
6	81	Lower Kaduna – Middle Niger flood plains	FGN, state, & local government, IUCN	Niger	Water released from Shiroro dam upstream is reported to often flood the Rosy bee-eater colonies
7	82	Maladumba Lake	FGN, state, & local government, IUCN	Bauchi	Lies in Maladumba Forest Reserve
8	83	Nguru Lake and Marma channel complex	FGN, state, & local government, NCF, IUCN	Jigawa	Designated Ramsar Site in 2001 (58,100 hectares). Important for Palearctic migrant birds.
9	84	Oguta Lake	FGN, state, & local government, IUCN	Imo	The Oguta Lake Watershed Protection Project is involving local communities in revitalizing the lake.
10	85	Pandam and Wase Lakes	FGN, state, & local government, IUCN	Nasarawa	Management plan developed but not implemented
11	86	Upper Orashi Wetlands	FGN, state, & local government, IUCN	Rivers	Lies in Upper Orashi Forest Reserve. Management plan not implemented
WORLD HERITAGE SITES					
1	87	Sukur Cultural Landscape	Federal & state governments	Adamawa	The cultural landscape of Sukur has survived unchanged for many centuries, and continues to do so at a period when this form of traditional human settlement is under threat in many parts of the world.
2	88	Osun-Oshogbo Sacred Groves	Federal & state governments	Osun	Located in Osun State in southwest Nigeria, this site is credited as the cradle of Yoruba cultural traditions.
UNESCO-MAB RESERVE					
1	89	Omo Biosphere Reserve	State government, UNESCO	Ogun	Lies in Omo Forest Reserve

ANNEX III: PEOPLE INTERVIEWED

Date Met With	Organization	Name and Title	Phone	Email
15-Apr	Chemonics-MARKETS	Somachi Kachikwu, associate		skachikira@chemonics.com
16-Apr	Chemonics-MARKETS	Monique Mitchell, Dep. Dir.		mmitchell@chemonics.com
16-Apr	USAID/EGAT	Tim Resh,	703-470-3166	trersh@usaid.gov
		Diane Russell		drussell@usaid.gov
17-Apr, phone	WCS/New York	Andrew Dunn		adunn@wcs.org
		Graeme Patterson		gpatterson@wcs.org
18-Apr	Nigerian Conservation Foundation	John Oates--by email		johnoates1@aol.com
18-Apr	World Bank	Tony Whitten	202-458-2253	twhitten@worldbank.org
		Isabel Braga	202-458-0121	mbraga@worldbank.org
		Kathy MacKinnon	202-458-4682	kmackinnon@worldbank.org
21-Apr	MARKETS	Alan Bright, Operations	080-54001327	abright@nigeriamarkets.org
		Dick Cook, Director		rcook@nigeriamarkets.org
		Damian Ihedioha, Technology	080-52007010	dihedioha@nigeriamarkets.org
		Niels Hanssens, Dir. Tech Serv		nhanssens@nigeriamarkets.org
21-Apr	Dept. National Parks	Haruna Abubakar (C.G.)	8054904505	
		Jarefu Mamzo/Conservation Dir.	080-35766544	
		Modu Sheriff/Deputy Director		
		Suleiman Yahaya/Admin		
		Admu Hussaini/ecol monitoring		ranger.africa@yahoo.com
22-Apr	CIDA	Ako Amadi	080-33072551	
	World Bank	Afrika Eshogba-Olojoba	093145269-75	aolojoba@worldbank.org
23-Apr	USAID	Nduka Okaro		nokari@usaid.gov
23-Apr	Ministry of Envir., Housing, Urban Development	Chief (Mrs) Halima Tayo Alao		
	Ministry of Envir., Housing, Urban Development	Amos Alolabi, Dir Forestry	080-23396714	amosafolabi44@yahoo.com
	MARKETS	Damian Ihedioha	080-52007010	dihedioha@nigeriamarkets.org
		J.F. Adesina, Deputy Dir	080-30865067	jabesina@yahoo.com
26-Apr	CRS Forestry Commission	Tony Bassey, WL and Conser	080-35526651	tonybassey@hotmail.com

Date Met With	Organization	Name and Title	Phone	Email
28-Apr	Forestry Cross River State/CEO	Dr. Chris Agbor, CEO	080-33221562	fc_gorillas@yahoo.com
	CRS Forestry Commission	Roy Egba/Board member	080-33380626	royrone2002@yahoo.com
	Cross River National Park	Richard Effa/Director	080-57073677	
	Ministry of Envir. Cross River State	Edward Aekpe, Director		
		Stephen Bette, Waste Mgt		
		Godwin Unor Ilem, Envir Quality		
29-Apr	Wildlife Conservation Society	Andrew Dunn	080-35679609	adunn@wcs.org
	Cercopan	Jerry Akparawa, Educ. Officer	087-234-670	jerryakparawa@yahoo.co.uk
		Hendrickxs Anyaoroh, Vet	080-33116344	uchevet@yahoo.com
		Kristine Krynitski, Finance	087-234-670	
	Pandrillus	Dr. Kathy Wood, researcher		klwood22@aol.com
		Dr. Adeniyi Eobetade		wildcave98@yahoo.com
	Nigerian Conservation Foundation	Ubi Sam Ettah, Afi Mt. Wildlife	087-236593	ubisam@yahoo.com
30-Apr	Drill Ranch	Peter Jenkins	087-234-310	pandrillus@earthlink.net
		Olatunji Olatundun		scholeoy_tee@hotmail.com
		Ainare Idoiaga, Vet		ainareidoiaga@hotmail.com
		Erica Farrell		erickahctste@yahoo.com
	Mbe Mt. Community (SPACE)	Mr. Akom Linus, Representative	080-77045355	
	Univ. of Ibadan Students at CRNP	Ogunleye Akinicibola		temidayo2007@yahoo.com
		Esther Omoabemi		temidayo_2001@yahoo.co.uk
	Edun Bummi		esty28@yahoo.com	
		Ademole Adekunle		guard_angel234@yahoo.com
1-May	Cross River National Park	Ajayi T.O.D., conservation	080-53481862	
		Mathias Adie	080-37874210	matadie@yahoo.com
		Ofare Abbor Nohton, interpreter		
	Village near entrance CRNP	H.H. Chief F.N. Apah, chief		
		Albert Akom		
		Apah Peter Nge		
3-May	Gashaka Gumti N.P.	Abubakar Abschulazeez, Educ	080-85231418	ibrabulbakar2004@yahoo.com
		Mohammed Umar, Chief Warden	080-27832726	

Date Met With	Organization	Name and Title	Phone	Email
	Primate students in GGNP	Jackie Buhl		jackiebuhl@hotmail.com
		Jackie Ellis		ellisj12@roehampton.ac.uk
		George Nodza	080-53480499	george84@yahoo.com
		David MacGregor Inglis		
5-May	Bauchi State Govt-Yankari	Alhaji Sadusu Abdulmumin, P.S.	080-33978543	
	NPS/GEF Focal Office	Okafor Francis A.	080-368736	okaforaf@yahoo.com
		Fxentirimam Jauro, Info Officer		fxentirimam@yahoo.com
		Usman Abubakar, M& E		habusman@yahoo.com
	APLORI Research Center Yankari	Talata Tende, student		talatuntende@yahoo.com
6-May	Lake Chad Basin N.P.	Abdullahi Aboulhameed, tourism	08-027998931	abdulnguroje@yahoo.com
		Bello Wakirwa, Park Engineer	080-57055371	
7-May	Nigerian Conservation Foundation	Mohammed Ciarba Boji		mgboyi@yahoo.com
		Harry Hamson Jr.	080-34407960	harryhansjr@yahoo.com
	Nguru Farmers Association	M. Umar Gambo, Chairman	080-6041476	
	IUCN Komadugu Yobe Basin Project	Hallai Garba Ilallah	080-52074949	garbahallai@yahoo.com
	Federal Min of Environment	Hassan Hassan, RAMSAR		c/o Harry Hamson
8-May	MARKETS	Bello Yakasai, Bus. Mgr north	080-52007060	byakasai@nigeriamarkets.org
		Abbas Sheriff, BPO North	080-55095509	asharif@nigeriamarkets.org
		Mairo Hassan, Admin	080-55095516	mhassan@nigeriamarkets.org
	Kano State Forestry Dept.	Yahaya S.B. Kura, /Dep Dir.	080-65533407	
	Kano State Zoo and Wildlife	Musa Kwalli, G.M.	080-34512488	
		Ali Lamal, Zoo Director	080-53573973	
	Min. of Environ, Kano State	Bashir Abba Abubakar, Dir Ecol	080-65573270	
	Falgore Farmers Group	Ten members		c/o MARKETS Kano
9-May	Garko Women Farmers Assn.	Adama Inusa		c/o MARKETS Kano
		Rabi Mohd		
		Abu Rabi		
		Hadiza Adamu		
		Jummai Aadiya		
		Tarasulu Ishaya		

Date Met With	Organization	Name and Title	Phone	Email
		Gabasaws Musa		
		Lachdi Ibrahim		
		Hasatu Abdu		
		Hawwa Bello		
		Jummai Bawa		
		Tabawa Jahiru--chief of women		
10-May	Alheri Seeds Ltd	S.D. Yakubu Atar, CEO	080-37016371	yakubatar@yahoo.com
	Extension Service	J.U. Yashims	080-35073470	
12-May	Leventis Foundation	Phil Hall	080-33083311	110226.2654@compuserve.com
	USAID	Wayne Frank, Agri	0080-34081046	wfrank@usaid.gov
		Anne Fleuret, Strat. Analysis	080-36650146	afleuret@usaid.gov
		Sandy Oleksy-Ojikutu	080-34081059	sojikutu@usaid.gov
13-May	Nigerian Conservation Foundation	Prof Emmanuel Obot		eaobot@yahoo.com
	USAID	Garba Abdu, Child Survival	080-37868016	gabdu@usaid.gov
		Akua Kwatend-Addo, Survival	080-36590377	akwateng-addo@usaid.gov
		Minnie Wright, Prog. Officer	080-39606380	mwright@usaid.gov
17-May	Team Meeting	Prof Enoch Opkara-policy		eekonzult@yahoo.com
		Dr. Damian Ihedioha	080-52007010	dihedioha@nigeriamarkets.org
19-May	Presentation at MARKETS			
	Sust. Tree Crop Program	Dr. Chris Okafor, country manag	080-33801225	c.okafor@cgiar.org
	Fed. Min. of Environment	Dr. Nanma Okoye	080-33771142	dr_ujuokoye@yahoo.com
	Imo State University, Owerri	Enoch Okpara	8033234993	
	MARKETS	Ibrahim Mohammed	8055095512	imohammed@nigeriamarkets.org
	MARKETS	Samuel makinde	8055095504	smakinde@nigeriamarkets.org
	MARKETS	Kurawa Farouk	8055000267	fkurawa@nigeriamarkets.org
	MARKETS	Simon Ibana	8054001252	sibana@nigeriamarkets.org
	MARKETS	Ogadinma Ogbonna	8054001173	oogbonna@nigeriamarkets.org
	MARKETS	Ben Odoemna	8055095514	bodoemena@nigeriamarkets.org
	MARKETS	Gloria Nwokedi	8055095501	gnwokedi@nigeriamarkets.org
	MARKETS	Niels Hanssens	8055095502	nhanssens@nigeriamarkets.org

Date Met With	Organization	Name and Title	Phone	Email
	National Park	John Larry Makong	8033782618	
	National Park	Suleiman Yahaya	8036903057	
	TreeCrop Agency	Dr. Adeleke	8036532451	
	Ministry of Environment	Dr. Uju Okoye	8033771152	dr_ujuokoye@yahoo.com
	MARKETS	Godson Ononiwu	8054000945	gononiwu@nigeriamarkets.org
	MARKETS	Theo Agada	8055095505	tagada@nigeriamarkets.org
	CIDA	Ako Amadi	080-33072551	

ANNEX IV: SCOPE OF WORK

Overview and Objective

USAID/Nigeria operational planning process requires a current biodiversity and tropical forestry assessment. With Nigeria designated a USAID/State/National Security Council (NSC) priority country, it becomes even more imperative to have this assessment. Understanding of threats to biodiversity and opportunities for forest and biodiversity management into USAID/Nigeria's operational planning process will help to ensure that activities are conducted in an environmentally sustainable manner, while at the same time identifying opportunities for enhancing the quality of the natural resource base.

The objective of this task is to deliver to USAID/Nigeria a countrywide tropical forestry and biodiversity Assessment that will meet the requirements of Sections 118(e) and 119(d) of the Foreign Assistance Act of 1961, as amended (FAA) and ADS 201.3.8.2 regarding tropical forestry and biodiversity analyses for country strategic plans and other plans prepared by USAID. USAID/Nigeria conducted an Environmental Analysis in April 2002 and 2005. The Mission also provided an update to meet the requirement for the FY07 Operational Plan submission.

Background

Policies Governing Environmental Procedures

The Foreign Assistance Act (FAA) of 1961, Section 117, requires that the President take fully into account the impact of foreign assistance programs and projects on the environment and natural resources (Section 117 (c)(1)).

Section 118 states that each country development strategy statement or other country plan prepared by the U.S. Agency for International Development shall include an analysis of (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

Section 119 of the FAA relates to Endangered Species. It states that "the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems and through the protection of wildlife habitats should be an important objective of the United States development assistance" (FAA, Sec. 119 (a)). Furthermore it states, "Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of (1) the actions necessary in that country to conserve biological diversity and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified" (FAA, Sec. 119 (d)).

USAID's Program in Nigeria

USAID launched the 2004-2009 Country Strategic Plan on January 1, 2004, and signed four Strategic Objective Grant Agreements with the Government of Nigeria on June 30, 2004. These

agreements, for programs in democracy and governance, agriculture and economic growth, integrated social services, and HIV/AIDS treatment, prevention, care and support, reflect the four objectives that formed the core of USAID's strategic approach at that time.

The USAID/Nigeria strategy statement approved in June 2006 has five mutually reinforcing strategic objectives: governance, livelihoods, health, education, and HIV/AIDS. Each of these strategic objectives will simultaneously promote achievement of a transformational development goal, while promoting US foreign policy interests and addressing one or more of the causes of fragility in Nigeria. Four of the five SOs directly address one of the major hurdles confronting Nigerians youth. The health SO 15 will reduce child mortality; the education SO 16 will increase school attendance and literacy; the HIV/AIDS SO 14 will provide prevention, treatment, and care and support interventions with youth as a target population, and the livelihoods SO 12 will offer hope and opportunity for the unemployed. The governance SO 11 will support efforts across the portfolio to increase capacity, transparency, and accountability, and mitigate conflict, with specific attention to the needs of youth.

Under the new strategic framework for U.S. foreign assistance, USAID Nigeria operate in four of the five priority objectives; namely, Peace and Security, Governing Justly and Democratically; Investing in People; and Economic Growth. Nigeria is categorized as Developing Country, which is a state with low or lower-middle income, not yet meeting performance criteria related to effective and democratic governance, investments in people and economic freedom.

USAID/Nigeria between March 3, 2004 and March 2, 2007 under the Mission's Improved Livelihoods Strategic objective implemented an environmental program called SPACE designed to limit agricultural expansion into a 7,000 square km of the remaining lowland tropical rain forest in Cross River State, Nigeria.

Statement of Work

The Contractor shall perform the following activities:

- Pre-travel informational meetings and information gathering. Prior to travelling to the field, the contractor is expected to:
 - Hold meetings with the USAID/Bureau for Africa Bureau Environmental Officer (BEO) Bureau Environmental Advisor (BEA) to ensure full understanding of USAID planning procedures, the assessment experience, and purpose of this assignment.
 - Gather and get acquainted with existing background information on Nigeria such as the country's natural resources, geographical, ecological and biological specificities, current status of environment and biodiversity, institutional organization on entity and state level, key stakeholders and donors in environment and biodiversity, legislation related to the environment and biodiversity, and other relevant information required for the country assessment. Key reference will include the mission web site at <http://www.usaid.gov/ng/> and the FRAME Nigeria web page at http://www.frameweb.org/ev_en.php?ID=1069_201&ID2=DO_TOPIC
 - Meet or speak with key stakeholders or managers at the World Bank, USDA Forest Service, and U.S.-based NGOs including World Wildlife Fund, World Resources

Institute, and Wildlife Conservation Society, or other organizations involved in biodiversity conservation in Nigeria or relevant regional efforts.

- Field a team to conduct an overview and general analysis of the country's biodiversity and its current status. Upon arriving in Nigeria the team will:
 - Meet with USAID/Nigeria Economic Growth (EG) team to get a solid understanding of Mission program goals and objectives under its Operational Plans for FY 2007 and FY2008; perspectives of this assignment and specific interests for the team, including advice and protocol on approaching USAID partners and host country organizations with respect to this assignment. The team shall be aware of sensitivities related to an assessment exercise (i.e., the potential for raising expectations, and the need to be clear about the purpose of the assessment) and respect Mission guidance. The team will discuss organizations to be contacted and any planned site visits with the Mission and coordinate as required. USAID/Nigeria EG team will facilitate meetings with other USAID Objective teams.
 - Hold meetings with donor organizations, NGOs, relevant government agencies, and other organizations that are knowledgeable about biodiversity and tropical forestry conservation or are implementing noteworthy projects and gather information locally.
 - Conduct no less than three priority site visits, which would supplement understanding of USAID's program, or of biodiversity issues that arise in interviews and literature or would confirm information in previous assessments. One visit shall include the Cross River rain forests and its National Park. The site(s) for the second (or third) field visit will be determined by the team during the assessment in consultation with USAID.

- Assess and summarize the needs for biodiversity and tropical forestry conservation in Nigeria based on key threats and analysis of country, donor and NGO responses to meet these needs. Prepare a report on the status of biodiversity, tropical forestry and conservation efforts in Nigeria and potential implications for USAID or other donor programming and environmental monitoring which shall define the actions necessary for conservation. The report shall include:
 - The current status of the environment, biodiversity, tropical forests, and water resources in Nigeria based on current and available information.
 - Major ecosystem types, highlighting important, unique aspects of the country's biodiversity, including important endemic species and their habitats.
 - Descriptions of natural areas of critical importance to biodiversity conservation, such as forests and wetlands critical for species reproduction, feeding or migration, if relevant. Particular attention should be given to critical environmental services and non-commercial services they provide (watershed protection, erosion control, soil, fuel wood, water conservation, carbon sequestration, and amenity and recreation). It will also summarize how current land tenure arrangements affect conservation in Nigeria.
 - An overview table and map of the status and management of protected area system in Nigeria including: an inventory of all declared and proposed areas (national parks, wildlife reserves and refuges, forest reserves, sanctuaries, hunting preserves and other protected areas). The inventory will identify the institution responsible for the protection and management of each decreed area, its date of establishment, area, and the protection status of each (i.e., staff in place, management plan published.) In addition to this

summary of the current protection and management status of each protected area, an overview of the major threats and challenges facing protected areas in Nigeria, including vulnerability of areas to predicted changes in climate, and a brief summary of any recognized economic potential of these areas (including productive assets, environmental services and recreation and tourism opportunities) should be provided.

- Descriptions of plant and animal species that are endangered or threatened with extinction. Endangered species of particular social, economic or environmental importance should be highlighted and described, as should their habitats. Technical information resources such as the IUCN red list and their websites should be referenced for future Mission access as required. This section should not emphasize species counts, but look at the relation of endangered species and important habitat conservation areas and issues, and evaluate the pressure on those areas, including vulnerability to predicted changes in climate, and current efforts to mitigate pressures, including the participation and compliance with CITES and other international efforts.
- Recent, current, and potential primary threats to biodiversity, whether they are ecological (i.e., fire, pests), related to human use (i.e., agriculture, contamination), or institutional (i.e., failed policy) or trans-boundary issues, as appropriate. These should emerge from a general assessment of national policies and strategies and their effectiveness, issues related to institutional capacity, trade, private sector growth, participation in international treaties, and the role of civil society.
- Conservation efforts, their scope and effectiveness. This section also should include recent, current and planned activities by donor organizations that support biodiversity and tropical forestry conservation, identification of multilateral organizations, NGOs, universities, and other local organizations involved in conservation, and a general description of responsible government agencies. A general assessment of the effectiveness of these policies, institutions, and activities to achieve biodiversity conservation should be included. Priority conservation needs that lack donor or local support should be highlighted.
- Analysis of the current legislation related to the environment and biodiversity. This section should include identification of laws related to protection and management of biological resources and endangered species. It should also point out any differences in laws that require further harmonization. This section should also review international treaties signed and ratified, as well as those that Nigeria needs to sign in order to conserve and manage its biological resources more efficiently.
- An overview of the major biodiversity and tropical forest conservation activities of the commercial private sector to identify ways to better foster private sector alliances. Of interest are the norms and standards followed by those commercial entities most engaged in management and use of Nigeria's tropical forests and tracts near protected areas, including tourism developers and coffee producers. Consideration of policies promoted by the key relevant governmental ministries should also be included.
- An assessment of how USAID's program and proposed country strategy meets the needs for biodiversity and tropical forestry conservation, consistent with Mission program goals and objectives, through strategic objectives other than environment. The assessment shall include recommendations on where U.S. comparative advantages and capabilities are likely to have the greatest impact. These issues and recommendations should be prioritized to identify those requiring the most immediate attention.

If any perceived areas of concern related to USAID's program and its contribution or impact arise during this assessment, the contract shall provide views and suggestions directly to the Mission Environmental Officer in a separate briefing.

Key Personnel and Technical Expertise

There is one key personnel associated with this activity, the Biodiversity Conservation Specialist & Team Leader as described below who coordinates the whole effort. He or she will work with other short-term consultant(s) with experience in forestry, ecology, hydrology, and/or natural resource management assessment and analysis. Also, the consultant(s) will be familiar with the impacts of government policy on biodiversity conservation and natural resource conditions.

Biodiversity Conservation Specialist & Team Leader

The lead consultant will have an advanced degree in conservation biology, wildlife biology, conservation management or related specialization with no less than seven years experience in international conservation. The person should have solid team leadership and evaluation experience and should have experience leading similar biodiversity and forestry conservation analyses in Nigeria or West Africa. Other key characteristics will include excellent communication skills (oral and written), analytic skills, and strong interpersonal skills. Familiarity with USAID programs is strongly preferred.

Additional NRM Specialists

The Consultant shall propose additional technical specialists needed to effectively carry-out this analysis. Priority shall be given to hiring Nigerian specialists familiar with Nigeria's biodiversity and forest resources where appropriate.

Responsibilities and relationships: This activity is managed by USAID/Nigeria's Mission Environmental Officer (MEO) through the MARKETS project. The Mission has provided financial support for this task to MARKETS project. The consultants will report to MARKETS MD but work closely with the MEO for the implementation of this program. The Mission will provide comments (along with AFR Bureau Office of Sustainable Development/EGEA) on the draft report submitted by the Lead Consultant

Period of performance and LOE: A level of effort of two months will be required to accomplish this activity:

- 1 week initial desk study in Washington;
- 4 weeks to conduct literature review and conduct field studies and;
- 2 weeks to write up the draft report
- 1 week to write up the final report.

Deliverables: All reports will be provided to USAID/Nigeria in hard-copy and in electronic format using MS Word and in Adobe PDF.

- Tasks and deliverables

- Within one week of the TO being awarded the Consortium leader and Key Personnel will hold a teleconference with the USAID/Nigeria MEO to discuss the TO and agree on expectations and site visit criteria and deliverable formats.
 - Within 15 working days of Award, the TO Key Personnel will deliver a detailed proposed methodology and timeline for the 118/119 analysis. Key personnel and MEO will discuss and finalize.
 - Implement agreed upon methodology for the analysis, including appropriate document reviews, interviews, 1-3 site visits and associated data analysis. Site visits may include USAID participation.
 - Prepare draft report for review by MEO, USAID staff, and host country partners. It is expected that USAID will review the draft focusing on sensitivities and overall focus and not comment on specific technical findings.
 - Incorporate necessary edits and prepare final report and associated presentation materials.
 - Deliver two presentations of findings, one for an internal USAID audience and one to a broader body of GCP and conservation partners.
- Specific deliverables will include:
 - Draft methodology and timeline.
 - Final methodology and timeline, including site visits agendas.
 - Draft report with additional associated appendices and supporting materials as outlined in the SOW.
 - Final report submitted in paper and electronic copies not more than one week after comments are due. Report must meet all legal USAID branding, style and formatting requirements.
 - All reports shall be in English
 - Presentation of findings in PowerPoint format to be delivered.

Key reference documents: In preparing a response, consultants are encouraged to utilize the following key documents for relevant background information:

- USAID/Nigeria's Mission Strategic Plan 2004-2009
- USAID/Nigeria Country Strategy Statement, January 2006
- Nigeria Environmental Analysis [2005.pdf](#) (206KB); [2002.doc](#) (1MB)
- Sustainable Practices in Agriculture for Critical Environments (SPACE): Conservation and Livelihoods in Cross River State, Nigeria – Final Report (May 2007)
- USAID's Definition of Biodiversity Programs:
- http://www.usaid.gov/our_work/environment/biodiversity/code.html
- USAID's Biodiversity Conservation Guide for Staff & Partners
- [Biodiversity Conservation: A Guide for USAID Staff and Partners, FY2005](#) (6.81MB PDF)
- [Tropical forestry and biodiversity \(FAA 118 and 119\) analyses: lessons learned and best practices from recent USAID experience](#). (655 KB) Associates in Rural Development, Inc. (ARD); USAID. Bur. for Economic Growth, Agriculture and Trade. Ofc. of Environment and Natural Resources. Sep 2005. 74 p. PN-ADE-195
- [Best practices for biodiversity and tropical forest assessments](#) (508 KB) Chemonics International Inc.; USAID. Bur. for Economic Growth, Agriculture and Trade. Ofc of Agriculture. Apr 2005. 28 p. PN-ADE-673