

World Heritage Sites

Protected Areas and World Heritage



ECOSYSTEM & RELICT CULTURAL LANDSCAPE OF LOPÉ-OKANDA GABON

Few other African sites to have so high a density of animal biomass, which exists within a well protected forest varied and large enough to maintain its genetic diversity. The site also preserves a record of biological evolution over the last 15,000 years on the edge between a dense and well conserved tropical rainforest and relict savannah. These occur with an exceptional record of successive cultures from the late Palaeolithic, their hilltop and cave sites, tools, iron workings and some 1,800 petroglyphs; also the record of the southeastward migration of the Bantu peoples through the Ogooué valley.

COUNTRY

Gabon

NAME

Ecosystem and Relict Cultural Landscape of Lopé-Okanda

MIXED NATURAL AND CULTURAL WORLD HERITAGE SITE

2007: Inscribed on the World Heritage list under Cultural Criteria iii and iv & Natural Criteria ix and x.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE

The UNESCO World Heritage Committee issued the following statement at the time of inscription:

The Ecosystem and Relic Cultural Landscape of Lopé-Okanda represents an unusual interface between dense and well conserved tropical rainforest and relict savannah environments. A greater number of threatened species of large mammals find their last refuge in Lopé-Okanda than in any other comparable rainforest area in the Congo Rainforest Biogeographical Province. The property also preserves a record of biological evolution over the last 15,000 years of the still extant rainforest-savannah transition zone.

The Lopé-Okanda National Park displays remarkable evidence for settlement stretching over 400,000 years from the Palaeolithic, through the Neolithic and Iron Age, to the present day Bantu and Pygmy peoples. The National Park includes the River Ogooué valley, one of the principle migration routes for the diffusion of people and languages, including the Bantu, to Central and Southern Africa, in the Neolithic and Iron Age, as evidenced in extraordinary number of substantial settlements sites and an extensive collection of rock art petroglyphs. The Lopé-Okanda National Park provides the oldest dates for the extension of the Tshitolién culture towards the Atlantic and it has revealed evidence of the early domestication of plants and animals and the use of forest resources.

Criterion (iii): the rich archaeological ensembles of the middle stretches of the River Ogooué Valley demonstrate 400,000 years of almost continuous history. The archaeological sites have revealed the earliest date for the extension of Tshitolién culture towards the Atlantic, as well as detailed evidence for the early use of forest produce, cultivation of crops and the domestication of animals.

Criterion (iv): the collection of Neolithic and Iron Age sites together with the rock art remains appear to reflect a major migration route of Bantu and other peoples along the River Ogooué valley to the north of the dense evergreen Congo forests from West Africa to central east and southern Africa, that has shaped the development of the whole of sub-Saharan Africa. The subsidiary Iron Age sites within the forest provide evidence for the development of forest communities and their relationship with present day peoples.

Criterion (ix): The nominated property demonstrates an unusual interface between forest and savannah environments, and a very important manifestation of evolutionary processes in terms of species and habitat adaptation to post-glacial climatic changes. The diversity of species and habitats present are the result of natural processes and also the long-term interaction between man and nature.

Criterion (x): The diversity of habitats and the complex relationship between forest and savannah ecosystems have contributed to a high biological diversity particularly in relation to the property's flora, making it one of the most outstanding areas in relation to floristic diversity and complexity in the Congo Rainforest Biogeographical Province. Over 1,550 plant species have been recorded, including 40 never recorded before in Gabon, and it is anticipated that once all the floristic surveys and research are completed the number of plant species could reach over 3,000.

The property is of sufficient size to maintain the long-term ecological viability of its habitats and ecosystems. The conservation and management of the property is guided by a management plan for the period 2006-2011 which is supported by international cooperation, particularly through a number of international and national NGOs. Conservation and management of the property also benefits from a number of transboundary cooperation initiatives. Key management issues include the need to resolve conflicts from competing interests, and to raise awareness amongst local people on the importance of conserving this property and to involve them in its management. Control and regulation of commercial poaching is of priority as well as the need to fully enforce regulations banning commercial logging within the property. Additional financial, logistical and human resources need to be obtained to ensure the effective management of the property and its buffer zone.

The authenticity of the archaeological sites and rock art site is intact. There is a need for consolidation of the excavated sites to be carried out to ensure that they are not eroded by natural or human processes

The integrity of the cultural sites lies mainly in their relationship to one another along the River Ogooué Valley corridor which facilitated waves of migrations and subsidiary, later archaeological sites which fan out along the lesser river valleys within the forest. It would be desirable if at some point in the future that part of the river valley between the north-west corner of the National Park and the historic ensemble to the north-west could be included so that the integrity of the river corridor as a whole could be protected

The legal protective measures for the property are adequate to protect the cultural attributes of the landscape. Without a mission to the main archaeological sites in the River Ogooué Valley, details of the state of conservation of the cultural property cannot be recorded. Currently there are no active conservation measures undertaken on the archaeological sites. Although many of the sites are remote and this remoteness will help provide good protection, it would appear that over time consolidation and remedial work will be needed. High priority should be given to putting in place one or more staff with appropriate training for archaeological sites and cultural landscapes

IUCN MANAGEMENT CATEGORY

Lopé-Okanda National Park:	II National Park
Lopé-Okanda <i>Aires Culturelles Protégées</i> :	II Natural Monuments

BIOGEOGRAPHICAL PROVINCE

Congo Rainforest (3.2.1.)

GEOGRAPHICAL LOCATION

The area is located in central Gabon just south of the equator, 290 km east of the capital Libreville and 20 km west of Booué on the Oguoee river. With the buffer zones to the northwest and southeast, which enclose the historical sites, it lies between 0° 02' S to 01° 13' S and 11°02' E to 11° 54' E.

DATES AND HISTORY OF ESTABLISHMENT

1946: The Lopé-Okanda Hunting Reserve created, with the Okanda National Park and Offoué Strict Natural Reserve further south, totalling 480,000 ha;

1962: The three areas were combined to form *l'Aire d'Exploitation Rationnelle de Faune de l'Offoué*;

1982: All three areas became the Lope Faunal Reserve with controlled access and prohibition on development;

1983: The *Brigade de Faune* assumed control of the Reserve and began to limit encroachments;

- 1996: A *Reserve Naturelle Integrale* established over the whole area with controlled economic activity permitted only in the multiple-use *Zone d'Exploitation Villageoise*;
- 2002: *Le Parc Nationale de la Lopé* created by Ordonnance 6 with boundaries defined by Decree 607;
- 2005: 7 adjacent archaeological *Aires Culturelles Protégées* gazetted by the Ministry of Culture & Arts;
- 2007: A High Council of National Parks and National Parks Agency created.

LAND TENURE

Government of Gabon, in the provinces of Ogooué-Ivindo, Moyen Ogooué, Ogooué-Lolo, and Ngounié. The administrative responsibility rested until early 2007 with the *Conseil National des Parcs Nationaux* (CNP) in collaboration with the *Direction de la Faune et de la Chasse* (DFC) of the Ministry of Waters, Forests and the Environment (MEF). The Park is managed in the field by CNPN's *Brigade de Faune* with the advice of the forest service. The relation with the Ministry of Culture for management of the seven complexes in the buffer zone is being defined. An *Haut Conseil des Parcs Nationaux* and an *Agence Nationale des Parcs Nationaux* have just been created to succeed CNPN

AREA

491,291 ha: National Park, 484,894 ha + 6,397 ha multiple use zone enclosures around six villages within the Park. A 170,700 ha notional buffer zone is formed of a peripheral 5 km-wide strip of 150,000 ha plus 20,700 ha in two extensions to include 6 historical complexes in the Ogooué valley (16,700 ha) and one on Mont Iboundji to the southeast (4,000 ha).

ALTITUDE

75m - 960m (Massif du Chaillou)

PHYSICAL FEATURES

The Park extends some 120 kilometres south from the Ogooué, the major river of central Gabon, the valley of which is the country's major cross-country transport corridor. The Park has an average width of 45 kilometers, narrowing towards the south. It is centred on the Lélédi river basin between the Mingoué river valley to the west and the Okanda Mountains, extending to the west slopes of the Offoue river valley on the east, and the Mighakou river valleys in the south. A smaller tributary, the Lopé, also flows north to the Ogooué directly from the Park. The Okanda Mountains run from the Ogooué rapids and gorge, *les Portes de l'Okanda*, becoming a plateau at 350m, rising gradually to 850m and reaching a highpoint of 960m in the Massif du Chaillou just outside the Park in the far southeast. The northern end of the Reserve is the level basin of a former lake between 110-300m in elevation, closed on the west by the hills. In the north, northeast and central eastern area savannas and a forest-savanna mosaic occur amongst hills, plateaux, ravines, rapids, rivers and marshes. These provide the basis for a great diversity of flora and fauna, to the dispersal of which the surrounding large rivers have formed natural barriers. The bedrock is a 2,700 million-year old granodiorite platform overlaid with 1,950 million-year old Proterozoic strata of schist and gneiss, volcanic detritus and quartz sandstone (which is carved with petroglyphs). River terraces are formed in recent alluvial deposits, where most of the relics of human settlement are found. The savanna soils are granular, acid, eroded, especially on slopes in the savanna, and suffer from dry-season fires. The valley soils are hydromorphic. The south and west of the Park are roadless forest.

CLIMATE

The equatorial climate is warm-humid with an equable temperature of around 26°C. But the annual rainfall at Lopé of 1,502mm which falls mainly between mid-February and June is unusually low for its location because it is in the rain-shadow of the Massif du Chaillou, which gives rise to warm dry föhn-like winds from the west. There is a three-month dry season between mid June and mid September and a shorter dry season from mid December to mid February. Clouds frequently hanging over the montane forest preserve its humidity which limits fires from the savanna. Flooding is regular but benign.

VEGETATION

The Park contains both Pleistocene relict rainforest and very ancient anthropogenic savannas with an interface between which reveals a record of biological evolution over the last 15,000 years at least. 1,500 plant species are recorded, 40 being newly known to Gabon. The densely forested mountains of the south are little studied. At the global level, one of its species, *Tricalysia macrophylla*, is critically endangered, 8 others are classified as endangered and 24 more as vulnerable. Within the Park six types of savanna cover 5% of the north, northeast and east, and 17 types of forest survive in an excellent state of preservation. The landscapes of the savanna and savanna-edge have been markedly shaped by man.

On the savanna 231 species have been collected. Among the dominant families are the *Poaceae*, *Cyperaceae*, *Papilionoideae*, *Asteraceae* and *Rubiaceae*. The varieties of savanna range from dry with nine species per sq.m dominated by *Anadelphia arrecta* through two other distinct sub-types to rich (and more fire-prone) grasslands with 20 species per sq.m where the *Anadelphia* is co-dominant with a range of other grasses and shrubs. There are also floristically richer marshland savanna and fern grasslands on steep forest escarpments dominated by *Dicranopteris linearis*. There is great variety in compositional balance between sites. Especially around the forest-savanna interface, forest types have changed dynamically in the past, and continue to do so. One major reason has been the activities of Iron Age people who, in varying places in the forest, felled trees to smelt iron. They also burnt the savanna regularly. Until about 1400 BP much of the area now forest seems to have been grassland. Thereafter for 600 years the population declined and after 800 BP left the forest area to recolonise the savanna.

The biogeographic type is described as Congo Rainforest in the Udvardy system, and Lower Guinean in the nomination. The zone is transitional between the two forests and its biota is enriched from both extremes. There are three principal types of forest: gallery forest with old planted groves in the extensive forest-savanna mosaic of the north and east, young forest on former savanna on the forest edge, and ancient mature forests on mountain tops in the north. In the south, Pleistocene refuges still yield species new to science. Forest species grow larger and denser in the succession from the savanna edge through open forests to dense mature forest. This succession is categorised in eight types differentiated by the dominant canopy and herbaceous species: pioneer woodland, the forest edge marked by *Aucoumea kleineana* (VU), *Lophira alata* and *Sacoglottis gabonensis* always found with settlements, a similar forest edge with a Marantaceous herb layer, and denser heterogenous marginal forest. Towards the heart of the Reserve occur mixed high canopy forest, mature forests, three differing forest types dominated by single species and ancient ombrophilous forest.

Above the lowlands are semi-montane forest to 500m and inselberg forests. In both former savanna and mountains there are three types of forest on rock outcrops ranging from sparse to quite dense. Associated with water are distinct marshland, riverine and ravine forests and there is pioneer growth on forested land disturbed by landslides or logging. As is typical of tropical forests, the diversity is very high: more than 1,550 plant species have been collected in the area. The dominant forest families are *Rubiaceae*, *Caesalpinaceae*, *Poaceae*, *Euphorbiaceae*, *Pteridophyta* and *Papilionoideae*, at least 15 per cent of which are leguminous. Six genera and 40 species have been fairly recently discovered. Six species are endemic to Lopé. As late as 1996 a tall tree of a monotypic genus was discovered: *Engomegoma gordonii*; and one, *Conceveiba macrostachys*, in the Euphorbiaceae, is the first South American species to be found in Africa. There are no other exotics. Four further endemic species are recent discoveries: *Cola lizae*, a forest edge tree, and *Afromomum sericeum* a wild ginger also found there, *Dialium lopense* in gallery forest and *Begonia lopense*, a Pleistocene relic.

FAUNA

Within its natural limits and nearly 900m of vertical range, the Park contains a large and complete enough series of ecosystems at all trophic levels to sustain its animal populations over the long term. It is also connected to the forests of the Massif du Chaillu, allowing the larger mammals an extended foraging range. The 21 threatened species are more than are found in any comparable Congo rainforest site. Among the 84 species of mammals, primates are abundant and dominant. There are 15: 9 diurnal and 6 nocturnal primates, 7 of which are globally threatened. Among these the western lowland gorilla *Gorilla gorilla* (EN:>2000 individuals in 2003; CMS/GRASP, 2008), mandrill *Mandrillus*

sphinx (VU; 100,000), central chimpanzee *Pan troglodytes* (EN; 2,200, in recent decline), the endemic sun-tailed monkey *Cercopithecus solatus* (VU) discovered in 1994, black colobus *Colobus satanas* (VU: 100,000), northern talapoin monkey *Miopithecus ogouensis*, Stampfli's putty-nosed monkey *Cercopithecus nictitans stampflii*, and three near-threatened species. Mandrills have been seen travelling in groups of up to 1,350. As with the gorillas, they are not endangered within the Park. There are also 12 carnivore species, among them leopard *Panthera pardus* (1,000) African golden cat *Caracal aurata*, spotted-necked otter *Lutra maculicollis* (VU) and giant otter shrew *Potamogale velox*. In 2006 there were some 5,500 forest elephants *Loxodonta africana cyclotis* (VU), the densest population in Africa, and 14 ungulates, including African forest buffalo *Syncerus caffer nanus*, the endemic Ogilby's duiker *Cephalophus ogilbyi crusalpum* and seven other near-threatened species; also 21 smaller mammals. Two or three hippopotami *Hippopotamus amphibius* (VU), a species thought to have been exterminated in 1998, were sighted in 2006 at the confluence of the Ogooué and Offoué rivers.

405 species of birds have been identified - 60% of those recorded in Gabon, 285 of which breed in the Park. Of these 193 are forest birds, 38 are found in the forest-edge and savanna, 40 by rivers and marshes and 25% are migratory. Rare species include grey-necked rockfowl *Picathartes oreas* (VU), lyre-tailed honeyguide *Melichneutes robustus*, red-fronted parrot *Poicephalus gulielmi* and Dja River warbler *Bradypterus grandis*. Fish, amphibians and reptiles are not well studied but the latter include the African dwarf crocodile *Osteolaemus tetraspis* (VU), monitors and numerous lizards and snakes. Three new species have been found on Mt. Iboundji: a toad *Werneria iboundji* (CR), a gecko *Hemidactylus kamdemtohami* and a blind snake *Letheobia pawelsi*: indicators of the biotic richness of the mountain.

CONSERVATION VALUE

Few other African sites have so high a density of animal biomass within a protected area inaccessible, large and undisturbed enough to maintain its genetic diversity. In addition the site preserves a record of biological evolution of the rainforest-savanna edge over the last 15,000 years and an exceptional record of successive cultures from late Palaeolithic times, their sites, tools and petroglyphs.

CULTURAL HERITAGE

Culturally the long climatic, technological and societal history of the forest-savanna interface in central Gabon is well preserved by ecological and archaeological evidence in the Park. Its grasslands were inhabited almost continuously from later Palaeolithic times 350-400,000 years ago to the present, preserving in very good condition an exceptional record and dense concentration of successive cultures in the remains of Palaeolithic tools, Neolithic villages of 4,000 years BP and Iron Age metal-working sites from 2,500 years ago. The hunter-gatherer settlements on hills in the savanna left the oldest and greatest concentration of archaeological relics in west-central Africa, surrounded by the remains of their food plants. Except for a few hunting camps, the forest may have been little entered until the Iron Age when settlers advanced into the heart of the Park.

Between 2500 and 1400 BP two waves of Bantu iron-working cultures on their slow migrations south, settled in large hilltop settlements, burnt and felled the forest and carved some 1,200 petroglyphs on quartz sandstone which are found especially in archaeological sites around Elarmékura on the Ogooué west of the National Park. These are mostly circles and chains of circles but also show animals, tools and arms. After a lapse of about 700 years during which the marginal forest recovered, two new groups of iron-workers settled by the Ogooué: the Lopé group in the savanna and the Lélédi group near the Ogooué valley, though Bantu through-migrations continued until the 18th century. For centuries they extended the savanna by use of brush fires and encroached on the forest, clearing it for plantations of fruits and manioc, a pattern which still persists in the north of the Reserve. Two of their sacred places are traditionally protected: Mount Mikongo and the Ogooué rapids. The population is also notable for being on a border between matrilineal (Okandé) and patrilineal societies. The cultural significance of the area has been evaluated by ICOMOS.

LOCAL HUMAN POPULATION

The region is inhabited by a mosaic of people speaking four of the eight Bantu languages of Gabon. Fewer than 2,000 of the original Okandé live along the Ogooué valley with the related Saké and Simha people. The southern forests along the Offoué river are inhabited by the Akélé and groups of Baka

pymies. In the near past there were agricultural villages in the interior of the Park, now removed to the Ogooué valley, their sites reverting to forest, and small pygmy bands in the forests of the south. Despite its former designation as a Reserve, the area was opened to exploitation after a railway and main road to the interior were cut through the northern edge of the site in the Ogooué valley to the town of Booué between 1979 and 1983. Hunting was permitted and the local hippopotamus, which the Park was created to protect, was virtually killed off. Since the 1960s nearly half the Reserve was selectively logged and the forest opened up by tracks. Forests in the northern half next to the savanna, in the Mingoué valley in the west and down the Lélédi valley in the centre have suffered most from logging and the loggers who hunted down the wildlife. This has now been stopped: villagers have been moved to the north of the Park and secondary forest is reclaiming the village sites. However, by 2000 the population had grown to some 1,320 inhabitants in nine villages, mostly in the savannas of the north and northeast along the Ogooué, Lopé and Offoué rivers, with 300 living in the buffer zone. Lopé village is now the Park Headquarters. The main occupations are agriculture, fishing, hunting with some cattle-rearing, practised from village enclaves in the multiple-use zone within the Park borders. There is a small saw mill.

VISITORS AND VISITOR FACILITIES

Between 2000 and 2005 the Park saw only about 1,200 visitors a year, mostly foreigners, but the number is growing. Access is easy via the railway and highway along the Ogooué valley on the northern border. The town of Booué, 20 km east, has an airstrip and there are three landing strips within the Park. There is a very good hotel in Lopé village at the north end of the Park with a small airstrip, restaurant, 30 bungalows and 12 well-trained guides who lead small ecotourist groups to view the savanna, the forest, the fauna, especially gorillas, and the archaeological sites. Information boards and a guide book have been prepared. In addition to visits in the northern sector of the Park, the Mikongo Conservation Center on the Offoué has visitor facilities: 6 bungalows, restaurant and trained guides. From 2001 - 2003, an average of several hundred tourists per year visited Mikongo. With WCS help an eco-museum at the Park entrance has been completed and the displays for the interior and exterior of the museum have been prepared showing the main ecosystems of the Park and the rich prehistory and culture of the area. However, owing to the disturbance they cause, there are limits on 4WD vehicles and boating.

SCIENTIFIC RESEARCH AND FACILITIES

In 1982 a biological research station *la Station d'Etude sur les Gorilles et les Chimpanzés*, was established near the Park headquarters by the *Centre International de Recherche Médicales de Franceville* (CIRMF) to carry out epidemiological studies on primates and tropical ecology. With co-funding and researchers from the Wildlife Conservation Society (WCS) this Centre has studied the relations between animals and vegetation and uses radio tracking of leopards, mandrills, elephants and buffaloes. It also trains students from the forestry school and the national university. The northern part of the Park has been mapped and has been the focus for most of the research. Since 2003 the Zoological Society of London (ZSL) has run a Conservation Centre at Mikongo in the east. Much more work needs to be done on both the flora and fauna of the southern half where it is estimated that a further 1,500 species may exist. As important as its biodiversity is the area's archaeology which makes the site essential for the study of the development of past central west-African cultures and their effects on the landscape. Again, the remains in the southern half need more research. In 2006 there were some 75 research scientists working on site. The Park has been the base for some 120 research publications. A widely qualified Scientific Committee with an administrative *Commission du Site* are being formed to evaluate proposals for research within the Park. An EU-subsidised program, ECOFAC (*Le Conservation et Utilisation Rationnelle des Écosystèmes Forestiers d'Afrique Centrale*) also sponsors research.

MANAGEMENT

The Park is governed by Law 16 of 1993 on the Conservation of Nature, and Law 16/2001 of the Forest Code. In 1992, ECOFAC chose the Lopé Reserve as one of IUCN's fifteen critical zones for the conservation of central African biodiversity because of its large, intact and very rich lower Guinean forest. The project funded a gorilla habituation program, the re-opening of 35 km of tracks to facilitate tourism and anti-poaching patrols, 12 tourist guides, improvement of the Lopé hotel and issued

publications on the flora and fauna. It also funded buildings for the Park headquarters and staff. In the process it has increased the opportunities for local employment. A second phase encouraged ecotourist activities, including an effort to habituate gorillas for easy viewing.

A detailed management plan and zoning map was adopted in 2002, finalised in 2006 and agreed between many partners: CNPN, the Ministry of Economic Forestry, Ministry of Culture, Wildlife Conservation Society (WCS), Zoological society of London (ZS), the EU, US Forest Service, *le Réseau des Aires Protégées d'Afrique Centrale* (RAPAC) and others. Its aims are conservation of the unique mosaic of habitats with their primate fauna, their inventorying and monitoring; multidisciplinary research synthesising biological and socio-economic knowledge about the Park; the resolution of conflicts with surrounding interests, convincing local people of the virtues of conservation and involving them in management; innovative eco-tourism, logistical improvements and the requirements for and sources of funding. The basic zones are the central core, (the existing National Park), with its extended 5 km-wide buffer and the historic complexes within the latter area. This has been further defined into zones for Special Protection, Tourism and sport fishing, Sacred Places, Light Infrastructure, Heavy Infrastructure (for future Park-related development, Research and Natural and Cultural Sanctuaries. At present the Park is staffed by less than a quarter of the number needed. Their work is confined to special purpose patrols, routine patrols, supervision of camping and guarding the boundaries from seven ranger stations. The condition of the Park and of the historical sites is very good, but threats remain.

Not long ago logging concessions were allocated within the Park, with the government adjusting its borders in one instance to exchange old growth forest for a less biologically rich area. However, the last concession in the Park was closed at the end of 2004. In managing the encroachment of scrub onto the savanna, carefully controlled burning is used. The IUCN site evaluator in 2004 questioned the effectiveness of a 5-km buffer zone (IUCN, 2005). With the Congo Basin Partnership funding raised by the Wildlife Conservation Society (WCS and USAID), there are plans to establish a base in the south of the Park. Responsibility for the management of the seven historical sites is in the process of definition.

Subsistence hunting by the small local population does not notably impact the Park although the locals do not see why conservation matters and the Offoué Reserve to the east remains an "*aire d'exploitation rationnelle de faune*". Commercial poaching however remains a major problem. Initiatives have been launched in recent years by the WCS to fund outreach and environmental education programs. And in early 2004 the WCS completed construction of a Training Centre near the Park entrance that will be used to increase the capacity and understanding of conservation for students and professionals from Gabon and the region. Finally, WCS has hired, trained and equipped a biological monitoring team which is working to fill the large gaps in the understanding of the biodiversity of the Park.

Under the COMIFAC Convergence Plan several projects have been established to help the coordinated conservation of transboundary natural resources. The Congo Basin Forest Partnership, a USAID-funded initiative, is promoting the conservation and responsible management of 11 of the Basin's tropical forest areas in Gabon, Cameroon, Central African Republic, Democratic Republic of Congo, Equatorial Guinea, and the Republic of Congo. In Gabon the Lopé-Chaillu-Louesse Forest Landscape Project in the northeast, managed by the WCS, is planning for ecological corridors to link these blocks of forest. Gabon also cooperates with several other regional and international conservation bodies. The presence of the ebola virus radiating from Odzala National Park in the west of Congo is inhibiting the project at present, but it has not so far affected the large primates of Lopé.

MANAGEMENT CONSTRAINTS

Mechanised logging, killing animals for bushmeat and, among the gorilla and chimpanzee populations, the Ebola virus, are all major threats to the ecosystems of Gabon. Legal protection to the sites is given by four national laws and twelve decrees regulating hunting, forestry and tourism. In practice, the lack of adequate funding means that the number of staff is quite inadequate for effective surveillance of so large an area which needs at least 40 rangers. Since the 1960s some 40% of the Reserve has been logged, sometimes more than once, by several companies, and the forest ecosystem has been disturbed by logging tracks opening up the canopy in hitherto intact forest. Forests in the northern river valleys and next to the savanna have suffered the most. A particular concern was the construction by

Eurotrag from 1976, of the trans-Gabon railway across the north end of the Reserve, and its exploitation of the virgin forest between 1979 and 1983, the year when the ranger force arrived.

Between 1992 and 1997, there were never more than 4 rangers to patrol not only the 5,000 sq.km of the Reserve but also the concessions on its borders, in an effort to prevent poaching. This was done particularly in the north by labourers from the railway and by organised commercial expeditions connived at by officials, for bushmeat. Much of this was sent by rail down to the large towns on the coast, and much was killed to feed labourers on the railway and in nearby logging camps. These incursions were very destructive: buffaloes and elephants suffered greatly and the hippopotamus population was almost exterminated. Eurotrag has now withdrawn, but five active concessions continue in the forests of the west and southeast margins, some within the Park itself, and their employees poach for bushmeat and profit, mostly monkeys. Crop raiding, especially by elephants, is a major source of conflict with the surrounding farmers. A company also holds diamond-exploitation rights for the whole region.

COMPARISON WITH SIMILAR SITES

The World Heritage tropical moist forest sites most strictly comparable with Lopé-Okanda are those in the Congo Rainforest, and at a remove, of the Guinean Rainforest of West Africa. Other sites in subtropical rainforests and, because of its savanna element, those in tropical dry forests, could be borne in mind, as also similar sites in other continental rainforests. However, tropical moist forest protected areas on the World Heritage list total at least 27, and sites in tropical dry and subtropical forests total a further 13. So a comparison of the twelve most closely related sites, three being still at the indicative stage of the process, is made to justify the designation of a yet another example of the best represented biome in the World Heritage system. A comparative table is given in the Annex.

The main bases for comparison of Lopé-Okanda with similar existing World Heritage sites are:

- (iii) Its unique, well preserved heritage of petroglyphs, and concentration of other archaeological sites;
- (iv) The exceptional evidence of past cultural and biological history chronicled in relics found on the forest-savanna edge and in Iron Age sites within the forest;
- (ix) The importance of its ecological processes measured by:
 - the wide extent of its intact rainforest, within an area with an 870m vertical gradient, natural biogeographic barriers, Pleistocene micro-refuges and consequent high endemism;
 - the variety of its biological and ecological habitats and processes, especially in the micro-refuges on the long settled savanna border to the forest;
 - the integrity of the two-thirds of the site which remains undisturbed, including its gene pools;
- (x) The richness and diversity of its flora and fauna, which is only half explored, and its major, endemic and endangered species such as gorillas, chimpanzees, elephant and hippopotamus.

Comparable World Heritage sites within the Congo rainforest include Dja Faunal Reserve in Cameroon, and Salonga National Park and Okapi Faunal Reserve in the Democratic Republic of Congo. In the Guinean forest region Tai National Park in Côte d'Ivoire is similar. The main points of comparison are the comparative richness and diversity of flora and fauna, the integrity of the site and its cultural significance. Dja is also a well preserved humid forest, transitional between the Congo and southern Cameroon forest regions with a tree cover as much semi-deciduous as evergreen. It is very diverse, and was designated a Biosphere Reserve over 20 years ago but is now much poached. Salonga is the largest tropical lowland rainforest park in Africa, including swamp, riverine and dryland forests. It is isolated, rather inaccessible and very diverse, with many endemic endangered species, notably the bonobo *Pan paniscus*. But like the eastern Congo reserves, it has recently been ravaged by war. Tai has a similar quality of flora and fauna but, like the distinctive Mt. Nimba, of Guinean forest type; both have recently been degraded by refugees from civil conflict.

All the sites considered have great biodiversity. Each represents different parts of the great central / west African rainforests and, until the wars, were fairly unimpacted. Lopé-Okanda, as representative of the far western Congo forest, remains relatively undisturbed having recovered from past logging of part of the area. Its mixture of savanna and forest possesses within 17 sub-types of western Congo tropical rainforest, and 6 types of savanna, a very high density of biomass. It is also large enough to maintain its

great genetic diversity. It is one of IUCN's fifteen critical zones for the conservation of central African biodiversity and is rich in birds. The site also preserves a record of biological evolution over at least 15,000 years of the rainforest-savanna edge, together with an exceptional record of successive savanna-based cultures from late Palaeolithic times, their sites, tools and petroglyphs. In Gabon there are several similar National Parks, also created in 2002, including Minkébé (756,669 ha), Ivondo (300,000 ha), Mwagné (116,000 ha), the Chaillu-Louesse Forest Landscape in the east, and Moukalaba-Doudou (450,548 ha) and Loango (155,224 ha) which are interwoven with the Gamba West Gabon Complex on the coast. And in the neighboring Republic of Congo there is Odzala National Park (1,354,000 ha) which has a high population of elephants. All are dense tropical rainforests rich in biodiversity. There is potential for transboundary designation.

STAFF

The Reserve is staffed by a DFC team of one conservator, 3 engineers and 5 technical assistants, patrolling from Lopé and 7 boundary ranger stations, with limited 4WD and river transport but mostly on foot. Both equipment and staff numbers are inadequate. Help is also given by 6 agents from the Forest stations east and west of the area and, when needed, by police from Lopé and Ayem railway stations. By 2006, there were 50 employees affiliated with MEF/ECOFAC, and an additional 40 Gabonese nationals employed by WCS at the Research Station/Training Centre and on the biological monitoring team. WCS also has 3 permanent expatriates on site to help with management. ZSL employs 15 staff at Mikongo. A Cultural Conservator and management staff are to be found for the historical sites.

BUDGET

The annual DFC budget for the *Brigade de Faune*, is stated as FrCFA*20 million (US\$40,000), divided between salaries, operations and charges. Between 1992 and 2004 the EU contributed via ECOFAC €4.5million (US\$3,375,000) and for 2006-8 will contribute €3.5 million over three years (US\$2,630,000). Since 2003, WCS has contributed approximately US\$300,000 a year for various activities, with funding from the Congo Basin Forest Partnership. The World Bank has pledged US\$10 million over the next five years. €200,000 (US\$150,000) a year is contributed to the Research Station by CIRMF, US\$150,000 by Total for 2006-8, and the GEF via WWF, US\$100,000 annually between 2006 and 2011 for Iboundji, and €100,00 (US\$75,000) by ZSL for the work at Mikongo. *franc du Communauté Financiere d'Afrique.

LOCAL ADDRESSES

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M.le Conservateur, Lopé-Okanda National Park, B.P.546, Libreville, Gabon.

REFERENCES

The principal sources for the above information were the original and resubmitted nominations for World Heritage status.

Christy, P. & Clarke, W. (1994). *Guide des Oiseaux de la Réserve de la Lopé*. ECOFAC Gabon, Libreville. 191 pp.

Christy P., Jaffre, R., Ntougou, O. & Wilks, C. (2003.) *La Forêt et la Filière Bois au Gabon*. 389 pp.

CMS/GRASP (2008). *Gorilla. Reports on Conservation Status*. Tech. Serv. Public'n 7, Royal Belgian Institute of Natural Science, Belgium. (2003 Population totals from Woods Hole Research Center (2005). *Mapping & Monitoring the Forests of Central Africa*. Land Cover & Land Use Program, WHRC, MA, U.S.A.)

Conseil National des Parcs Nationaux (CNP) (2006). *Plan de Gestion du Parc National de la Lopé 2006-2011*.

Direction de la Faune et de la Chasse (2005). *Proposition d'Inscription de Biens sur la Liste de Patrimoine Mondial. Écosystème et Paysage Culturel Relique de Lopé-Okanda, République du Gabon*. Ministry of Waters & Forests and the Environment, Libreville. [Contains a bibliography of 168 references]

d'Huart, J-P. & Dembele, M. (2005). *IUCN Technical Evaluation, Ecosystem and Relict Cultural Landscape of Lopé-Okanda (Gabon)*. IUCN, Gland, Switzerland.

Mackanga-Missandzou, A. (1999). *Les Zones de Contact Forêt-savane dans la Réserve de Faune de la Lopé (Gabon): Importance pour les Grands Mammifères et la Gestion*. Thèse de doctorat, Université Paul Valéry, Montpellier, France.

Oslisly, R. 1996. The rock art of Gabon: techniques, themes and estimation of its age by cultural association. In Pwiti, G. & Soper R.(éd), (1995). *Aspects of African Archaeology*, Xth Congress, Pan African Association for Prehistory & Related Studies, University of Zimbabwe Publications, pp. 361-370.

Oslisly, R. & Peyrot, B. (1993). *Les Gravures Rupestres de la Vallée de l'Ogooue (Gabon)*. Ed.Sepia, Paris. 95 pp.

White, L. & Abernethy, K. (1997). *A Guide to the Vegetation of the Lopé Reserve*, Gabon Wildlife Conservation Society / Multipress. 224pp.

White, L. & Edwards, A. (2001). *Conservation en Forêt Pluviale Africaine - Méthode de Recherche*. WCS, Libreville.

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