

CONSERVATION OF TROPICAL RAIN FOREST IN LIBERIA

RECOMMENDATIONS FOR WILDLIFE CONSERVATION AND NATIONAL PARKS

by Jacques Verschuren
IUCN/WWF Consultant

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Report of the International Union for Conservation of Nature and Natural Resources to the Government of Liberia prepared with the financial support of the World Wildlife Fund and the Forestry Development Authority of Liberia with the cooperation of the Institut Royal des Sciences Naturelles de Belgique, Brussels

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All the pictures were taken by the author

FOREWORD

The geographical importance of Liberia in the conservation of the West African moist forest was brought into focus during a UNEP/IUCN sponsored survey on the status of conservation of the biotic communities of West and Central Africa, 1975-76. The report of this survey was the basic document discussed at the Technical Meeting on the Conservation of Biotic Communities of West and Central Africa, held at Ouagadougou, Upper Volta, 4 - 10 February 1980 and sponsored by the two organisations.

The survey considered Liberia and adjacent Ivory Coast as the centre of biological diversity and endemism, for the West African moist forest (Lower Guinean Forest). However, and in spite of previous suggestions for conservation action by individuals such as Professor Kai Curry-Lindahl, none of the different biomes found in Liberia were protected except as forest reserves, themselves subject to timber exploitation and inevitable threats from shifting cultivation.

In view of the foregoing, IUCN sought the cooperation of the Government of the Republic of Liberia, through the Forestry Development Authority (FDA), in setting aside as national parks and reserves, a network of representative samples of biotic communities found there. The keen interest shown by the Government led to a more detailed survey by Dr. Jacques Verschuren, late in 1978, the result of which is the subject of this report. The report recommends a series of measures - legislative, institutional and management - which it is hoped will provide a basis for long-term conservation of fauna and flora in Liberia.

It is without doubt through the cooperation of the Government of the Republic of Liberia, the World Wildlife Fund International which provided financial support, and the Institut Royal des Sciences Naturelles de Belgique, that this survey was made possible. In addition, valuable comments and suggestions on the report were made by the FDA officials and a number of individuals, among whom were Professor S. Kolade Adeyoku (University of Ibadan, Nigeria), Professor Kai Curry-Lindahl (Royal Ministry of Foreign Affairs, Sweden), Messrs J.D. Keita (FAD, Accra), G.S. Child (FAO, Rome), Dr. E.O.A. Asibey (Ghana), Dr. G.W. Schmidt (FAO/World Bank, Legal Advisor to the FDA, Monrovia) and Dr. Claude Martin (WWF-CH). IUCN wishes to record its gratitude to all these contributors.

POST SCRIPTUM

1. For several reasons, the publication of this report has been somewhat delayed but the three years delay does not mean that the document is outdated. A preliminary report has been handed over at the end of the mission, in 1979, and has been the basis for the recent decisions taken by the Liberia Authorities.
2. Important political changes have taken place in Liberia since then. The author is convinced that the new Authorities will be more concerned by this prime conservation issue and will fully support the project.
3. The main part of the report has remained in its original form and the many favourable facts which have since then changed have not been modified. The author stresses that Liberia Authorities asked him to be "honest" and that many negative elements now belong to the past. Exceptional improvements have occurred since 1978.
4. Among the recent modifications, one could mention that the Fauna and National Parks Section has become a Division, several decrees have been issued and there is a proposal to establish a park, the Sapo Park.
5. Several authors, including Dr. Curry-Lindahl, Dr. Kabala, Dr. Robinson, P. Robe, have actively dealt with Liberian issues (especially concerning Mount Nimba) since the report was written. One should also note the Liberia experts among whom the new FDA Managing Director, Mr Kaydea New available references are not indicated. Mount Nimba is listed as a World Heritage Property and an Inter-Government Commission for the Nimba issue has been set up.
6. In consideration of the World Conservation Strategy published in 1980 by IUCN, the conservation of the Liberian forest biome is essential and Liberia is listed as a high priority country under WWF's Tropical Rainforest Campaign.
7. All photographs were taken by the author himself who regrets the bad quality of some photocopies. The author particularly regrets that the report having been originally written in French and then translated, thanks to several persons of good will, may sometimes seem insufficient and not convey the true opinion of the author and the same applies to the order of the document.
8. The author is particularly grateful to M A. Peal with whom he has had very fruitful contacts and who virtually started the conservation measures as well as to Mr P. Portas who has had the difficult task to prepare the document for publication and thus to solve all related problems.

Bruxelles, 31 October 1982

SUMMARY OF OBSERVATIONS

1. This report takes stock of the existing situation regarding nature conservation, wildlife and national parks in Liberia, and puts forward several proposals to remedy the situation described - which at first sight seemed hopeless. Urgent measures are absolutely necessary or the point of no return will be reached in Liberia, with all the economic and ecological consequences which that implies. The author is convinced that the setting up of the Forestry Development Authority (FDA) in 1976 and the great interest in conservation shown by the highest authorities of Liberia will allow for the forest ecosystem in Liberia to be saved before it is too late.
2. A general survey was carried out between 1978 and February 1979. Meetings in Monrovia and several other places preceded some 50 hours of aerial surveys and several days spent making ground surveys, both with vehicles and on foot, in order to examine the situation in so-called "inaccessible" areas where wildlife has a better chance of survival (see Chapter I).
3. A quick look at the geography of Liberia shows, among other things, that the rainforest covers only 50 per cent of the country, that the true rainforest cover no longer reaches the coast and that in Liberia it reaches its most northern limit in Africa. The economic situation of the country seems to be flourishing and rapid development appears to be in progress; this development is largely based on the crude exploitation of raw materials (see Chapter II).
4. Most forests were classified "National Forests" in the 1960s. Fauna has always been considered as free for all, without any controls. Gradually, however, as from 1965, some people have become concerned about the problem of conservation and, more recently, the FDA has developed important links with the International Union for Conservation of Nature and Natural Resources (IU and the World Wildlife Fund (WWF) (see Chapter III).
5. The status afforded to fauna till 1978-1979 can be summed up in one sentence: "anyone can kill anything, anywhere, anyhow, anytime". Fire-arms are sold freely and their number is continually growing. Hunting is mostly carried out at night. There is no protection of any kind, even of the so-called protected species. Game meat is the most important source of protein for the rural population, but its price is increasing all the time as it becomes scarcer and scarcer (see Chapter IV).
6. The position of the principal large mammals is bad. Chimpanzees are becoming extinct, other 'primates are threatened. There are probably fewer than 500 elephants left. Forest antelopes are steadily declining, as are the buffaloes. The position of the pygmy hippopotamus, however, seems less critical (see Chapter IV).
7. The area of primary or old secondary growth forest (still about 50 per cent) is constantly being reduced through shifting cultivation and forestry concessions. With the exception of certain areas on steep relief, nearly all the forests of Liberia have

been granted to concessionaires. The actual forest reserves (called “National Forests”) exist more or less on paper only and enjoy little protection (see Chapter IV).

8. There are no national parks in existence and original plans to establish such areas have not been carried out (see Chapter IV). (Note 1982: this situation has largely changed and Sapo National Park will be created in 1983).
9. The most worrying pollution problem is caused by iron in several rivers. Fire and livestock do not constitute major problems at the moment (see Chapter IV).

SUMMARY OF PRINCIPAL RECOMMENDATIONS

These recommendations represent an ideal and are the most one could hope for. However, account has been taken of up to date information and opinions and, in this regard, some minimum measures are proposed, especially those relating to hunting. The most practical approach is to prohibit commercial hunting and trade in game meat.

1. Hunting-Optimum Measure

A complete ban for five years on the hunting of all species should be decreed at once in Liberia. With regard to the more seriously threatened fauna, the ban should be extended to ten years for all species of primates, and remain permanently in force for endangered species (*Cephalophus jentinki*, *Cephalophus zebra*, *Loxodonta africana*, *Choeropsis liberiensis*, *Pan troglodytes* - which appear under species categories 1 and 2 of the IUCN Red Data Book).

2. Hunting - Minimum Measures

- 2.1 A ban on hunting should be decreed for ten years in connection with the species referred to in recommendation (1) above. If necessary, the ban should be extended at the expiry of the ten- year period.
- 2.2 A five-year ban on the hunting of all types of primates should be decreed.
- 2.3 For all other fauna:
 - hunting at night should be prohibited;
 - hunting should be carried out by authorized 1 persons only or those with a permit issued by the FDA.
- 2.4 All trade in game meat (bush meat) should be prohibited unless the meat is accompanied by a certificate showing that the animal was killed legally (see 2.3)
- 2.5 The sale of all by-products of hunting (that is, products other than meat, such as skins and ivory) should be prohibited, and this prohibition should equally apply to species not existing in Liberia.
- 2.6 As a matter of urgency, the new regulations on hunting should be officially approved and put into effect by the FDA.
- 2.7 Control of the sale of game meat should be enforced along the roads, in particular, where there are already posts for checking the movement of traffic.

3. Fire-arms

- 3.1 The sale of guns and ammunition should be subject to severe restrictions and should only be allowed on presentation of a certificate to be provided by the FDA or other

government agency, and on payment of a “deterrent” tax. Such tax should be allocated to wildlife conservation activities.

- 3.2 All guns at present in use should be declared and registered with the appropriate government agency, which would, in turn, issue permits for their retention.
- 3.3 Any gun not declared should be confiscated and retained by the State.
- 3.4 Arms permits should be renewable annually on payment of a fee, a proportion of which should be allocated to wildlife conservation activities (see 3.1)
- 3.5 The selling price of ammunition should be increased and should include a State tax of at least 50 per cent (see also 3.1 and 3.4)
- 3.6 Very strict control should be applied to the local ammunition factory, closing it down if possible in view of the harm which the acquisition of ammunition causes in neighbouring countries.

4. Forestry and Shifting Cultivation

- 4.1 The legislation envisaged should be effectively applied to the national forests. The list of these forests should be brought up-to-date and no further declassification should be made. In particular, a tribal reserve could be a solution in areas where human settlements were established before the proclamation of the national forests. Hunting activities could be limited to specific species of game animals on a subsistence basis only.
- 4.2 All existing forest concessions should be examined by an ad hoc committee within the FDA, whose approach should be restrictive, leading to tighter controls and an increase in the levy payable to the State.

5. National Parks and other Conservation Areas

- 5.1 The following three national parks should be officially decreed as soon as possible:

- The Loffa-Mano National Park
- The Sapo National Park
- The Cestos-Senkwen National Park

They should correspond, as near as possible, to the boundaries I described by the consultant in his report.

Any deviation there from, which decreases the surface area of any of these three parks, should be compensated for by an increase of a similar size elsewhere.

- 5.2 The legislation and the regulations for internal order applicable to these national parks should be rapidly completed, approved and brought into force.
- 5.3 If certain areas in the parks have already been granted to concession holders, a formula should be worked out by amicable arrangement, taking account of the fact that the State is the true owner of the land, and that the superior interests of nature take precedence over all other considerations. In any case, all deforestation should immediately be stopped in the areas under discussion.
- 5.4 All traditional rights existing in the national park areas should 'be examined by an ad hoc committee of the FDA, which, when necessary, would arrange for compensation or for resettlement elsewhere.
- 5.5 Teams formed for the purpose should immediately work out the actual boundaries of the parks on the ground.
- 5.6 Reserves should be established at Mount Nimba, at the Cavally valley, at Mount Wonegizi and at Cape Mount, with boundaries as indicated in the report. The Nimbaco forestry concessions should be cancelled as a matter of urgency.
- 5.7 A commission should proceed at once to Robertsport to ensure the immediate earmarking of the Cape Mount forest - the most threatened area of Liberia - and to mark out its boundaries on the ground.

6. Administrative and Miscellaneous Recommendations

- 6.1 The Wildlife and Parks Section should be upgraded to a full Division within the FDA. A Scientific Consultative Committee should be established to determine essential, immediate and future scientific research programmes for the fauna and flora and their associated habitats.
- 6.2 The FDA personnel should be granted, as soon as practicable all legal powers needed to enable them to put into force effectively existing and proposed wildlife conservation measures, including those pertaining to the protection of national parks and related conservation areas.
- 6.3 The closest possible contacts should be established with the neighbouring countries (Sierra Leone, Guinea and the Ivory Coast) with a view to creating a common policy for conservation and for the suppression of illegal activities. The reserves on the frontiers (Loffa-Mano, Nimba, Wonegizi and Cavally) should be managed jointly at a later stage.

Considerable importance could be given to the Inter-Governmental Projects related to Mount Nimba Reserve under the World Heritage List.

- 6.4 Liberia should, as soon as possible, adhere to and enforce CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), as well as the OAU African Convention on the Conservation of Nature and Natural Resources, if this is not already the case. (Note 1982: Liberia is member of CITES, which has been signed and ratified).
- 6.5 A public opinion study on wildlife conservation should be under taken and the results should be the basis for directing efforts in publicity and the development of wildlife programmes.
- 6.6 A public awareness and conservation education programme should be instituted as soon as possible in order to extend the knowledge of Liberians about the importance and need for conserving and protecting their national heritage. Stamps, posters, mobile audio-visual units, the press, radio, etc., could be employed in this task.
- 6.7 A statement by the Highest Authority on nature conservation should be widely publicized and distributed throughout the country to all members of the Administration, including Members of Parliament.

7. International Cooperation and Assistance

Considering that the Government of Liberia is ready to embark upon a country-wide nature conservation programme, and the fact that the current wildlife staff is inadequate in terms of numbers and expertise, the following suggestions should be given serious consideration.

- 7.1 The most important task in Phase II of Project 1567 is the set ting up of at least one of the three national parks. It is recommended that IUCN and WWF continue their assistance through the provision and support of an expert, including the necessary equipment, for at least t years.
- 7.2 It is further recommended, complementary to the conservation programme in Liberia, that IUCN and WWF assist as much as possible in the design, development and implementation of an effective public awareness and conservation education programme. (See paragraph 6.6.).
- 7.3 For the remaining two national parks and reserves, the government should explore the possibility of acquiring expertise and equipment through other international aid agencies, especially FAO under UNDP Country Programmes, and through bilateral technical assistance, such as with the Federal Republic of Germany (currently involved in forestry matters in Liberia) and the USA.
- 7.4 Under its “Man and Biosphere Programme” (MAB), Unesco should consider the possibility of creating biosphere reserves in selected areas with a view to promoting and developing an integrated forestry resources management-conservation option applying to the Liberian situation.

- 7.5 Training - Bearing in mind the lack of adequate and trained manpower at both junior and senior levels, and in recognition of the government's determination to effect necessary conservation measures arising from the survey, it will be necessary to:
- 7.5.1 Institute a crash, but intensive training course for newly recruited as well as existing junior staff. This could later be developed to a game ranger/scout school or be incorporated into the forestry training schools;
 - 7.5.2 Identify suitable candidates to participate in senior administrative/management courses at the College of African Wildlife Management, Mweka, Tanzania at diploma and post-graduate diploma level;
 - 7.5.3 Identify, with the collaboration of the University of Liberia, suitable candidates, who could receive further training for undertaking research on fauna and flora.

In all of the above aspects, international assistance will be required in addition to the support offered by the FDA. It is recommended that FAO, Unesco and WWF/IUCN give special attention to this need.

GENERAL REPORT

I. INTRODUCTION AND GENERAL REMARKS

1. Three large blocks of equatorial forest exist in the world; these are situated in South America, in Southeast Asia and in Africa. In Africa, the forest block is divided into two sub-blocks separated by the Dahomey Gap: the Guinean Block of West Africa and the Congolese Block of Central Africa. In the short term, there is no doubt that the Guinean Block is the most directly threatened. In general terms, this block covers Guinea, Sierra Leone, Liberia, the Ivory Coast and Ghana and on the local front, Togo. The Liberian portion is, certainly, the most important since here the forest block attains its most developed stage from both ecological and evaluation viewpoints.
2. Until recently, the state of natural resources in Liberia was depressing. Dr. Kai Curry-Lindahl was merely “a voice crying in the wilderness” in the face of shifting cultivation, forests being destroyed, no national parks, uncontrolled hunting, and whole species of fauna being wiped out; with the disappearance of fauna came the added problem of a serious shortage of bush meat upon which the rural populations depend for their existence.
3. Within the last few years, however, a new light has dawned. The Forestry Development Authority (FDA) was created by an Act of Parliament in November 1976 to manage the forests of Liberia, including wild fauna and flora. Certain individuals within the FDA have enthusiastically decided to take up the challenge, “the wildlife of Liberia shall not disappear” and have sought the cooperation of the International Union for Conservation of Nature and Natural Resources (IUCN) and the World Wildlife Fund (WWF). It is very encouraging to find that the creation of the FDA signalled a new era in conservation of living natural resources in Liberia.
4. In response to the FDA initiative, both IUCN and WWF offered to assist in the identification of potential conservation areas and, possibly, in the actual establishment of one such identified area. This led to WWF/IUCN Project 1567: “Conservation of Tropical Rainforest in Liberia” and, subsequently, led to sending a consultant to Liberia on a short-term basis. The present report is the outcome of this initial field mission.
5. The consultant spent four months in Liberia during the season November 1978 to February 1979. The expedition was subsidized by the Government of Liberia through the FDA and WWF and by Belgium through the Institut Royal des Sciences Naturelles de Belgique.

Terms of Reference

6. In consultation with the FDA, to review existing documentation pertaining to conservation and protection of wild species of fauna and flora, together with their associated habitats. Such documentation should include reports emanating from previous consultancies and also information on areas already under proposal by the FDA. The time should also be used for planning a work schedule for field surveys.
7. To assist the FDA in identifying sites for locating national parks and equivalent protected areas, taking into account information gathered in (6) above and also the diversity of biotic communities within the Republic of Liberia. The national parks and equivalent protected areas should comprise a viable system of representative samples of these communities.
8. To provide the FDA with as full a description as possible of one or two of the sites identified in (7) as potential national parks. This should include a physical and biological description, proposed boundaries, possible location of administrative headquarters for the park, envisaged staffing, etc. Priority for such selection should be given to sites in the Guinean dense humid forest and mountain communities.
9. To discuss with the FDA officials any other matters relating to the establishment of such a system of protected areas, including legislation, personnel and equipment. Within one month of completing the above tasks, a report should be submitted to WWF/IUCN and the FDA with recommendations and a strategy on follow-up to Phase I of Project 1567. (In the event, it was possible to submit only a first draft report after two months, most of the delay being caused by the need for translations and reviews to be made.)

Work Plan and Field Activities

10. During 1965/1966 the consultant had made a five-month visit to the Nimba Research Laboratory in Lamco; thus observations made at that time could be compared with the findings of the 1978/1979 survey.
11. After studying legislation and meeting local officials, the consultant spent some fifty hours flying over the whole country at low altitude in a Cessna 180 chartered by the FDA. This detailed survey helped to complete and update the information provided by aerial photographs and local maps (which, incidentally, are very good - 1:250.000, 1973, in brown, Ministry of Land and Mines 1:250.000, 1972, in colour, Defence and Topographic Mapping Agency, Washington).
12. Detailed field surveys were made in three particular regions: the North-west, the Southeast and Nimba. The areas were reached by Landrover and with the assistance of bearers, followed by several days of inspection on foot along the Mano, the Loffa and the Sinoe rivers.

13. The mission ended with visits to the highest authorities of the country. The authorities were deeply touched by the sad situation regarding conservation reported to them.
14. The consultant has attempted to be as factual and frank as possible and in doing so, some negative aspects will have to be covered. It is hoped, however that the Government of Liberia will not take offence at this, since the FDA specifically requested that the report include all observations.

II. GEOGRAPHICAL NOTES ON LIBERIA

15. It does not seem worthwhile describing yet again the geographical features of Liberia. However, mention must be made of features of particular significance with regard to the fauna and flora of Liberia and in relation to the objectives of this survey.
16. Although it would appear from maps (Michelin and Unesco maps, for example) that Liberia is completely covered by forest, this is by no means true. The climax vegetation is, of course, rainforest, but the West African forest has suffered considerable damage, (more so on the west than the east of the Dahomey Gap, in fact). The "normal" picture is, therefore, of a mosaic of forest, savannah and palm-trees. It is possible to cross the entire country (from Monrovia to Nimba) without seeing a trace of even secondary forest. Less than half the country is still covered with primary forest and, in some places, advanced secondary forest.
17. The forest hardly reaches the coast anymore, although it should be most developed there since the coast receives between five and six metres of rainfall annually. However, forest does occur at Cape Mount and, very locally, between the mouths of the Cestos and the Senkwen rivers. There is coastal savannah, obviously edaphic, but deteriorating under man's influence along virtually the whole seaboard.
18. Except for along the coast, Liberia is an extremely undulating country, notably in the north, although the highest point - Mount Nimba - is only 1385 m. A few other mountains are worth mentioning: Wologizi which is 1380 m, Wonegizi at 1145 m and the Putu Range. The hilly terrain helps to protect some particularly threatened forest types.
19. Climate varies considerably from one year to the next. The Harmattan hardly reached Monrovia during the 1978/1979 dry season whereas in 1965/1966 it blew for 15 days without a break. Some 13 years ago, the dry season in Nimba continued for 72 days without a single drop of rain, yet in early 1979, Yekepa was clammy and sultry.
20. Between one and two per cent of the country is covered by savannah. Along the coast this is due to a combination of soil conditions and man's influence. Savannah covers another several thousand hectares in the northwest; this is entirely due to

man's activities. There are also extensive natural patches of savannah on laterite at the foot of the Wonegizi Mountains and on slopes in the north of the country.

21. Africa's lowland rainforest reaches its most northerly point in Liberia near Voinjama, where it is, in fact, already semi-deciduous. Voinjama is on the same latitude as Garoua in Cameroon.
22. Nearly the whole coastline is sandy. There are relatively few mangrove swamps at the mouths of rivers; in fact, the largest mangrove swamp is in Monrovia itself. There are hardly any rocky coastal areas (the exception being at Robertsport), but there are some reefs to the southeast of Buchanan and Cape Palmas.
23. The water courses are almost all a series of rapids and they play virtually no part in the country's development.
24. There are few, if any, people living primarily in the forest. There is no equivalent of the Central African pygmy in West Africa.
25. According to the most recent census carried out in 1974, the country has a population of 1,500,000, which means a density of around 14 per km². Population distribution is very uneven, some areas in the main forest region being practically uninhabited. With few exceptions (in urban centres and amongst the Mandingos groups), the population explosion seems to be, subjectively at least, less serious than in other African countries. Birth control is not unknown.
26. In no way does Liberia give the impression of being "under-developed". Its standard of living is amongst the highest on the African continent. The markets attract large numbers of customers and the shops are well-stocked with imported goods. It is, therefore, unlikely that the Liberians are starving. The country's life-style is very close to that of a consumer society (even inland and outside the privileged classes). Cars - which proliferate - are real throw-away products. Few countries have such an extensive network of local airports as Liberia. The hard covering of the bush houses is certainly the best in the whole of Africa (although the aesthetic effect is none too successful, not to mention the microclimate inside).
27. The danger is that this prosperous economy is based on the relentless and not yet sufficiently controlled exploitation of the abundant natural resources (iron, timber, diamonds, rubber, etc.). If subsequent problems are to be avoided, this exploitation must be controlled through better ecological and economic planning. Most resources are exported in bulk and this does not provide much work locally. Liberia is rapidly draining itself of its riches. One could perhaps ask the question "What happens when the richest supply of iron ore in the world comes to an end?"

III. PAST HISTORY OF NATURE CONSERVATION IN LIBERIA

28. There is apparently no tradition of nature conservation in Liberia. The USA, with which Liberia has for a long time been closely associated, has, unfortunately, not played an active role in this respect - as might have been hoped.
29. Until 1953, nothing had been done about conservation. At this time, however, there were presidential declarations, classifying a number of forests as "National Forests". These forests were remarkably well chosen but, in most cases, they were protected in name only (see list in annex). They accounted for a total surface area of 15,623 km which represents more than 16 per cent of the country's land area, an excellent proportion in theory. In April 1958 an Act for Conservation of the Forests of the Republic of Liberia declared the policy and programme of wildlife reserves conservation, as well as providing for the establishment of national parks. The Act was, however, not implemented by the relevant authorities of the time.
30. Exploitation of the forest was fairly limited until the 1960s, but thereafter, between 1965 and 1970 followed a tremendous boom which still continues.
31. Wild fauna has always been looked upon as of no consequence and until very recently, no practical protection measures had ever been taken. Hunting of all types has always been totally unrestricted.
32. An Act creating the Forestry Development Authority (FDA) was approved on 1 November 1976 and published on 20 December 1976. The FDA is an autonomous public corporation with a management team led by a Managing Director; the policies of the FDA are formulated by the Board of Directors, mainly composed of Government Ministers, with the Minister of Agriculture as ex-officio Chairman.
33. The Managing Director and his staff have drawn up a special budget for conservation as they are extremely concerned about this problem. It is too early to expect practical results of the FDA effort, but there is reason to believe that there will soon be an end to the present desperate situation as a result of measures now underway. We should also mention the excellent work done by the German Forestry Mission and the FAO/World Bank and Administrative Advisor seconded to the FDA. The Wildlife and National Parks Section (actually 1982 "Division") is under the enthusiastic direction of Mr A. Peal. Mr Peal and the FAO/World Bank Legal and Administrative Advisor have drafted an FDA Wildlife Conservation and Hunting Regulation based on the Act which created the FDA; this now needs to be passed and made effective by the FDA Management.
34. The FDA has recently made several expeditions to different regions and has ascertained that there is nothing to show for all the "forest reserves". Unofficial proposals have been made for national parks (Tiempo, Bokumu and Wologizi - see paragraph 75), but have not been acted upon in spite of visits by experts who have put forward various other proposals.

35. For more than fifteen years now, IUCN has been in contact with Liberia. During a short IUCN consultancy in 1975, Major Ian Grimwood drew attention to the serious decline of the forest biome in Liberia. Soon afterwards IUCN, with the financial support of WWF, offered to assist the Government of Liberia, through the FDA, in identifying for protection purposes still intact representative samples of this biome. Consequently, WWF/IUCN Project 1967 was drawn up and put together by Mr John Kundacli, IUCN Programme Officer for Africa who was behind the present expedition (WWF/IUCN Project 1567)
36. The Wildlife Society of Liberia was formally established on 17 February 1979 with Mrs Ophelia Freeman-Johnson as President; the officers were inducted into office on 3 March 1979. Since then, there have been many public programmes, films and lectures. The first issue of "WSL News" was published in June 1979.

IV. PRESENT STATE OF CONSERVATION IN LIBERIA (1978-1979)

a. Fauna and Hunting

37. The situation is catastrophic. In fact, it is obvious to the visitor that "anyone can kill anything, anywhere, anyhow". There are currently no laws or regulations on hunting whatsoever. All previous laws have been repealed by the FDA Act anticipating the promulgation of a new Wildlife Conservation Regulation by the FDA. Rifles and cartridges are on sale practically everywhere - which must make the country almost unique.
38. The situation gets worse year by year. By way of an example, the number of rifles sold "officially" increased from 6,308 in 1976 to 13,052 in 1977. There are probably, however, more than 100,000 rifles in Liberia at the present time. Furthermore, the number of headlamps for hunting at night is increasing all the time.
39. It is most common in the Liberian countryside - although extremely surprising for the visitor - to literally see "hordes" of armed hunters along certain roads. They all carry modern guns (usually 12 calibre). Cartridges can be purchased freely at low prices. The weapon business is booming to such an extent that there is even a local factory manufacturing cartridges.
40. Everyone finds it perfectly natural to kill without restriction any animal which comes within reach. To emphasize the prevailing attitude, it might be added that the words "animal" or "wildlife" are rarely used in everyday Liberian language; the word "meat" is commonly used to denote living animals. This deplorable situation has been the same for years, as illustrated by the following quotation: "Even in 1965 in Nimba we had to take into account, when distributing the load among the bearers, that each of them carried a rifle" (Nimba Research Committee Report, 1966). Owning a gun is almost a divine right, the result of "American" influence, as

was often explained to us. It is not the wish to challenge this here - it would take too long - but what should be restricted is the use made of the gun. In the USA, in practice, anyone can buy a gun, but its use is circumscribed by very strict regulations. In Liberia guns are extremely common, even in the most remote villages, and everyone's first priority is to acquire a weapon. By way of comparison, anyone in the USA can buy a car which will do 100 mph but, in fact, this is never possible because one is forced to obey a speed limit of half this figure. In some areas of Liberia (in Krahn-Bassa, for example), highly sophisticated weapons for shooting elephants are to be seen.

41. It never occurs to hunters to kill animals only at certain times or of only a certain sex or age. They kill everything, from birds to the largest mammals. If the rate of hunting seems to have dropped in some areas (as in Upper Nimba), this is merely because there is very little left to kill. The reason why there are few hunters along the coast is that all the main species of fauna disappeared decades ago.
42. The most murderous form of hunting is at night with headlamps, since the animals have very little chance of escape. Traps are not very widely used. The most persecuted animals at the present time are the monkeys and these are likely to disappear soon if protection is not given to them immediately. Sightings of monkeys have become extremely rare; a ranger who operates deep in the forest had seen only one monkey in four years (Jo River area).
43. It might be worth mentioning in passing that foreigners of Lebanese origin and from elsewhere spend their free time hunting pigeons and other birds.
44. Game meat is sold quite openly and it is common, when travelling, to see animals on sale by the roadside. There is no protection for the rarest or endemic species. Such rare animals like the Cephalophus jentinki or Cephalophus zebra are killed in large numbers. People are just not aware of the value of rare and endemic species.
45. There are a few game guards and the forest guards either have no power or are involved in hunting themselves. A few officials, who have had the courage to take action, have later been discouraged since they were not supported by a legal instrument. There is no doubt, therefore, that most of the fauna is rapidly becoming extinct in the face of this wide spread massacre and that bush meat, which is presently a very important source of protein in Liberia, will soon be so rare as to become a luxury only for the rich. At present, the inhabitants of Monrovia from all walks of life hire professional hunters to hunt for them, both for their own consumption and for sale to others.
46. Liberia is becoming a zoological desert. Officials frequently reported that the population obtains as much as 70 per cent of its animal protein from the forest. Sceptical about this figure, new enquiries have been proposed by the FDA. Fish now seems to be the basic diet, either being caught out at sea or killed inland using dangerous methods (dynamite, poison, etc.), again without any form of restriction.

47. In Liberia it has become almost an obsession to kill animals, even if there is no need for food witness the example of the bearers eating birds netted for scientific purposes, although they had already been well fed on fresh or imported fish). The hunters miss nothing. Until fairly recently, the smallest birds sitting on electricity wires were targets for mass extermination and although action was finally taken, it was to protect the wires from damage rather than the birds. Liberia is probably the country in Africa with the least number of birds (apart from the cattle egret, Bubulcus ibis which is strictly protected by a taboo - unfortunately the only one in the whole country).
48. At present game fetches an unexpected price: a small night heron was on sale in a Monrovia supermarket at \$2.50. Two particularly nasty methods of capture, metal cables from bicycle brakes and Japanese mist nets are, fortunately, little used in Liberia. Except for closely supervised scientific purposes, it is recommended that the importation of nets be banned to prevent any possibility of their being used for captive purposes.
49. The mass destruction of wildlife is accelerating at an alarming rate. In 1965 several monkeys were observed near Putu. They are nearly extinct now The Nimba is virtually devoid of large animals. During the same year of 1965, elephants were still an important ecological component of Liberia's forest. Today signs of their presence are rare, even in the remotest areas - there are no signs of rubbing and or of trees having been destroyed. During five months of continuous observation in Nimba in 1965-1966, the depressing results in numbers of direct sightings of antelopes were as follows: three! There was no direct sighting of a large ungulate during the whole of the survey 1978-79, even in the remotest areas. Monkeys were seen on only four occasions and were amazingly shy.
50. The increasing number of roads - which is, of course, a good thing in itself - is cutting the country into ever smaller areas so that fauna, which used to take refuge far away from the roads, can no longer find this relative safety. N there is no refuge at all and the whole country is combed by armies of hunters. All one finds are empty cartridges - anywhere and everywhere!!

Inside the capital, Monrovia, the situation concerning the remaining vegetation is discouraging. If one compares current photographs of Mount Monrovia in the heart of the town with the aerial shot published (though not necessarily taken) in 1973 in Schulze's book, one realizes the extent of forest degradation within the capital.

b. Current Status of Principal Fauna Species

The information summarized below is based both on direct field observations during the survey and other current records.

Primates: (Chimpanzee (*Pan troglodytes*) and others)

51. The chimpanzee, unlike other species of mammals, is not normally hunted for food, but to have the young as “mascots”. Its numbers are also threatened by strong pressure to have chimpanzees for biomedical research. No breeding grounds were discovered, nor were chimpanzees heard during the survey. It is difficult to gauge how many chimpanzees, which are not naturally retiring animals, still survive, but it can be assumed that they are rapidly becoming extinct in Liberia. They are still common in Guinea, even near the Liberian border of Bossou. It has been suggested that in no case should live chimpanzees be exported, even if they fetch very high prices.
52. As regards other primates, there are a dozen species of monkeys, all of which are under severe hunting pressure. At the present rate of destruction, all monkey species will shortly be a thing of the past in Liberia. Incidentally, no baboons (the *Papio* species) occur naturally in this country. In Central Africa, baboons are common in forest areas, but not in the West African forest.

Elephant (*Loxodonta africana*)

53. A very optimistic estimate would put the number of elephants in Liberia at under 500. Traces of elephants were observed during the ground surveys along the Loffa, Mano, Sinoe rivers. It would appear that elephants are deserting the primary forests where they are too vulnerable to man and are taking refuge in the marshland or bush which man cannot penetrate. The Kpelle National Forest survey team counted 20 elephants in 1979. One of the FDA technical officers was extremely surprised to have seen six in 1979 near Vahun, in the north-west, where game seems to survive with less difficulty than elsewhere. On the other hand, a hunter in the Krahn-Bassa area boasted that he had killed nine elephants fairly recently.
54. It is no longer possible for elephants in the west to communicate with those in the east of the country as they are now separated by a large area of human settlements stretching from Monrovia to Nimba. (There have been no elephants in the Nimba region for a long time).
55. Recolonization is possible from Sierra Leone, Guinea and the Ivory Coast where elephants are not hunted as mercilessly as in Liberia. At one time, the elephant was an important ecological factor in the development of certain forest areas, like the Grebo (see the report of the German Forest Expedition in 1965) however, it has now virtually disappeared from there. The elephants of the central region (Krahn-Bassa

and Sapo) are almost totally isolated, as the Zwedru-Greenville and Zwedru-Cape Palmas roads constitute an effective barrier.

56. Ivory is sold openly in Monrovia, although it is becoming rare. It was not possible to determine if elephants were killed for their ivory alone or for both ivory and meat.

Pygmy hippopotamus (*Choeropsis liberiensis*)

57. This animal is typical of Liberia and, surprisingly, appears to be rather better preserved in Liberia. Its habits make it harder for hunters to catch in spite of well-worn paths which, at first sight, would seem to facilitate trapping. Fortunately, however, trapping is very rarely encountered. In the Loffa, Mano and Sino rivers, very recent traces of pygmy hippopotamus were observed (one or two animals for every 5 km of bank on average). Extrapolating these figures to other banks in the country, where there is no reason to believe the animal should have suffered any less at the hands of hunters, there would seem to be little likelihood of the species disappearing - at least not in the near future.
58. The ordinary hippopotamus (*Hippopotamus amphibius*), incidentally, has not been part of the natural fauna of Liberia in recent times; no recent sightings have been reported.

Buffalo (*Syncerus caffer nanus*)

59. Buffaloes exist in very small numbers in all the forest regions; occasional traces were found in the Mano region. Until a short time ago, buffalo were a regular feature of the great edaphic savannas of the Wologizi Mountains, but armies of hunters from LISCO have wiped them out.

Manatee (*Trichechus senegalensis*)

60. There have been no recent sightings of the manatee, although one would expect them to be common in the mangrove swamps. As the local inhabitants of the coast are not great hunters and hardly venture into the swamps, there is a chance that some of these animals still survive, in spite of the limited area of their habitat. A survey is, therefore, highly desirable.

Animals of the Savannah (antelopes, warthogs and lions)

61. All these animals disappeared a long time ago - if, indeed, they were ever present. There are no longer any large mammals in the limited savannah country of Liberia. The bush-pig (*Potamochoerus porcus*), nevertheless, is very common and, as in most of Africa, is one of the animals which best tolerates the presence of man since he helps them a great deal by clearing land. Huge wallows were observed near Gilima in the north-west.

Forest Antelopes

62. After monkeys, the forest antelopes are the most persecuted group of animals, usually being hunted at night. However, whereas monkey populations have been almost completely decimated, the destruction of antelopes has not been so total in many regions, some animals are managing to survive. The most common species is, certainly, the blue duiker (Cephalophus (Philantomba) maxwelli), which was observed even in the forest-savannah mosaic and is not absent in the littoral bush as close as Monrovia. Hunters make no distinction at all in favour of rare and protected duikers. Bongo (Boocercus euryceros) has not disappeared; recent tracks of a female and its young were observed near the Jo River. Antelopes seem to possess a greater degree of tolerance and adapt more easily to secondary forest than monkeys.
63. Among the small mammals, the tree-dwelling squirrels are eagerly searched for, as well as pangolins (the Manis species) and porcupines (Hystrix and Atherurus species). However, hyraxes, ground squirrels (favoured by the clearing) and large bats (Pteropidae) are seldom captured. The giant rat (Cricetomys emini) and cane rat (Thryonomys swinderianus) are hunted, but not the small rodents like the Muridae group.
64. All birds are hunted indiscriminately as long as their size is larger than that of a pigeon to make it worth the use of a cartridge. Species usually common to forests like Calaos, Turacoes and even birds of prey, are very scarce in the Liberian forest. The sight of a bird of so little game value as the palm vulture will automatically attract the attention of a hunter. Yet the European swallows, which winter in large numbers in Liberia, somehow escape this destruction. Hunting pressure is much less heavy in the coastal zone; the waders and other game birds are not immediately shot, as is the case in the north of the country.

Reptiles

65. Crocodiles are less rare, as one might rightly assume; three species exist, two of which survive in the almost impenetrable mangrove swamps of Monrovia. The littoral beaches are said to be the breeding areas of marine turtles; however, it is probable that practically all suitable sites have already been destroyed by man.

c. Forest and Flora

66. A look at a map which shows forestry concessions leaves one discouraged. Nearly all of the exploitable forest in Liberia is under concession (see annex), generally allocated to foreign companies de facto, even if de jure they are Liberian. As mentioned earlier, national forests can only be said to exist on paper, as they are in no way protected. They are damaged either legally through the concession system or through legal retrocessions, such as the 30,000 acres (12,141 hectares) along the

Zorzor-Voinjama road in the North Loma National Forest, or degraded through shifting cultivation. This happens immediately after the opening of numerous tracks by lumbering companies. These tracks are often a greater threat to the forest than the concessions themselves.

67. As discussed previously, the littoral forest has almost disappeared. The forest is strictly evergreen in the south, yet assumes a semi-deciduous character further north, this is accompanied by a change in the composition of species. On the highest hills, vegetation cover is typically montane, as evident on the Nimba, Wologizi and Wonegizi mountains. The lowland forests are the most endangered since the land is almost flat, thus making lumbering easy. For this reason, a large part of the forest in eastern Liberia is threatened with immediate destruction, while in the more mountainous north, the forest is of less interest to the logging companies because it is more difficult to exploit. However, shifting cultivation on the mountain slopes, even the steepest, is not impeded.
68. Some international wood dealers are only motivated by short-term profit without any care for the long-term interests of the country. This means that Liberia will, undoubtedly, import wood for its own industry before the year 2000, though one wonders where from. Unfortunately, some companies are also responsible for much wastage of commercially valuable timber at logging sites, transport routes and at the harbour.
69. Faced with this prospect, the FDA is trying to curb the trend of destruction, but it is up against a serious conflict of ideas - and the conservationist should not forget this - in that one of the principal reasons for creating the FDA was to bring in money. Therefore, the FDA has to choose between optimum conservation of forest resources and the economic imperative.
70. Reforestation with exotics (teak, Gmelinia etc.) has been undertaken, but the areas involved are small, amounting to only hundreds of hectares (the FDA's official figure for 1979 is 6,150 hectares). Attention is given to the ecological risk taken in planting these exotics or to the environmental effects.
71. In spite of all these negative elements, there were still splendid primeval forests in Liberia in 1979, and some of these, like the Sapo forest, are the most unique forests ever encountered by the author in his travels through Africa and the Far East since as far back as 1948. It should also be mentioned that until about 1960, a large part of the interior forest of Liberia was practically virgin, the exception being the populated region between Monrovia and Nimba. Even in 1979, the most attractive areas of the West African forest were to be found in Liberia, since the degree of deforestation is far more acute in Sierra Leone and the Ivory Coast (apart from the Tai Forest/Tai National Park) where the exploitation of forest for timber started much earlier.

72. Among other points to raise, one must note the following:

- a) The volume of wastage, often through the rejection of valuable logs by logging companies both on logging sites and along transport routes, including their rotting away at the port. An FDA regulation (Reg. 1) on the waste of forest resources was published, on 15 April 1978 and the Managing Director is taking measures to ensure its enforcement.
- b) The problem posed by the pulp and paper factory projected for the River Cess-Sinoe area.
- c) The existence of some local saw-mills which should be encouraged since they help to avoid the exportation of logs.
- d) The vital importance of firewood and charcoal, even in a forested country like Liberia. In Monrovia, firewood has become an expensive commodity; yet this source of energy could be a by-product from logging, clearing for paper plantations or from areas being ruined by shifting cultivation.

d. National Parks (1978-79)

73. Three areas have for some time been under consideration as national parks, but not one has actually been established. The three proposed areas are:

Tiempo National Park	13,000 hectares
Bokumu National Park	2,950 hectares
Wologizi National Park	20,800 hectares

The demarcation lines of Bokumu National Park have, in fact, been set and Wologizi National Park appears prematurely on official maps. (Map joint Operation Graphic Sheet NC - 2914).

74. When official FDA teams surveyed for the proposed Tiempo National Park, they came to the conclusion that shifting cultivation was increasing rapidly and that it was too late to reverse the trend. The proposed area of the Tiempo National Park would have protected a mountain massif. The smaller Bokumu National Park would have included a spectacular waterfall, but no game. If the Wologizi National Park had materialized, it would not only have been a beautiful nature reserve, by virtue of its mountains, but also a very valuable one. It would have included Liberia's second highest mountain (1,380 m), covered with a splendid primary forest at its lower elevations and grading to montane vegetation cover. At its foothills, as well as along its steep valleys, are to be found large areas of edaphic savannah. Fauna at one time was abundant here, but has been almost completely exterminated through over-hunting. Furthermore, a tremendous mining scheme for the exploitation of this mountain's rich iron ore will soon begin; at the hands of Lisco, a Japanese-Liberian

group. Preliminary investigations have already started. Any idea for a nature reserve, therefore, has to be abandoned.

75. Finally, the Nimba Mountains - of worldwide interest, but not carrying the status of a national park - are under symbolic protection: a pole stands at their entrance. The Nimba Research Laboratory operates there and scientists carry out research in the area in the fields of botany, zoology, etc. An excellent Liberian technician, Mr E. Yallah, is based at Nimba permanently.

e. Miscellaneous

Aspects of environmental pollution

76. Without going too far into this problem, which alone merits a long report, the following observations are significant:
 - a) The effects of pollution from the Mano River iron ore mines are dramatically apparent in the lower stretches of the Mano River - the river is bright red along its entire course with a vast area of the Atlantic ocean similarly being affected. This problem, at the border of Sierra Leone and Liberia, is of international importance.
 - b) The same pollution is observed at Buchanan, although not to the same extent.
77. Pollution in East Nimba arises from mining wastes from the east of the Nimba massif. Vast areas of forest have been completely destroyed and pollution is spreading far away into a tributary of the Yah River. The LAMCO Company (Liberian-American Company) is aware of this problem - the building of a catchment dam has been proposed and a resettlement village has already been built. The FDA granted the designation "salvage area" to Nimbaco, but this company overstepped agreed limits and the FDA stopped their operations there.
78. On the coast between Monrovia and beyond Buchanan, fuel residues are major pollutants, contaminating also the lagoons where the high waters have brought them. This is a problem which requires international action. In addition to this, and like all coastlines with urban settlements or with boats sailing nearby or anchoring at harbours, there is the problem of enormous quantities of plastic rubbish which pollute the entire coastline.

Finally, mention must be made of the pollution arising from the excess of rubbish in Monrovia and the problem, more acute here than anywhere else, of the numerous derelict cars in the capital. These pose very real threats to the environment within and around Monrovia.

Livestock and overgrazing

79. This problem, so worrying in many African countries, does not exist as yet in Liberia. Cattle are scarce, although not completely lacking anywhere. The cattle shortage explains the prevailing hunting attitude, the obsession to kill, the existence of bush meat markets and the high cost of meat. Under the present circumstances, the development of a livestock industry must be recommended to stop the spread of bush meat markets, although such goals may not be readily accepted, considering the reputation of livestock for destroying vegetation cover.

Wild fires

80. The outbreak of wild fires is not a major problem in Liberia, but could well become one. All the savannas along the coast, despite their 5m to 6m annual rainfall, as well as the edaphic or man-made savannah further up-country are affected by fire every year, with the consequence that the forest, attacked at its edges, is gradually shrinking. Fire, as a tool for shifting cultivation, is extremely harmful. During dry years (1965-66), when the Harmattan winds persist long over the land, semi-deciduous forests are directly threatened in spite of their good regeneration during wetter years (1978-79).

Shifting cultivation

81. Shifting cultivation is, without doubt, the greatest threat to the future of Liberia's forest. It is practically uncontrolled and vast areas of national forest are destroyed each year. It is evident that in the short term, shifting cultivation - which is not described in detail in the report - is much more damaging to the forest than exploitation through concessions. It is particularly destructive in the mountainous zones and is responsible for various soil erosion phenomena.

Management and administration

82. Until the creation of the FDA, the Bureau. of Forest Conservation of the Ministry of Agriculture was concerned with forest conservation. Now that the FDA has been empowered to legislate on conservation matters, it may be expected that immediate conservation measures will be taken. Given the current situation, however, it is obvious that rulings made at the highest level will carry more weight and thus facilitate the FDA's actions.
83. During its short existence, the FDA has made efforts to curb careless forest exploitation. A Wildlife and National Parks Section (note: actually "Division") has been set up in the FDA Division for Forest Management; there is one officer in charge and three technical assistants based in Monrovia (their hierarchical level with respect to other sections of the FDA, however, could be improved). In the field, there are a number of wildlife officers full of goodwill, but the lack of logistic support and, most of all, lack of appropriate regulations (to be promulgated by the FDA) make them powerless and unable to act in preventing the current destruction

of wildlife. A number of Liberians have undergone training at the College of African Wildlife Management, Mweka, Tanzania and others are expected to follow.

V. PROPOSED ACTIONS FOR PROTECTION OF SPECIES AND HABITATS

84. As has already been observed, the concept of conservation is in full mutation in Liberia. Many decisions in favour of conservation need to be taken without delay and should become legislation, which must be enforced with implacable strictness. In a country used to a tradition of freedom and “laissez-faire”, the authorities will need a great deal of courage to apply repressive measures, and at the same time be associated with a public-awareness campaign.

Hunting, Arms and Game Preservation

85. As explained earlier in this report, an excellent draft regulation on wildlife conservation has been prepared by the FDA and the FAO/World Bank Legal and Administration Advisor.

Hunting

86. Bearing in mind the situation in Liberia and following various consultations, both optimum and minimum measures are proposed here. Initially, a total ban on hunting was considered essential, but subsequent events in Liberia led to only a partial ban being recommended. The application of the optimum measures given in the following paragraphs will, without doubt, be difficult, but they serve as the ideal.

Optimum measures

87. With immediate effect, an almost full moratorium on all hunting for a five-year period is suggested. This measure has been applied with some success in a few countries already. Although a very hard, somewhat unpopular decision, it seems the one and only immediate alternative open to Liberia if the current decline in numbers of important fauna is to be arrested. It is better to operate in this way than to wait for a moratorium de facto in four or five years' time when nothing will be left to preserve. At present, the trend can still be reversed, but this may not be the case for long. It is essential, therefore, that once it has been decided to ban hunting, the ban be effectively enforced. Penalties must be sufficiently deterring and should not exclude any person found contravening the ban; such penalties should be more severe where civil servants are involved (in the case of the FDA, employees should be suspended immediately).
88. Implementation of the regulations will necessitate inspecting markets and roadside sale posts and, above all, checking vehicles along the roads. This latter point is of top priority and will be easy to apply since there are administrative control posts almost everywhere in the country; furthermore, the road net in Liberia is such that this measure can be easily enforced. Twenty-five capable uniformed wildlife

assistants, well-distributed throughout the country, should be adequate for the task. These measures will have to be implemented by the Ministry of Commerce, Ministry of Justice and the National Police Force in cooperation with the FDA. Confiscated meat should be sold and the revenue should go to the State.

Minimum Measures

89. A ten-year ban on hunting should be decreed for the threatened species Cephalophus jentinki, Cephalophus zebra, Loxodonta africana, Choeropsis liberiensis and Pan troglodytes all of which are featured in the IUCN Red Data Book of endangered mammals. A five-year ban or severe restriction on the hunting of all types of primates should be decreed. For all other species:
 - a) hunting at night should be prohibited;
 - b) hunting should only be carried out by authorized persons or those with a permit issued by the FDA.
90. All trade in bush meat should be prohibited unless the meat is accompanied by a certificate proving that the animal was killed legally. The sale of by-products of hunting (that is products other than meat, such as skins and ivory) should be prohibited - or at least, strictly controlled, and this prohibition should equally apply to species not indigenous to Liberia.
91. Liberia should accede to and enforce as soon as possible the OAU African Convention on the Conservation of Nature and Natural Resources, as well as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the more recent Migratory Species Convention (Bonn 1979).
92. Two species are especially threatened in Liberia: the forest elephant and, above all, the chimpanzee. For these species, the fines must be very severe, comparable with those applied in Zaire, where penalties range from \$200 up to \$2,000 with jail sentences of one to ten years. The rare Okapi (Okapia johnstoni) was saved from total extinction thanks to a Zaire law passed on 22 August 1969 which imposed one to ten year prison sentences on poachers who were guilty of killing Okapi. The pygmy hippopotamus, although less directly threatened, could be promoted as the “animal symbol” of Liberia by virtue of its endemism and its name.

Arms

93. The question of arms and ammunition is a delicate one, as seen previously, because of its connections with sacred rights, there being a local ammunition factory, etc. Here again much courage will be needed to oppose private interests, often foreign ones, which will undoubtedly come to the surface. The abundance of guns constitutes a human risk, but also a political problem. All guns should be registered in terms of ownership and it should be specified that only the owner be entitled to use the particular arm. Purchase tax, deterrent in nature, should be imposed on arms

and import taxes should be considerably increased. The owner who uses his gun illegally, even if only once, should have it confiscated and destroyed (a most desirable measure, considering the large number of arms now in the country).

94. As for ammunition, there is only one way to deal with this: impose deterrent taxes. Under present circumstances, it would be appropriate for the price of ammunition to include 90 per cent tax for the State (as on petrol in many countries); this would provide a good source of revenue for the national budget. If a cartridge cost \$2.00, for instance, this serious problem concerning ammunition would immediately be mitigated.
95. The problem of the local ammunition factory still remains: this evil is an existing reality. Neighbouring countries like the Ivory Coast are blaming Liberia for a lack of control on the supply of ammunition and, consequently, for the difficulties encountered in suppressing poaching. This is an extremely sad situation which merits immediate attention.
96. Conservation measures proposed in this report will require large financial expenditure. It is, therefore, strongly recommended that a percentage of the taxes referred to in the preceding paragraphs go directly to the FDA, for the very purpose of implementing these measures.

Protection of Human Life and Crops

97. Damage done by wild animals will, undoubtedly, be pointed out. In the case of areas prone to damage by certain wild animals, such as bush-pig or elephants, control measures could be carried out by or under the supervision of the Wildlife and National Parks Division rather than by private individuals or groups. However, the elephant, for example, has become so rare that damage is only encountered occasionally and is generally exaggerated in such cases (some damage was reported near Vahun). Should the situation arise, driving back the elephants, rather than shooting them, would be preferable. It may be necessary to train special assistants for this purpose.

Alternatives to Bush Meat

98. One must not forget that people's diet and eating habits cannot be changed suddenly. Yet the current status of most fauna calls for alternative sources of meat to be investigated and developed in order to reduce the pressure on wildlife. 2 a matter of urgency, the Ministry of Agriculture should give priority to examining this problem and should take necessary measures. The problem was studied recently, by Mr Balogun O'Neill of the FDA, from which the following proposals emerged:
 - a) Cattle: Trypanosomiasis does not seem a real obstacle. Cattle are to be found in small numbers throughout the country; intensive stock farming exists in localized areas and needs to be further developed.

- b) Goats (with care), pigs, poultry and rabbits are very easy to raise, even single-handed.
 - c) Sea Fish: the role of the “Mesu Fish is well-known Liberia. Its importance should be developed, but with discretion in littoral waters (unfortunately sometimes it is wrecked by foreign boats). Local canning factories and improved distribution would help reduce the shortage of protein.
 - d) Freshwater Fish: Their importance should also be developed, but with the help of strict legislation (regarding the size of nets, for example, and imposing a complete ban on the use of poison and dynamite).
 - e) Pond Fish: This seems to be the most productive form of fishing. Aquaculture could also be a viable substitute.
99. Other alternatives would only be marginal - for example, invertebrates, game cropping and game farms, including the farming of cane rats. The importation of cattle and dried or canned fish could be developed to compensate for the luxury items currently imported and which cannot be justified on economic grounds. It is rather surprising to find that the first advertisements to catch the eye on arriving at Robertsfield, when driving from the airfield to the capital are for dog food (canned and imported); and this in a country where the animal protein supply for human consumption is considered a major problem.

Proposed National Parks

100. The selection of potential sites for national parks was one of the principal aims of this survey and the subject is here developed in more detail. National parks are established in order to preserve natural biotopes against man's destructive activities. The objectives are threefold:
- a) general conservation, including in situ preservation of genetic diversity;
 - b) scientific research;
 - c) recreation including development of tourism as an economic resource.

A national park is generally created by government decree; this ensures its maximum protection since only another decree at the same level could cancel it.

101. There are several types of national park, which we will not elaborate here, but it is evident that a “strict nature reserve” affords the most protection. In such a strict nature reserve, it is normally prohibited to:

- a) chase, hunt, capture, destroy, frighten or disturb in any way any wild animal, even dangerous ones - except in the case of self-defence;
 - b) steal or destroy eggs and nests;
 - c) cut, destroy or uproot wild plants and trees;
 - d) introduce any animal or plant species foreign to the specific biotope;
 - e) undertake excavations, dig, bore, take samples or carry out any other activity which would bring about modifications to the land or vegetation;
 - f) dam rivers, draw or pollute water, directly or indirectly;
 - g) fish;
 - h) fly an aircraft below 300 m.
102. What is the desired extent of national parks over the whole of Liberia? The answer can be given by referring to neighbouring countries. Most ecologists consider that five to seven per cent of the land area should be set aside as national parks. In Zaire, however, the President has officially requested that 12 to 15 per cent of its territory be preserved. In Rwanda - although an over-populated country - national park- land exceeds ten per cent of the territory. Senegal protects six per cent of its territory. Hence 600,000 to 700,000 hectares should be set aside in Liberia for national parks; this is not much compared to areas at least five times greater given over to forest exploitation.
103. It is vital that national parks cover forest areas of a critical minimum size. Recent studies in the Ivory Coast (Bousquet, 1978) have shown that 10,000 specimens of one tree species are necessary for the species to be preserved and to ensure its role in the gene pool.
104. One of the principal objectives of this survey was to identify suitable and sufficiently large tracts or zones of the primary or near-primary tropical rainforest biome to be set aside as national parks and/or reserves. The variety of biotopes in Liberia is rather simple:
- a) lowland tropical rainforest on more or less locally undulating terrain
 - completely evergreen
 - partly semi-deciduous;
 - b) montane biomes;
 - c) littoral and aquatic biomes;

- d) savannah (littoral and up-country);
- e) secondary forest - a mosaic covering more than 30 per cent of the Country;
- f) intensive crops (industrial or otherwise, including rubber, palm oil and paper plantations).

However, an attempt was made to include as many different biomes and sub-biomes as possible so as to ensure adequate biological diversity and edge effects. The actual choices (three parks and four reserves) were not to preclude future options for more parks and reserves, if they become possible.

105. The map of Liberia shows that the central zone between Monrovia, Buchanan and Nimba is severely degraded. The extreme north and, in particular, the extreme northwest is densely inhabited (Voinjama-Foya) the same is true of the extreme southeast (Harper-low Cavally). These regions had to be ignored, therefore, in seeking suitable sites for national parks and/or reserves.
106. The coastal belt is no longer fringed with primary forest and in spite of an obvious touristic appeal, it does not hold any exceptional biological value. Often scarcely settled, it is well protected in itself and the aquatic habitats (mangrove, etc.) are little altered. The coastline itself, almost everywhere, has been increasingly disfigured by coconut palm plantations. Very rapidly, as was known before the survey started and confirmed later in the field, attention came to be focused on the northern, western and south-eastern regions of the country for the location of national parks and/or reserves.
107. Northwest a very large forest zone is still relatively untouched in this region ($\pm$ 15,000 sq km). It offers a major advantage: an absence or rarity of concessions since timber exploitation is difficult because of the hilly topography. In the northern portion of this zone, a few rather old and scattered human settlements are noticeable (north of 7°30' N.).
108. In the southern part of the block between the Loffa and Mano rivers, the forest is practically uninhabited. However, a serious threat now exists in the form of the proposed dam on the Mano river. This dam will alter completely the natural aspect in that large areas of land will be flooded. To include a dam or even banks of an artificial lake in a nature reserve was considered undesirable, although such an area could act as a buffer zone to a more natural site.
109. In the north (Gelahun, Vahun), the fauna seems less reduced than elsewhere. This region is not part of the lowland rainforest, the most threatened habitat, but is an alternation of semi-deciduous forest, low bushland (yet to be categorized as secondary or otherwise) and marshes; this factor was also taken into account. An area between the Loffa and Mano rivers was suggested as a suitable area for a national park, but with some reservations, which will be mentioned later.

110. Southeast extensive forest zone is also found here, probably the largest in West Africa, but it is an area where enormous concessions have been granted. The resulting modification of the natural aspect between 1965 and 1979 has been dramatic. However, the problem of human settlements and traditional rights does not occur here. Extensive areas had recently (and still have) a human population density of near zero.
111. Until the beginning of 1970, there were still unexplored zones in this region, but roads have now divided this forest entity. Although initially under consideration, it later became clear that the Cavally valley, its tributary, the Douable (where fauna was exceedingly numerous 15 years ago), Grebo National Forest, etc. had to be disregarded because of concessions already in operation, followed by the usual procession of shifting cultivators, hunting, etc. In addition there is a project for a dam on the low Cavally, which considerably limits the potential of this area for a park. In the centre of the eastern block is the large Krahn-Bassa National Forest, one of the last forest strongholds in West Africa. Unfortunately, recent FDA reports, as well as observations made during this field survey, have shown a rapid encroachment of settlements and heavy hunting in this area.
112. Two areas, however, were considered the least disturbed and, therefore, the most suitable for national parks:
 - a) The Sapo Forest., totally uninhabited, but already completely divided into concession blocks - this forest has to be saved at all costs;
 - b) Further west, between the Cestos and Senkwen rivers, an area less threatened by concessions and including littoral forests (the untouched Cestos river, mangroves and coastal forests would also be protected).

Small Nature Reserves

113. Four small areas were considered worthy of protection as “biological samples” or small nature reserves. They are described in a later section and also marked on accompanying maps they include the Nimba Mountain range. Although not officially recognized, the term “biological sample” is very practical.
114. Long-term considerations, which include optimum management, development and rational utilization of forest resources, demand that management buffer zones be established around the proposed national parks; this will, however, require further investigation.

Preliminary Description of the Proposed National Parks and Reserves

115. Following the foregoing discussion, and taking account of salient points arising therefrom, the following areas are proposed (the names are tentative and principally geographical):

Loffa-Mano National Park

116. Proposed size: about 230,000 hectares. This reserve will protect a large area of rainforest, strictly evergreen in the south, becoming progressively semi-deciduous in the north. It includes large patches of low bush, marshes and some savannah on lateritic soil. The whole region is extremely undulating, the maximum elevation being only 800 m at the highest point of the Wonegizi range. The area includes part of this mountain range, with a series of rounded hillocks and some steep bare rocky slopes. The park is drained principally by the Mano and Loffa rivers and their tributaries. Within the limits, the river banks are probably virgin. The rivers are characterized by rapids and waterfalls, often spectacular. The Mano and Loffa rivers are important watercourses, with considerable variations in level during the year; they cannot usually be forded.
117. Within its boundaries, there is little or no human population. However, some small villages will need to be resettled, in particular along the Sierra Leone border. The resettlement of these villages, which have few administrative contacts with the Liberian authorities, is in accord with the land consolidation policy of the Government. There are extensive empty regions outside the future park which could be suitable for this resettlement.
118. There are also a few other settlements to be considered, notably Gonhsua, Gohn-Fala, Gbaama and Domamana. These are not at all important villages like Jenne and Lomboba, which, unfortunately, prevent the extension of the reserve to the spectacular region between the Loffa and Lawa rivers.
119. The two main blocks of the reserve, the right bank of the Mano and South Loffa, are almost uninhabited. It is only the third zone, between the Mano and Loffa rivers, which presents some problems.
120. An unavoidable problem arises from the presence, upstream and to the north outside the proposed limits, of the future LISCO mines (Wologizi). There may be, in the future, some mining in the Wonegizi mountains themselves but this remains very uncertain.
121. In the medium-term, the main threat comes from the railway and more particularly from the proposed iron ore pipeline, which will connect the LISCO mines to a projected new harbour near Robertsport for ships of up to 150,000 tons capacity. A decision has not yet been taken on this development and it may be that the ore will be piped more to the east, necessitating an extension of the port in Monrovia rather

than the construction on a new port. It is impossible to discount the threat of the pipeline at the moment, but the FDA must, at all costs, try to insist on a point of exit further east.

In several African countries; roads have been modified to take into account the interests of nature conservation. If this was economically impossible, the park would be split into two blocks. Nowhere else in the northwest is there a suitable site for a reserve of sufficient size. In any case, the right bank of the Mano River will remain intact; if the construction work is well-controlled, the park should suffer very little damage.

122. Another problem exists downstream outside the park: the construction of a dam on the Mano river, a little upstream from the present Mano River Mines. Preliminary works are well advanced. This project is part of a vast programme planned by the Mano River Union, an authority established jointly by Liberia and Sierra Leone in 1973. Some interesting information can be found in the document ON/C0N165/75 of December 1976, published by the Mano River Union General Secretariat in Freetown, entitled "Study of water resources and hydro-electric potentials in the Mano River Basin":

- area of the Mario River Basin = 5650 km
- total length of the reservoir = 74 km
- maximum water level of the dam 140 m
- minimum water level of the dam = 124 in
- 3000 people will have to resettled (1400 in Liberia, 1600 in Sierra Leone)
- mainly for electric power; only 110 km being irrigated.

123. The economic importance of this combination of mining and energy production leaves relatively little argument for ecological considerations. It is, therefore, deemed necessary to exclude from the limits of the proposed national park all the partly flooded zones, associated lake shores and artificial islands. When the dam is totally functional (not before 1985), some small zones included in the proposed park on the higher Mano river may also be flooded, but this is not certain.

124. The artificial lake shores could be set aside as a real forest reserve, though not under national park status. As the flooding progresses, the FDA and specialized technicians could take steps to save the affected wildlife. Similar problems exist across the border on the Sierra Leone side. One useful consideration might be the creation of a protection forest belt around the dam. Sadly, the construction of this dam prevents the inclusion in the park of a forest region, which is scenically and scientifically perhaps the most interesting and actually untouched landscape in Liberia, but one has to be realistic, of course.

125. Another problem comes from a possible high powerline, the lay-out of which has not yet been decided, but which may cross the national park. If it is decided that the

powerline will, indeed, cross the park, then it is suggested that the powerline, the pipeline and any associated service road be aligned together.

126. A major economic reason to set up the national park in the high Mano-Morro region is its value as a water-catchment area for the Mano River dam. Were there only one reason to preserve this forest forever, this would be the one and of national significance.
127. We should mention that the administrators of the Mano River Union have not forgotten the requirement of nature conservation and have taken this into account in their preliminary report, "Resolutions of the Union Ministerial Council 1974-1978, Resolution II, Cooperation in Trade, Industry, Agriculture and Forestry": "Harmonization and intensification of wildlife conservation management and training in both countries must be intensified".
128. Vegetation in this proposed park can be considered 90 per cent natural, if not primary. Except very marginally in the western and northern blocks, there is no problem of forest concessions because of the difficult terrain. The situation is somewhat different in the southern block (which is, paradoxically, a national forest), where there are plans for concessions. One hopes that the section of the Kpelle National Forest proposed for inclusion in the park will be excluded from forestry exploitation schemes.
129. In the proposed Loffa-Mano National Park, fauna remains certainly the most abundant in Liberia in spite of heavy hunting. The variety of bio-topes, unique in Liberia, the vicinity of the northern savannas and the wildlife recolonization from Sierra Leone are important factors. At least one-third of the Liberian elephant population survive in these forests; the pygmy hippopotamus is still rather common. In fact, tracks of all the classic Liberian fauna were observed here. Primates of most species seem less reduced here than elsewhere in the country.
130. For the limits of the reserve, as far as possible, natural boundaries have been used. In many cases, however, this was impossible since it was imperative to stay clear of human settlements. Some modifications may well be necessary during the physical demarcation of the park.
131. The starting point of the park is at the border with Sierra Leone - a straight line following more or less the ridge between the Njagohuni and Mehembu rivers. The line reaches the Gbeya river after excluding the heavily-cleared and settled Kalahun area. The Gbeya river makes an excellent limit up to its junction with the Mano river. A new straight line joins the Loffa river, making a curve to include a spectacular rocky peak 799 m high. A more north-eastern limit is impossible because of human settlements near Ngilima and Yaselahun. The Loffa thus affords a good limiting line. Thereafter, a triangle of forest, completely uninhabited, intrudes into the Kpelle National Forest. The boundary line then has to make a considerable deviation to avoid the important city of Zoi and its hinterland as well

as the traditional mines of Kongba. The limit then reaches the Morro river and on to the Sierra Leone border (the zone of the future dam).

132. Access: Access is possible from the south, but in the present circumstances, initial access will have to be from the north. Two roads are possible, both starting from the town of Voinjama, one towards Vahun, the other towards Gondalahun through Mbaloma and Gilima (the construction of which is presently underway)/
133. The headquarters of the park should be located at Vahun or at Gondalahun, hence outside the limits of the reserve. Positive contacts have already been developed with Chief Seku N. Diede (Paramount Chieftom of Yembe Yawayahun). It is very important when a reserve is being established that local inhabitants be made aware of how the temporary disadvantages they experience will be compensated in the medium-term by the different activities associated with the reserve, such as employment. Resources resulting from the exploitation of a park will always come back, partly and directly, to the populations affected.
134. In the initial stage, wildlife technicians will have to control the access roads; their number should be about 30. Tourist development could easily be provided at Voinjama, certainly one of the most attractive towns in the area, and with the best climate in Liberia and already provided with hotel facilities.

Sapo National Park¹

135. The total area of the proposed Sapo National Park is approximately 130,000 hectares. This is a uniform area of primary forest, so far completely unspoiled, but allocated to several concessions. No concessionaires have started exploitation yet, even though trees have already been marked by foresters. The basic problem will be to reach an amicable arrangement with the concessionaires. The forest is very dense, strictly evergreen with few large rivers (Sinoe) certain zones are moderately undulating, but generally the region is rather flat, which makes it highly vulnerable to exploitation. There are no permanent settlements inside the proposed limits of the park.
136. The Putu Mountain Range (710 m), north of Sapo, has always been considered one of the richest game areas of Liberia (as already noted back in 1965). Unfortunately, a series of villages and some mining projects - admittedly (still rather vague) prevent the inclusion of this mountain range in the reserve. Furthermore, the construction of a road in the Gambo region, connecting the two main roads south of Zwedru, is another factor against the Putu Mountain Range being part of the reserve. The proposed boundary of Sapo National Park follows a long stretch of the Sinoe river. Elsewhere, straight lines leave outside the park, inhabited regions such as the large villages of Doduaken and Peloken. Headquarters could be located at Pynetown Further north, the town of Zwedru is perhaps less attractive to the tourist

¹ An important preliminary description of the Sapo National Park was recently prepared by Robinson (1982)

than Voinjama but again it has potential hotel facilities. Access to the park is easy through the two main roads in eastern Liberia: Zwedru - Greenville and Zwedru - Harper.

137. Bearing in mind the situation in Liberia, fauna is still quite abundant here; it seems that the people living in the southeast, outside the proposed Sapo National Park, hunt less actively than in other regions of the country. Considering the need for protection of an ecological sample of primary rainforest, Sapo is probably of first priority to Liberia. The progressive destruction of this unique forest, unavoidable if not included in a national park, would be an ecological disaster.

Cestos-Senkwen National Park

138. The Cestos-Senkwen National Park would cover an area of about 145,000 hectares. The proposed national park is a lowland area; although some hills are quite conspicuous, they do not exceed 300 m. The objective behind the choice of this park's location is essentially to protect:
- a primary forest area, not very far from Monrovia, with a still representative fauna (especially elephants);
 - the extremely spectacular Cestos river;
 - most important, the biological transitions be the inland forest, the littoral forest (the only place where it subsists in Liberia), mangroves and a stretch of coast practically untouched (less strict legislation should be applied to this "wilderness area").
139. The proposed limit follows a long section of the old limits of the extension, westwards to Cestos river, of the Krahn-Bassa National Forest. Near Nema-town, settlements have progressively sprung up along the Cestos river, but it is mostly upstream from the junction of the Shani and Senkwen rivers that shifting cultivation is developing at an alarming rate. The provisional boundary should take account of this and, if necessary, be revised to exclude all settlements. Within these proposed limits, there is now almost no human settlement, except along the littoral and near the middle Senkwen. Pressure from concessions is much less than in the proposed Sapo National Park.
140. Access by road is possible by two routes: either from the north through the Jo river concession, Bolowehn, which is only two hours away from Buchanan, although the road does not reach the border of the nature reserve, or from the south from Juarzon or Greenville. The lower Cestos is, at present, an impassable obstacle to any traffic; only canoes can cross from one bank to the other.

Other Conservation Areas

141. Nimba Mountain Range This region is known throughout the world and has a major biological value, the importance of which was once more emphasized in a report (1979) by Dr. Kai Curry-Lindahl. First of all, it is of utmost priority that the logging rights of NIMBACO be withdrawn immediately, and the entire remaining forest be included in the reserve. The summits of Nimba West and Nimba East (outside the mining zone), plus the Iti valley, urgently need official protection. On the eastern slopes of Nimba East, ranging from 700 m to 1300 m in height, there is a strip of low altitude forest, which has survived NIMBACO destruction (at least until the beginning of February 1979). The Grassfield Laboratory would be excellent headquarters for the management of Nimba. The preservation of the forest in the Nimba Area is justified for pure economical reasons. It is important to be able to maintain the water level even in the very dry years. The water is also essential in the construction of a mineral concentration factory. The forests to be preserved are essential water catchment areas.

142. Large species of fauna are much reduced in number here. Buffaloes and elephants disappeared long ago; it is doubtful whether many primates still survive. The bird fauna, as well as lower vertebrates and invertebrates, are of major zoological interest in this region.

143. One should recall that in the Ivory Coast, Nimba is officially a nature reserve. In Guinea, mining development is projected at Nimba but, according to very recent information supplied by Professor M. Lamotte, this will only affect the extreme north of the range and will not touch the zone near the Liberian border.

144. Wonegizi Mountain Range: This mountain range, easily accessible from the Zorzor-Voinjama road, is of major interest since it boasts the third highest point in Liberia (1145 m) and an untouched transition from low-land rainforest to semi-orophilian vegetation, which, as far as an aerial survey can show, looks quite typical. Broad cliffs are a feature of this area. Another interesting aspect of this region is the continuity, in Liberia, of the very beautiful Guinean mountain range, east of Macenta. In the long-term, it might be possible to establish a trans-frontier national park to cover this biome in both countries.

- 145 Coastal Forest and Cape Mount Area: Two features of interest here are the rocky coastline (extremely rare for Liberia) and the coastal forest (also rare) on rocky soil in Liberia's maximum rainfall zone (about 6000 mm). The site is spectacular and touristic development immediately feasible. Frankly, it is strange that this forest (rather comparable to that of Freetown Peninsula in Sierra Leone) has survived. Any cultivation could be stopped immediately.

146. It would appear that a relic population of monkeys has recently been exterminated, but this is not certain. It is suggested that as a test of conservation in Liberia, a

decision with immediate effect be taken to stop shifting cultivation in Cape Mount Forest. Any contraveners should be dealt with severely.

147. Cavally Valley: This valley takes in a small zone of the Grebo National Forest, a more eastern variety of forest. It is an area not directly threatened by concessions and where wildlife is still rather abundant.
148. Buffer Zones: No attempt has been made to outline the limits of buffer or management zones around the proposed parks, nor has any attempt been made to look into other areas suitable for wildlife, and forestry management. It is hereby suggested that this task be carefully executed.
149. Conservation efforts in the country should also encompass historical monuments, archaeological sites, landscapes, caves, etc., which could conveniently be brought under the Convention concerning the Protection of the World Cultural and Natural Heritage (commonly known as the World Heritage Convention, Unesco, 1972).

Boundary Descriptions

Proposed Limits of the National Parks

The proposed limits of the national parks should be examined in conjunction with the annexed maps.

150. Loffa-Mano National Park

- From a point situated on the Liberia/Sierra Leone boundary, approximately Lat. 8° N., Long. 10°35' W., the boundary goes eastwards for 30 km; it continues south for 6.25 km; then eastwards again for 20 km to the crossing of the Gbeya river. From the left side of the Gbeya river it carries on to a point situated 1 km from the confluence of the Gbeya and Mano rivers.
- From this point, the boundary continues south-easterly (150°) to a point 17 km on the Loffa River, then southwards to Konahun. An extension is suggested to include the highest summit of the nearby mountain range. The boundary then runs in a south-westerly direction (225°) along the left side of the Loffa river for 7.5 km to a point indicated "rapids" on the map.
- From this point, the boundary runs south for 27.5 km and then west for 32.5 km to the Loffa river, here it continues upstream along the left bank of the Loffa River to the point where the river crosses Long. 10°22'5" W.
- From this point, the boundary follows a northerly line for 23.5 km to the Mano river; then west (260°) for 25 km.

- From this new point, the boundary continues south for 20 km to Lat. 7°30' N (near the Mano river); here it runs northwest (298°) to the Mano river at the junction of Loffa and Grand Cape counties; thence along the border with Sierra Leone to the starting point.

151. Sapo National Park

- From a point situated on the river Sinoe 12.5 km from Juarzon, where the river Sinoe crosses Long. 8°45' W, the proposed boundary of Sapo National Park follows the right side of the river Sinoe upwards to the point where the river crosses the boundary of the Grand Jide and Sino counties; it then continues in a north-eastern direction (45°) for 2.5 km.
- From this new point, the proposed boundary follows a line parallel to the county boundary for 26.5 km; then southwest (242°) for 52.5 km, north of Doduake Airport.
- From this point, it runs westward to Long. 8°45' W; then north to the starting point.

152. Cestos-Senkwen National Park

- From a point situated approximately 5°33' N and 9°28' W (where the boundary of the national forest crosses the Cestos River), the proposed boundary of the Cestos-Senkwen National Park follows the official limits of the Krahn-National Forest, going north, east and south, to a point where the forest boundary crosses the Cestos river again, north of Nema-town.
- From this point, the proposed national park boundary runs southeast (165°) for 18.5 km to the Shani river; then along the left side of the river, downstream to a point approximately 5 km to the southwest (210°).
- From this point, the boundary needs to be re-examined west of the Senkwen river so that the settlements of Neo-town Wia-town Pa-town, etc. are not included in the park; the boundary would, then join the Senkwen river at a lower point, as indicated on the annexed map.
- From here, the boundary follows the left side of the Senkwen river downstream to its confluence with an unnamed tributary on the left bank; it continues along the left bank of this tributary to a point situated 5 km southeast (125°).
- From this point, the boundary continues southwest in a straight line (280°) for 25 km to the coast on the Atlantic Ocean; then northwest to the junction of the Grand Bassa and Sino counties. From here it runs northeast for about 14 km to the boundary of the RCLC concession, and from this point, in a straight line to join the starting point.

Note: The exact limits on the coast must be surveyed. They must include the whole estuary of the Senkwen river and its mangroves. The coast itself and the surrounding areas should be kept as a wilderness area under special legislation.

153. Nimba Nature Reserve Complex

The Nimba complex can, from a conservation point of view be divided into eight main parts:

- a) West Nimba National Forest (not following the official limits, but the findings of Dr. Kai Curry-Lindahl's 1979 Survey);
- b) East Nimba National Forest (the "nucleus"), encompassing the western and the eastern ridge, the Iti valley and an area of transition on the eastern ridge, with the lowland rainforest, this is currently very heavily logged;
- c) The small mountain of Detton (which is separated from the main block);
- d) An area east of the mines is so heavily spoiled by the wastes from LAMCO; nevertheless a small dam will have to be constructed and a resettlement programme initiated;
- e) A very narrow area of intact forest along the boundary;
- f) Area 6 on the map, in the Ivory Coast, supposed to be a national park, but not actually developed;
- g) In Guinea, in the south, two-third's of the main block of the mountain;
- h) In Guinea again, this time in the northeast, one-third of the main mountain block, soon to be mined and lost for conservation.

It goes without saying that all the limits will have to be controlled. To this end, it would be advisable for a commission of the three countries involved (Liberia, the Ivory Coast and Guinea) to make a detailed survey of the Nimba Mountain Range, and to reach a decision on the future of this mountain ecosystem. Note (1982): there is an Inter-Government organization recently created (Unesco).

154. Wonegizi Mountain Range

Wonegizi Mountain Range represents a small area between 5°15' and 5°25' N, and includes all the high summits of this range (notably, the third highest point in Liberia at 1145 m) and the surrounding forests.

155. Cavally Valley

A small zone of the so-called Grebo National Forest is not directly threatened by concessions or shifting cultivation. Vegetation seems practically virgin and wildlife should still be plentiful. The forest belongs to a more oriental type. Boundaries appear on map.

156. Cape Mount Area

The Cape Mount Area constitutes a small area again, incorporating all the surviving forest, the rocky and sandy coast, as well as the flat areas, but excluding those which have actually been settled, as indicated on map.

Legislation and management of national parks

157. It would be tedious to describe the administrative and logistic structure envisaged for the national parks this can be drafted as an entirely separate report as and when required. It would seem at present that the following procedure should be adopted:

a) A proclamation is called for, establishing the parks and reserves according to the boundaries specified in this report, with the provision for minor alterations of these boundaries at a later date (and this does not necessarily mean reductions) if it should emerge that there are people living in certain areas, which the preliminary survey failed to discover, who cannot be settled elsewhere. It should be clearly understood that the use of land for national parks takes precedence over any other form of land use and that this principle cannot be violated.

b) The appropriation of land by the State in the interests of the nation should take priority. Any concessions already granted within the proposed parks and reserves, but not yet developed, should quickly be withdrawn for the sake of the State. It is recognized that to confer the status of national park on an area already leased out will cause legal and sometimes even political problems, and because it is a delicate issue, it will require the full cooperation of the Ministry of Justice. It is important to note also that all the areas now proposed, and which are already leased out, have not yet been exploited for logging.

In view of the multitude of land concessions in Liberia, it would be almost impossible to establish a national park in the east of the country, which is the most important region of tropical rainforest from a conservation point of view, without clashing with the concessionaires. However, a solution can surely be found if everyone cooperates, especially in view of the fact that the main block of leased land is usually situated outside the proposed boundaries of the national park in question.

- c) The problems of traditional local rights and possible resettlement should also be solved quickly, without forgetting that any country which plans to set up a national reserve is always swamped with claims in respect of imaginary or unproven rights.
- d) Even before (b) and (c) above are implemented, authorized personnel, with powers of arrest, should be sent out to ensure that a ban on all shifting cultivation within the proposed reserves is enforced.
- e) Transit and traffic rights should be settled gradually, but without inconvenience to those affected; such gradual action can have definite public relations effects.
- f) Immediately following the declaration or the setting aside of an area for a reserve, authorized personnel should clamp down on poaching; guards should be equipped with a uniform, a tent and a bicycle and barriers should be erected along access roads so that vehicles can be checked.
- g) Various rules and regulations concerning staff regulations, uniforms, rules of procedure, etc. should be enacted gradually.
- h) One of the first tasks of the authorized staff will be to mark off the boundaries of the national parks and reserves by making paths and putting up signposts. This will involve much hard work; an experienced team leader will certainly be necessary.
- i) The parks should be developed gradually over a period of time. To begin with, it is suggested that only the proposed Loffa-Mano National Park be developed (base station, guard camps, etc.), if only for financial reasons. Note 1982: priority was given to Sapo National Park.
- j) The other national parks should, nevertheless, be permanently sealed- off immediately after the declaration. There is no reason, however, why more than one park should not be developed at the same time, especially if some international organization or donor Government expresses an interest in offering assistance.
- k) The parks should be kept as natural as possible and tourism should be very carefully planned to ensure this. There should be no human interference in the form of clearing land to improve visibility, open areas, salt-licks, etc., until proper scientific and management information has been acquired. A careful management plan will obviously need to be prepared.
- l) Priority should promptly be given to scientific research, inventories and censuses, in the protected areas. (Research stations, sites where photographs can be taken regularly, etc. will be needed.). Research could be carried out simultaneously with localized development of tourism.

General Conservation and Management of Forests

158. Only a few observations need to be made here since there already exists an agency qualified to deal with the subject, the FDA (Forestry Development Authority). From the outset, it must be recognized that the forest is a major source of revenue for Liberia. The object is not to provide “protection for protection’s sake”, but rather to guarantee that this economic resource is sustained indefinitely. At the moment, this is not the case and the following suggestions require serious consideration:

a) The first step is to review some of the concessions. Nearly all the forest area which can be developed is currently held under concession, often by foreigners, and generally affording very little employment. Some of these concessions should be reduced and others withdrawn altogether.

b) In any case, concession-holders should be taxed more heavily. Even though the market for tropical timber may be unstable, and sometimes subject to decline, in the long-term wood will become just as precious a raw material as petroleum, production of which is now being cut back. Any country which has the courage to cut back its forest production and conserve its capital, while other countries exhaust their stocks, will make the most profit. A more restrictive and long-term forestry policy is therefore demanded.

c) No efforts should be spared in fighting shifting cultivation. At the moment, action is confined to deploring its occurrence, publishing articles and complaining about it - no practical measures have so far been taken and none is even planned. There is only one solution radical and severe enough: a resettlement programme, carefully planned and executed. Most important, and preceding this, the Government must come up with a policy on this issue. Advantages accruing from such a resettlement programme are obvious; the rural populations will benefit in terms of agricultural productivity, and the provision of public services (education, medical facilities, transportation, etc.), and the country, as a whole, will enjoy the benefit of a healthier agricultural economy, not to mention a healthier population.

Forest concessionaires would be obliged by law, to protect their concessions against shifting cultivation by having their own concession guards and putting up road barriers on access roads to their concession land.

d) Reforestation: Care must be taken with exotic varieties, although they need not be prohibited altogether. Reforestation programmes would be preceded by consideration of the ecological impact involved, while during the afforestation itself, vigilance should be exercised not to lay bare vast areas. Obviously as much natural riverine vegetation should be left intact as possible; indeed, a mosaic of natural and artificial forest might be the ideal setting.

General remarks on administration of parks and reserves and other related matters

159. It is suggested that the Wildlife and National Parks Section be elevated to a full Division of the FDA (note 1982: actually a "Division"); this is in consideration of the very important function of this Section, whose responsibility will expand, following acceptance of proposals made in this report. Logistic support and numbers of staff will need to be increased. There is also a strong case for giving the wildlife assistants (game rangers/scouts) specialized training as a para-military unit since their field activities require this preparation. One option might be the establishment of a junior staff training school.
160. Applying the regulations on hunting and setting up the national parks will involve an enormous amount of work. Rangers should be armed to defend the State's property; as the consultant has said rather harshly in many other similar countries: "Better a dead poacher than a dead ranger Vehicles should be specifically allocated to this division and not transferred. It would be very useful also to have a light aircraft equipped with anti-poaching devices - as the park departments have in at least ten other African countries.
161. A select committee, made up of foresters, scientists, economists, administrators and representatives from the University of Liberia, and the newly-formed Wildlife Society of Liberia, should be established; it should meet regularly, under the auspices of the FDA, to agree on the main ecological objectives of the national parks. The first issue for discussion might be the operation of the Wildlife and National Parks Division, especially in relation to power in implementing conservation measures and legislation. What is essential is that the rangers and the officers are able to act. At the moment, they can only observe; they cannot act, as they have no authority. In future, they must have the power to arrest. The closest possible cooperation should be developed with the Legal Department, the police and other related State Departments, including the provincial administration authorities and paramount chiefs.
162. The training of senior and middle level technical officers is in progress at the College of African Wildlife Management at M in Tanzania. In view of anticipated expanding conservation activities, more candidates need to be sent to this college soon. The FDA should encourage biology and ecology students of the University of Liberia to join its service, recommending that they be sent for a one-year post graduate orientation course at the M College or for specialized training at recognized universities which offer training in wildlife biology/management.
163. Tourism: The beautiful beaches are unspoiled here and constitute an unexploited attraction as yet. Inland, the hotels are inadequate, where they exist at all. It would be perfectly feasible to centre tourism around the parks. If this is to be a success, however, the attitude of representatives of the Tourist Office will need to change - certainly to something better than was observed at the time of this survey.

164. There are not enough brochures - and even then, they are not available outside the country, even at embassies - and reactions to the problems of tourism are founded on total ignorance. There is no mention of wild life, although the lagoons near Monrovia are of great interest to the naturalist (for example, near the Caesar Beach Hotel, where the consultant followed and photographed on its nest a rare sunbird, Nectarinia gabonensis. It would be desirable to extend the knowledge of French, which is hardly spoken in Liberia, especially since Liberia, together with Sierra Leone, is practically sandwiched between French-speaking countries; the guides at least should be bilingual.
165. Nature Conservation Awareness: It is strongly recommended that a series of National Park stamps be issued featuring the protected animals (although stamps on fauna do already exist, in fact). Various publicity schemes could do much to interest the public in conservation:
- T-shirts bearing conservation themes
 - records
 - posters in schools
 - administrative centres and other public places
 - a wildlife stand at the airport (such as found at Entebbe airport in Uganda).
166. There should be a widespread public awareness campaign (using the radio, television, pamphlets, posters, special classes in schools, etc.) to ensure that the young above all, become conservation-minded. Mobile audio-visual units should also be used in this campaign. Children should be made to respect life and to understand (as they do at least in Europe) that it is no longer clever to take birds' eggs. The favourite toy of too many children in Liberia is the catapult.
167. The newly-created Wildlife Society of Liberia, presently fostered by the FDA, should adopt the public awareness campaign and conservation education as its first priority. To accomplish this task, however, some external assistance by way of advice, expertise and equipment will be essential - at least in the first year or two.
168. Official Statement: Lastly, it is to be hoped that the highest authority of the State will make a statement on the conservation of nature since this would have a considerable impact on public awareness. A large number of copies should be published and circulated; it should also be made into posters and taught in schools.
169. Contact with Neighbouring Countries: The training and exchange of wildlife officers with Tai National Park in the Ivory Coast and Bia National Park in Ghana, harmonization in conservation policy, and the establishment of contiguous parks are but a few areas of potential cooperation. To this end, the existing Liberia-Ivory Coast Commission on Conservation could be strengthened and it is recommended that a similar organization be developed with Sierra Leone.

170. Zoo: At one time there was a zoo at Totota and collections of animals (chiefly snakes) at Monrovia. A zoo would certainly be successful in Monrovia and could help educate the public in natural history. Nevertheless, this subject, which has been raised several times, has rather low priority in relation to other considerations, such as controlling hunting and particularly setting up national parks. The Vice-President of the Wildlife Society of Liberia, Mr Charles S. Steiner and his wife have formed a private animal orphanage, which with limited means is doing an excellent job and has become very well-known. They and others should be encouraged in their initiative and enthusiasm.

Future Cooperation with International Conservation Organizations

171. Phase I of the WWF/IUCN Project 1567 should be followed by Phase II during the 1983/84 or 1984/85 dry season. This should include the provision of an experienced park manager for at least two years. His main task would be to help the FDA implement the suggestions contained in this report, giving top priority to the setting up of the first national park in Liberia.
172. As matters stand, the first national park should be Loffa-Mano (note 1982: not Loffa Mano but Sapo) one and the consultant should, therefore, be based near that park, perhaps in Voinjama. His initial duties would be to follow all the proposed boundaries and, with the help of the special FDA team, mark the geographical limits of the park with boundary signposts, at the same time making foot-paths. Naturally, this will necessitate locating suitable observation and camp sites and, most important, planning the location and building of administrative headquarters for the park.
173. The consultant will also be responsible for helping to train the rangers attached to the park and, during this period, he should also train a counterpart to himself.
174. It is essential that he should have full park warden's authority, as defined by the FDA, in order to carry out his duties for that Authority and to be in a position to take effective action against poachers or those contravening the park regulations. In this connection, the consultant will have to operate under similar staff regulations as those applying to senior officers of the FDA.
175. In addition to his responsibility for boundary demarcation and other activities mentioned previously, the consultant should spend much time in the main parts of the nature reserve and draw up a preliminary map of the natural vegetation cover as it exists in the park, adding an inventory of the major fauna to be found there.
176. The consultant should, therefore, be a competent field naturalist, possibly a forester, as well as an excellent organizer and field-worker. He should have had previous experience in setting up a national park, preferably in a forest region. He must also have qualities of leadership, exhibiting the right psychological approach. He should have a knowledge of topography (which will be required for planning the location

of buildings), mechanics of vehicle maintenance and the construction of bridges it would also help if he had a pilot's licence. His operational base should be inside the reserve and he should expect to spend 75 per cent of his time in the field, however, difficult this might be.

177. Without embarking on a cost analysis (which could perhaps be the subject of an additional document) the following should be budgeted for the consultant:

- a) salary for 24 months, plus allowances (including family all if necessary)
- b) two return journeys to Monrovia;
- c) a landrover or similar vehicle;
- d) a lorry (indispensable for building work) and perhaps a tractor;
- e) study prospecting, cartographic and camping equipment;
- f) medical expenses and insurance;
- g) local travelling expenses, including a number of reconnaissance flights.

178. Three items of expenditure could be charged in part to Liberia (although it is suggested that the consultant should receive some of this money from external sources):

- a) delimitation costs (for boundary posts and signs, for clearing trees, etc.);
- b) operating expenses, including the vehicle running costs
- c) the cost of hiring labour force (which will have to be large, especially for clearing the boundary).

It would seem logical for the local authorities to provide suitable accommodation for the person appointed.

179. Phase III of the project, involving detailed ecological and biological research, can get underway once the park boundaries have been indicated and the surveillance infrastructure installed. The first task for the expert appointed to implement this phase would be to make an inventory of the fauna, complete the maps of the natural vegetation cover and decide on sites for regular photographing.

180. Elephant Survey: Close cooperation should be developed with WWF/IUCN Elephant Survey and Conservation Programme. Similar cooperation should be strengthened with Professor Dr. H.H. Roth, who is Project Leader of a German Technical Assistance wildlife project in Tai National Park in the Ivory Coast. Both expertise and financial assistance may be needed for this purpose.

181. Apart from WWF/IUCN input, foreign assistance could be sought from several areas:

- Bilateral cooperation:

German Technical Assistance;

American aid through USAID or the Peace Corps;

U.S. non-governmental conservation organizations;

Frankfurt Zoological Society;

- Multilateral cooperation:

FAO (Food and Agricultural Organization of the United Nations)

UNDP (United Nations Development Programme)

UNEP (United Nations Environment Programme);

Unesco (United Nations Educational, Scientific and Cultural Organization - in particular through MAB, its “Man and Biosphere Programme”);

European Development Fund (within the context of Lomé Convention)

The World Bank

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The Institut Royal des Sciences Naturelles de Belgique, Brussels must be mentioned for their assistance, in particular, Mr A. Capart (Director) , Mr X. Misonne (Director), Mr J.P. Gosse (Head of Department) and Mrs Michel (Administration Department).

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A number of other IUCN and WWF staff helped in various ways, notably with the translation work and typing the report.

The consultant apologizes if any people have not been mentioned, especially to other IUCN and WWF staff who assisted in so many ways.

ANNEX A**LIST OF NATIONAL FORESTS EXISTING 1978-1979**

National forests requiring protection from both forest and wildlife destructions:

Name	Area
Gio National Forest	330 sq. km.
Gbe National Forest	610 sq. km.
Gola National Forest	2,070 sq. km.
Grebo National Forest	2,510 sq. km.
Kpelle National Forest	1,748 sq. km.
North Lorma National Forest	1,000 sq. km.
Lorma National Forest	435 sq. km.
Sapo National Forest	1,530 sq. km.
East Nimba National Forest	290 sq. km.
Krahn Bassa National Forest	5,140 sq. km.
Total Area	15,663 sq. km.

ANNEX B

CREATION OF THE FORESTRY DEVELOPMENT AUTHORITY

AN ACT CREATING FORESTRY DEVELOPMENT AUTHORITY

**APPROVED; NOVEMBER 1, 1976
MONROVIA**

**PUBLISHED BY AUTHORITY
GOVERNMENT PRINTING OFFICE
MINISTRY OF FOREIGN AFFAIRS**

MONROVIA, LIBERIA

DECEMBER 20, 1976

AN ACT CREATING THE FORESTRY DEVELOPMENT AUTHORITY

It is enacted by the Senate and House of Representatives of the Republic of Liberia, in Legislature Assembled:

Section 1

Chapters 1 through 4 of the National Resources Law with respect to the Bureau of Forest Conservation, the Conservation of Forests, National Parks and the Conservation of Wild Life are hereby repealed,

Section 2 - Creation of the Forestry Development Authority

An authority to be known as the “Forestry Development Authority” is hereby created as a corporate body pursuant to the Public Authorities Law. As used in this Act, the term “Authority” means the authority hereby created.

Section 3 - Objects

The primary objectives of the Authority shall be to:

- (a) Establish a permanent forest estate made up of reserved areas upon which scientific forestry will be practised;
- (b) Devote all publicly-owned forest lands to their most productive use for the permanent good of the whole people considering both direct and indirect values;
- (c) Stop needless waste and destruction of the forest and associated natural resources and bring about the profitable harvesting of all forest products while assuring that supplies of these products are perpetuated;
- (d) Correlate forestry to all other land use and adjust the forest economy to the overall national economy;
- (e) Conduct essential research in the conservation of forest and pattern action programmes upon the results of such research;
- (f) Give training in the practice of forestry; offer technical assistance to all those engaged in forestry activities and spread knowledge of forestry and the acceptance of conservation of natural resources throughout the country;
- (g) Conserve recreational and wildlife resources of the country concurrently with the development of the forestry programme.

Section 4 - Powers

In addition to the powers conferred upon an authority by the Public Authorities Law, the Authority shall have the following powers;

- (h) The power to issue, amend and rescind forestry regulations;
- (i) The power to engage in commercial undertakings as a principal or, in conjunction with others, to enter into contracts, to sue and be sued;
- (j) As a principal or in conjunction with others to fell trees and prepare them for export or to have them processed locally, or both; to trade with such timber in the

- raw or processed state and to engage in all other operations directly or indirectly connected with the trade in forest products;
- (k) To make by-laws for its internal administration.

Section 5 - Penalty for Violation of Rules and Regulations

Any person who contravenes any rule or regulation made under Sub-section (j) of Section 4 or fails to comply with the conditions made a part of any licence, permit, agreement or other instrument issued or entered into, under any such rule or regulation for which no penalty is expressly provided in the rules and regulations is guilty of a misdemeanour and punishable by a fine not exceeding five hundred dollars or by imprisonment for not more than one year. If any person shall be convicted of any offense under this Act, the court may in addition to or in lieu of the imposition of any fine or term of imprisonment, order that the whole or any part of the forest product or wildlife resources with respect to which the offense was committed, be confiscated and forfeited to the Government to be sold or otherwise disposed of in such manner as the Managing Director may prescribe.

Section 6 - Board of Directors

1. Composition; The policies of the Authority shall be formulated by the Board of Directors consisting of:
 - (a) The Minister of Agriculture as Chairman, the Minister of Finance, the Minister of Local Government, the Minister of Planning and Economic Affairs, the Minister of Commerce, Industry and Transportation, and the President of the Liberian Bank of Development and Investment;
 - (b) The Managing Director of the Authority, to be appointed by the President.
 - (c) Two Liberian nationals, one with experience in the field of law, and the other with experience in the field of business, to be appointed by the President.
2. Voting by Board Members without meetings The Board may by regulation establish a procedure whereby the Managing Director, when he considers such action in the best interest of the Authority, may obtain a vote of the Board members On a special question without calling a meeting of the Board.
3. Quorum: A quorum for any meeting of the Board shall be a U majority of its members.
4. Financial interest: No Director or member of his immediate family shall hold any financial interest in a forestry concession or in any auxiliary undertaking in Liberia.
5. Reimbursement The members of the Board, in their capacity as such, shall not receive salaries, but they may receive from the Authority a stipend for each meeting attended and reimbursement for all expenses they incur in discharging their duties to the Authority.

Section 7 - Officers

The Authority shall have a Managing Director and such other officers and staff as the Board may determine to be necessary or desirable for carrying out its functions. The Managing Director shall be professionally qualified in forestry. He shall be responsible for the conduct of the general operation of the Authority and for that purpose shall exercise all powers delegated to him by the Board. Subject to the approval of the Board with regard to senior officers and staff, the Managing Director shall be responsible for the organization of the staff and the appointment and dismissal of the officers.

Section 8 - Appointment of Assistant Managing Director

The President shall appoint an Assistant Managing Director for administration and finance, who shall be a qualified financial controller and administrator rather than a professional forester.

Section 9 - Collection of Revenues and Expenditures

The Authority shall be responsible for the collection of its revenues, settlement of its financial obligations and all other matters connected with the collection and disbursement of funds of the Authority.

Section 10 - Duration

The existence of the Authority shall continue until it shall be terminated by the Legislature. Upon the termination of the existence of the Authority, all its rights and property shall rest in the Republic.

Section 11 - Audits

The Accounts of the Authority shall be subject to periodic audits by the Government. The accounts of the Authority shall also be audited annually by a firm of independent accountants appointed by the Board.

Section 12 - Reports .

The Authority shall submit an annual report to the President and such other periodic reports as he may from time to time require. Such reports shall set out in detail facts describing the operation and fiscal transactions of the Authority during the preceding year, its financial condition and a statement of all receipts and disbursements during such year.

Section 13 - Power of Forest Officer to arrest Offenders

Every Forest Officer is hereby authorized and empowered to arrest any person whom he finds or reasonably suspects of violating any of the provisions of the statutes or regulations relating to conservation of forest. On arrest he shall immediately take such person before the Court of the County Superintendent, County Commissioner, Tribal Authority or Justice of the Peace, who shall immediately forward the matter to a court of competent jurisdiction in the County in which the reserve is located.

Section 14 - Power of Forest Officer with regard to Trees

A Forest Officer may fell, cut, damage, tap or destroy trees within Government Forests and National Parks, and make clearings or remove timber therefrom for the purpose of planting trees, improving the growth of trees or for the general better management of reserved forests.

Section 15 - Advisory Committees

An Advisory Conservation Committee shall be appointed within each County with the County Superintendent or County Commissioner as Chairman. The purpose of the Committees shall be to provide means of communicating to the Forestry Development Authority the ideas, desires and opinions of the people in matters pertaining to forest and wildlife conservation and to exercise general supervision of the enforcement of forest and wildlife regulations.

Section 16

This Act shall take effect immediately upon its publication in hand-bills, any law to the contrary notwithstanding.

Approved: November 1, 1976

MAPS

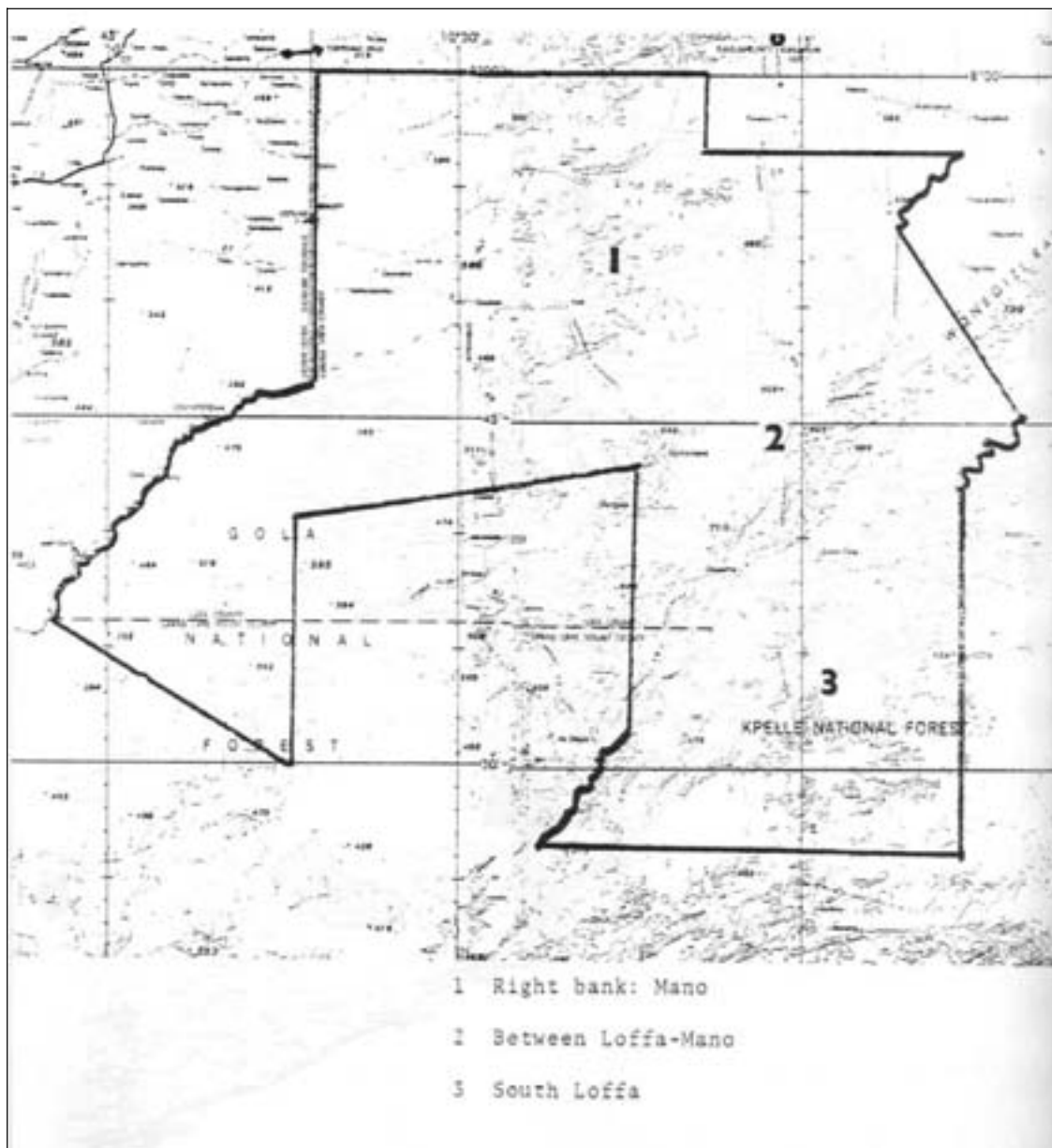
1. Approximate location of proposed national parks and reserves
2. Proposed Loffa-Mano National Park
3. Sapo National Park and Cavally Nature Reserve (proposed)
4. Cestos-Serkwen National Park (proposed)
5. Details of Mount Nimba Reserve Complex
6. Wonegizi Mountain Reserve (proposed)
7. Cape Mount Nature Reserve (proposed)
8. Mano River Basin project (draft)
9. Forest administration areas and national forests
10. Concession areas

The maps in this section are not precise but illustrative. The designations employed and the presentation of material in this section do not imply the expression of any opinion whatsoever on the part of IUCN or WWF concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

MAP 1 APPROXIMATE LOCATION OF PROPOSED NATIONAL PARKS AND RESERVES



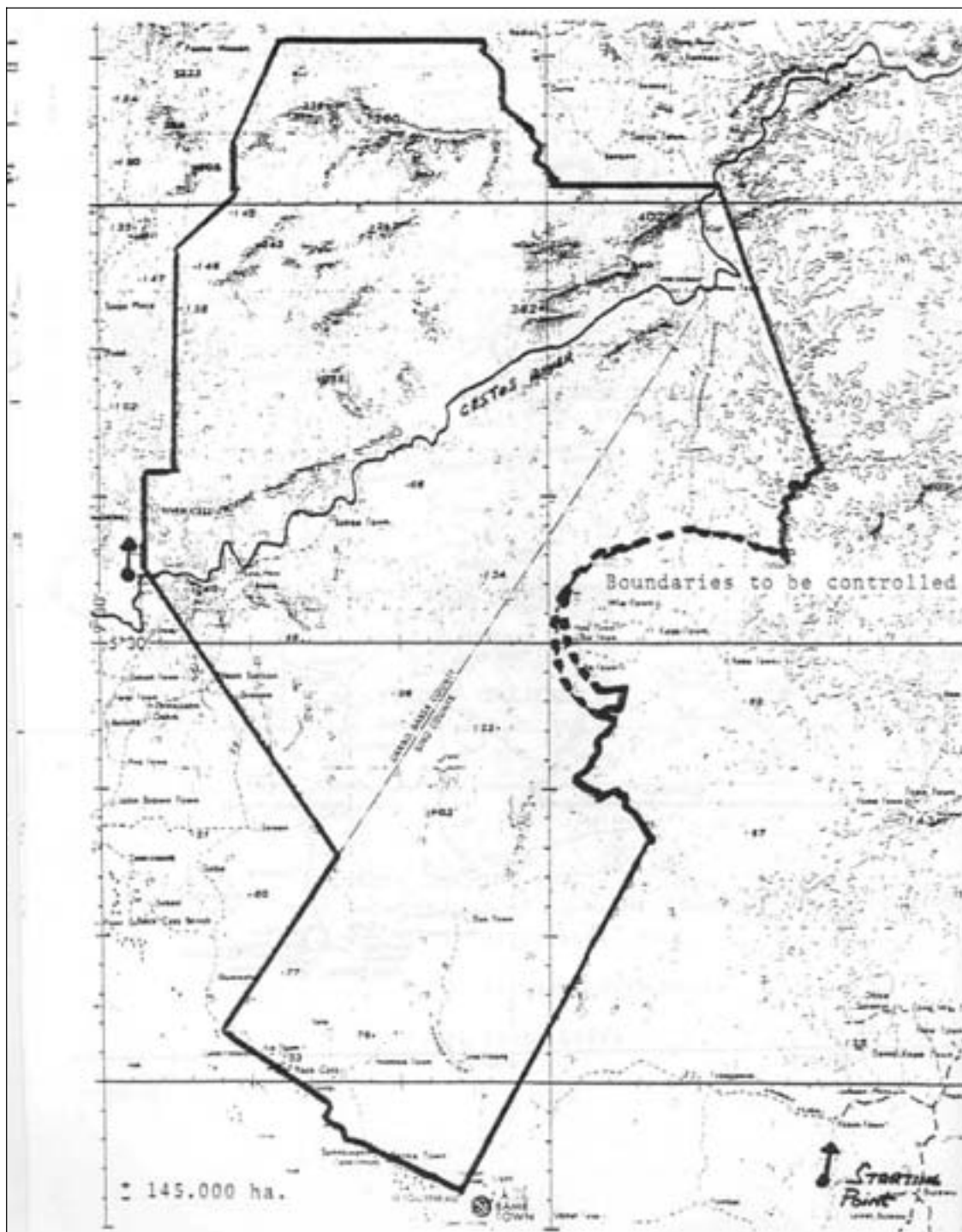
MAP 2 PROPOSED LOFFA-MANO NATIONAL PARK



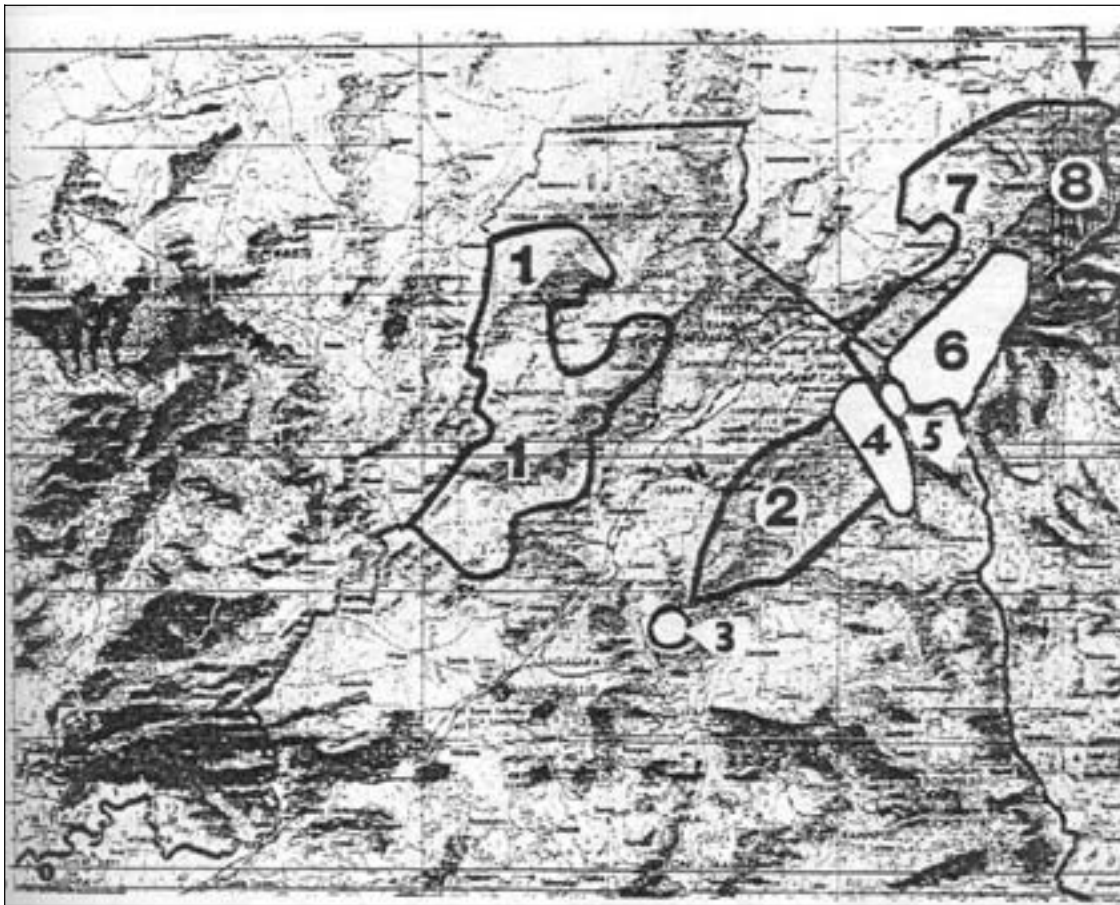
MAP 3 CAVALLY NATURE RESERVE (PROPOSED)



MAP 4 CESTOS-SENKWEN NATIONAL PARK (PROPOSED)



MAP 5 DETAILS OF MOUNT NIMBA RESERVE COMPLEX



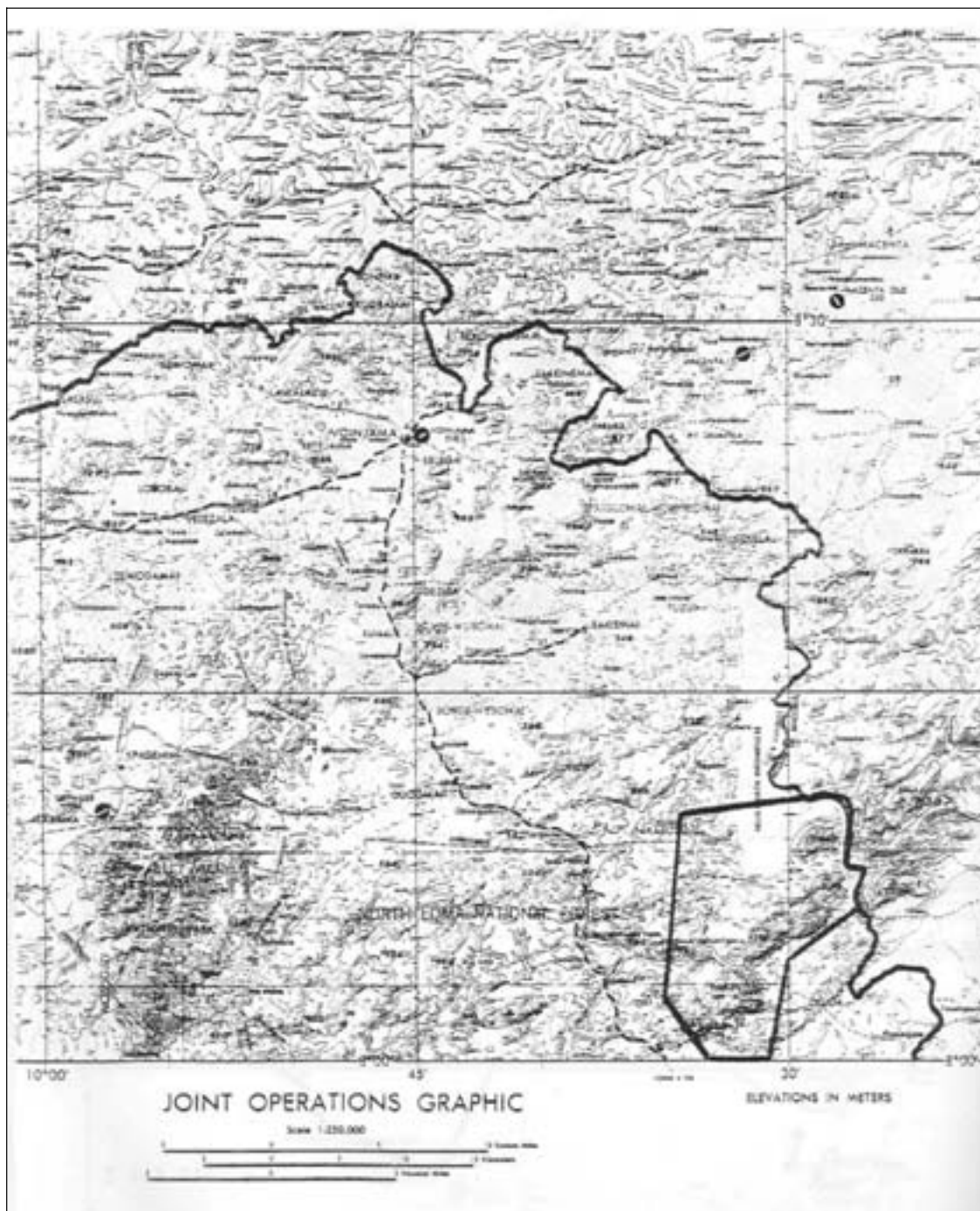
NATURE RESERVE: NIMBA

The whole of the Nimba complex can be, from a conservation point of view divided into eight main sections:

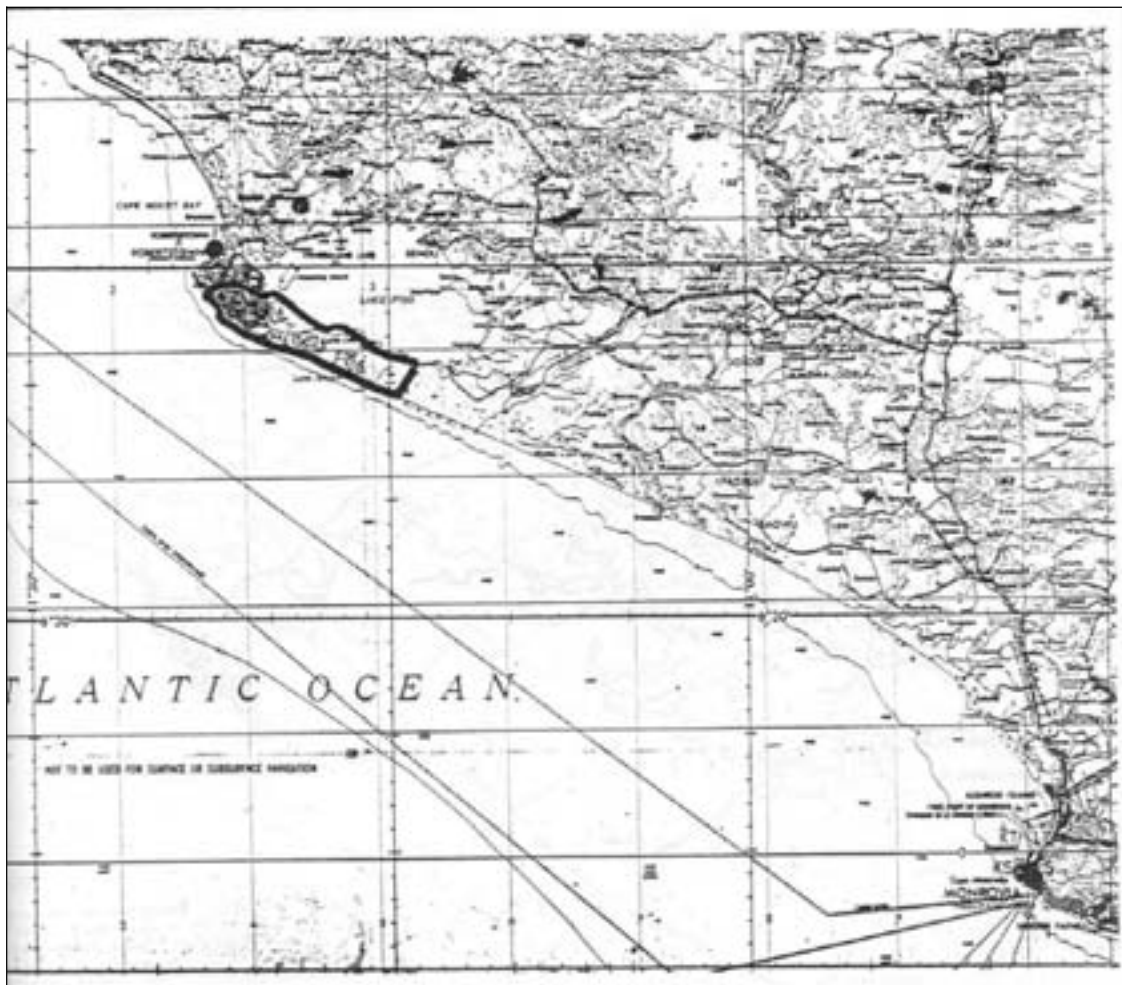
1. West Nimba National Forest not following the official boundaries, but the recommendations of Curry-Lindahl's 1979 survey.
2. East Nimba National Forest (the "heart"), including the western and eastern ridge, the Iti Valley, an area of transition on the eastern ridge and the lowland rain forests, currently being heavily logged.
3. The small mountain Detton which is separated from the main massif.
4. An area heavily spoiled by the "waste products" of Lamco, east of the mining area. This area is being destroyed by pollution, the forests will be felled and a small dam will be constructed. The area is no longer suitable for parks or nature reserves.
5. A very narrow area of intact forest along the boundary.
6. In Ivory Coast: supposed to be a national park, but not actually developed.
7. In Guinea: 2/3 of the main massif. (in the south)
8. In Guinea 1/3 of the massif (north-east) soon to be mined.

All the boundaries must be defined; it is highly advisable that an interstate commission (Liberia, Ivory Coast Guinea) makes a detailed survey, and decides on future policy. It should be noted that all this mountain range overlaps.

MAP 6 WONEGIZI MOUNTAIN RESERVE (PROPOSED)



MAP 7 CAPE MOUNT NATURE RESERVE (PROPOSED)



MAP 8 MANO RIVER BASIN PROJECT (DRAFT)



Legend

- International Boundary
- County Boundary
- Road, Highway
- Primary Forest
- Secondary Forest
- Tree
- Shrub
- Natural Forest
- Forest Reserve
- Forest District

Map Labels:

- Sierra Leone
- Liberia
- Guinea
- Atlantic Ocean
- Forest Reserve
- Forest District
- Forest Type
- Forest District

Scale: 1:100,000

PHOTOS

1. Typical aspect: clearing for shifting cultivation in the forest.
2. Heavy equipment used for logging by Nimbaco, East Nimba.
3. Scarce and “protected” species killed for meat *Cephalophus zebra*
4. Typical aspect of the Loffa River in the proposed Loffa-Mano National Park.
5. Typical a of a tributary of the Mano River in the proposed Loffa-Mano National Park.
6. The Wonegizi Mountains in the proposed Loffa-Mano National Park.
7. “The Sapo forest is the most beautiful primary rainforest I have ever seen ...”
8. Aerial view of the low-Cestos River in the proposed Senkwen Cestos National Park.
9. Natural clearing on lateritic rocks, South Nimba, alt. 700 m.
10. Heavy pollution of the Mano River below Mano River Mine, between Liberia and Sierra Leone.



Fig. 1. Typical aspect: clearing for shifting cultivation in the forest. (Liberia 1979)



Fig. 2. Heavy equipment used for logging by Nimbaco, East Nimba. (Feb. 1979).



Fig. 3. Scarce and “protected” species killed for meat: Cephelophus zebra (Near Pynetown, Jan. 1979)



Fig. 4. Typical aspect of the Loffa River in the proposed Loffa-Mano National Park. (Dec. 1978)



Fig. 5. Typical aspect of a tributary of the Mano River in the Proposed Loffa-Mano National Park. (Dec. 1978)



Fig. 6. The Wonegizi mountains in the proposed Loffa-Mano National Park. Note probable natural deforestation on the slopes. (Wonegizi, Dec. 1978)



Fig. 7. “The Sapo forest is the. most beautiful primary rainforest I have ever seen ...“
Sinoe River. (Jan. 1979)



Fig. 8. Aerial view of the low-Cestos River in the proposed Senkwen Cestos National
Park.

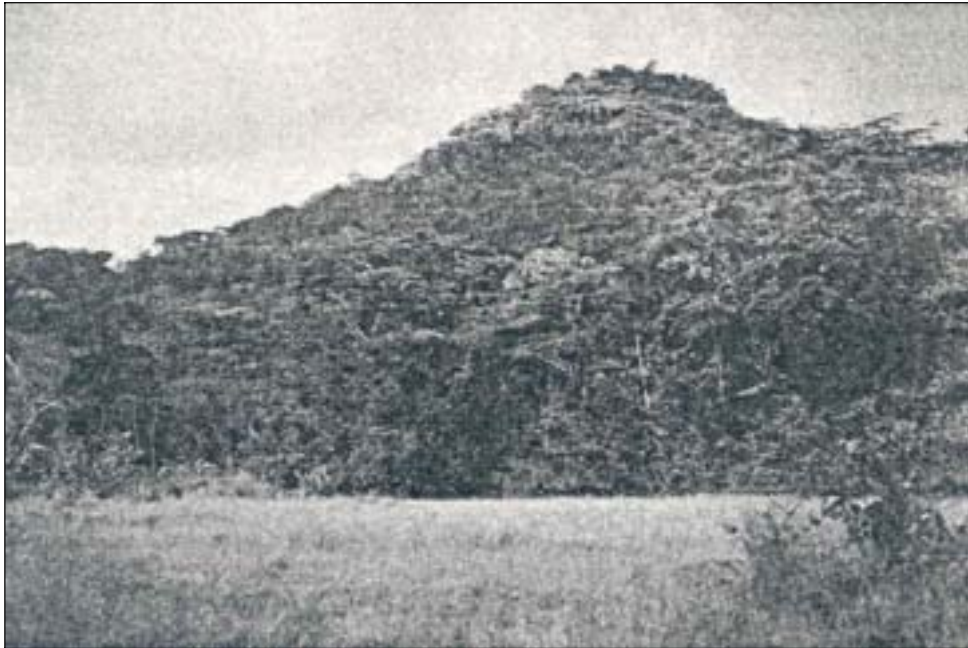


Fig. 9. Natural clearing on lateritic rocks, South Nimba, alt. 700 m. (Feb. 1979)



Fig. 10. Heavy pollution of the Mano River below Mano River Mine, between Liberia and Sierra Leone (Dec. 1978)