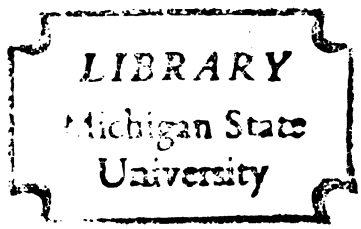
THE UTILIZATION AND ADMINISTRATION OF WILDLIFE RESOURCES IN EASTERN NIGERIA

Thesis for the Degree of M. S.

MICHIGAN STATE UNIVERSITY
INNOCENT OKWUDILI KANU

1975



This is to certify that the

thesis entitled

THE UTILIZATION AND ADMINISTRATION OF

WILDLIFE RESOURCES IN EASTERN NIGERIA

presented by

Innocent Okwudili Kanu

has been accepted towards fulfillment
of the requirements for

Masters degree in Fisheries and Wildlife

George A Petrides
Major professor

Date 1 November 1978

ABSTRACT

THE UTILIZATION AND ADMINISTRATION OF
WILDLIFE RESOURCES IN EASTERN NIGERIA

by

Innocent Okwudili Kanu

An analysis of the wildlife resource was conducted between October 1974 and January 1975 in the Eastern States of Nigeria, formerly the Eastern Region. Under the sponsorship of the Federal Department of Forestry at Ibadan, 1,200 family heads were interviewed and 12 local markets were surveyed.

The value of bushmeat in Eastern Nigeria was about ₦17 million (U.S. $27.76 million) and wild animal skins harvested were worth about ₦6.9 million (U.S. $11.2 million). Evidently, these values represent only a fraction of the total, since some exchanges of commodities were reported (by those interviewed) to take place outside organized markets. The processing and marketing of bushmeat and skins generally are conducted under unsanitary and inefficient conditions.

Bushmeat comprised 25.84 percent of all animal protein consumed and could be an even larger proportion if spoilage was reduced. Some wildlife products sold in the area come from other parts of Nigeria and from the Cameroun Republic.

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Bushmeat was the second most preferred source of animal protein, following domestic chicken. 61.5 percent of those interviewed preferred bushmeat to livestock meat. In descending order, bushmeat species preferences were grass-cutter (Thryonomys swinderianus), bush pig (Potamochoerus porcus), various antelopes, and brush-tailed porcupine (Atherurus africanus).

Apart from a few species protected by local custom, wildlife seems to have no proper legal place in the society. Exploitation of wildlife for meat is excessive and by no means on a sustained-yield basis. There are no properly organized and constituted national parks, game reserves and sanctuaries in these states and existing wildlife laws are totally inadequate to maintain animal numbers. Only 38.5 percent of the people interviewed were aware that there were wildlife laws in Nigeria. Other factors affecting wildlife in the area include habitat destruction, lack of trained management personnel and a negative public attitude toward natural resources. The number of visitors to the existing zoological gardens is on a steady increase, however, and this and other observations indicate that there is considerable public interest in the wildlife resource.

Suggestions are made to improve the management and administration of Nigeria's wildlife resource. These include creation of a National Conservation Commission, a Department of Wildlife and National Parks, and an Environmental Protection Agency. Local people should become involved and local districts should retain part of the revenue that comes from parks and reserves.

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Conservation education should be undertaken at all levels. Possibly in cooperation with other English-speaking West African countries, Nigeria should establish a school for wild-life management. Handicraft schools aimed at the manufacture of authentic Nigerian articles would contribute to tourism. Commercial food processing and improved storage and transportation would prevent insect infestation and other spoilages and would make bushmeat more attractive and valuable.

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INTRODUCTION

Smith (1967) indicated that the principal nutritional problems for Nigerians involve widespread deficiencies in protein and in the vitamins thiamin and riboflavin, particularly in the southern parts of the country. Deficient caloric intake and protein malnutrition is widespread especially among children.

The nutritional pattern for the whole country is not uniform. In Northern Nigeria, the staple foods, millet (Pennisetum typhoidum) and guinea corn (Sorghum spp.), are better sources of protein than the root crops, cassava (Manihot utilissima), yams (Dioscorea spp.) and cocoyam (Colocasia asculenta) commonly eaten in the south. In addition, in the north some milk and beef are available from the cattle herds. In all regions, the high-protein foods needed for balanced diets usually cost more than starchy foods. In consequence of these difficulties, there is a great pressure everywhere on wildlife resources to supply the population with the necessary food elements.

Bushmeat is the term used in English-speaking West Africa to refer collectively to animals, ranging from snails and reptiles to birds and mammals, which are harvested from the wild for use as human foods.

Eastern Nigeria is used throughout this paper to denote the area formerly known as the Eastern Region or the Eastern Group of Provinces. The same area was called Biafra between May 1967 and January 1970.

Study Area

Eastern Nigeria is currently divided into East-Central, South-Eastern and Rivers States. With 22.27 percent of the country's population, Eastern Nigerians occupy only 8.27 percent (29,484 square miles) of the nation's land area. While in 1963 Nigeria had an average population density of 156 persons per square mile, Eastern Nigeria averaged a concentration of 420 persons per square mile. In some parts of this region, population densities were found recently to exceed 1,000 persons per square mile (Nelson et al., 1972). Eastern Nigeria is the most densely settled area of tropical Africa, with the densest road network on the continent (Floyd, 1969).

Eastern Nigeria's population is approximately 99.8 percent African, divided into more than ten ethnic groups. Major groups are Ibo, Ibibio, Efik, Annang, Ijaw and Ogoja. 45 percent of the population is under fifteen years and the annual population growth rate is between 2.4 and 2.8 percent. The official literacy estimate in 1970 was 25 percent (Nelson et al., 1972).

Climate

Climatically, Eastern Nigeria is tropical with year-round high temperatures. Four seasons are distinguishable: the rainy season starts in February along the coasts and moves gradually northward with heavier rains continuing through July. August has a decline in rainfall. Rains are again heavy from September to early November (Nelson et al., 1972).

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The dry season lasts from mid-November to February but occasional rains occur even then.

Seasonal climatic variations are governed by the major airmass movements that affect all of West Africa. These include a tropical-maritime airmass that comes from the southwest across the Gulf of Guinea, is monsoonal in character and composed of moist, relatively cool air. It blows between February and mid-November. The harmattan or northeast trade wind originates in the Sahara region and blows from the northeast between mid-November and February. It is hot, dry and dust-laden. Cool temperatures occur at higher altitudes around the Obudu Plateau (maximum elevation 6350 feet) and the Oban hills with maximum elevation of 3771 feet (Floyd, 1969).

Available data show that mean maximum temperatures of Eastern Nigeria do not exceed 90°F while mean minimum temperatures do not fall below 65°F. Mean annual temperatures are everywhere above 75°F although they do not exceed 85°F (Floyd, 1969). The relative humidity throughout Eastern Nigeria is high, between 70 percent and 80 percent. In general it is higher in the vicinity of the coast and decreases inland (Floyd, 1969). Average annual rainfall is 80 inches except in the Niger Delta where precipitation averages over 140 inches (Floyd, 1969; Nelson et al., 1972). Because of its latitudinal location, Eastern Nigeria experiences a high intensity of solar radiation and daylight hours are nearly constant from month to month (Davis, 1965).

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Soils

In Eastern Nigeria, the slope of the terrain, together with the mineral properties of underlying rocks, have been important in resolving the broad characteristics of the main soil groups (Floyd, 1969). Floyd distinguishes five main classes of soils on the basis of their morphology and the degree of profile development. Lithosols are shallow, stony soils occurring on steep slopes where profile development is retarded due to erosion. Such soils are formed over resistant rocks such as granite and gneisses, also sandy or silty shales. Lithosols are found on the steep, rocky slopes of the Oban Hills, the Obudu Plateau, the Nsukka-Okigwi-Arochuku escarpment and northwest of Awgu.

Alluvial soils are young soils that lack well-developed horizons. They are derived from recent alluvium deposited by river or sea water, and are subdivided into three mapping units. Pale-brown loamy alluvial soils are soils of the freshwater swamps. These are found at the northern section of the Niger Delta and within the flood plains of the Niger and Cross River. Soils of salt-water swamps are also called dark grey mangrove soils. These occur in the lower Niger Delta and the Cross River estuary. Extending along the coast from Calabar to the western border is the third type of alluvial soils that are brownish-yellow sandy soils derived from beach ridges.

Ferruginous tropical soils are partially-weathered soils which contain a certain amount of weatherable minerals such as silicates and sesquioxides. They are also referred to as

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fersiallitic soils. In Eastern Nigeria, these soils are rich in free iron and they occur over basalts and acid crystalline rocks. Ferruginous tropical soils are found in Ogoja Division.

Ferrallitic soils are completely weathered soils. In Eastern Nigeria, these soils are rich in free iron but have a low mineral reserve and consequently a lower natural fertility than the ferruginous tropical soils. Ferrallitic soils cover over fifty percent of the entire Eastern Nigeria (Floyd, 1969).

Hydromorphic soils are mineral soils whose morphology is influenced by seasonal waterlogging caused by underlying impervious shales. They are reddish-brown gravelly and pale clayey soils derived from shales. Although subject to water-logging these soils have been used for substantial production of yam, cassava maize and some legumes (Floyd, 1969). Hydro-morphic soils are found in Onitsha, Abakaliki and Ogoja Divisions.

Most of these soils are poor and no suitable technology has been developed for farming them. They are, however, very suitable for growing tree crops such as plantain (Musa), raphia palm (Raphia spp.), iroko (Chlorophora excelsa), mahogany (Khaya spp.) and could also be useful for game ranching.

Vegetation

Vegetation of Eastern Nigeria varies according to climatic, topographic, edaphic and biotic factors. Keay (1959) mapped the principal plant zones and reviewed the factors affecting their distribution. In general, climatic factors have been most influential in governing the original vegetation cover of

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Eastern Nigeria (Keay, 1959; Floyd, 1969). The five main vegetation types are mangrove swamp on the coast around Calabar, freshwater swamp around Ahoada, rainforest, derived-savanna (a result of forest clearing) and montane rainforest and grassland.

Mangrove swamp forests develop where deltic muds and silts accumulate, usually in tidal creeks and around brackish lagoons. Mangrove trees are unique for their stilt-root systems which raise the trunks above the high-tide mark, and permit growth of trees in soft mud and swampy environment. Some mangroves are adapted for greater salinity in the soil. Rhizophora racemosa is the pioneer species and the commonest mangrove in Eastern Nigeria. R. harrisoni dominate the middle area and R. mangle occupies the drier inner margins of mangrove swamps (Floyd, 1969).

Inland from the mangrove swamp and around freshwater creeks and lagoons, freshwater swamp forest appears. This comprises an irregular growth of many trees, shrubs, herbs and grasses. Many freshwater swamp trees are upheld by systems of curving and ramifying adventitious roots. Trees found in freshwater swamp forests include raphia plam (Raphia spp.), Abura and mahogany (Khaya ivorensis). This zone has been cleared extensively for rice production (Floyd, 1969).

The rainforest contains the most important timber trees of Nigeria. The rainforest to the east and south of the Cross River has somewhat different characteristics than that over the rest of the region (Keay, 1959; Floyd, 1969). West of the

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Cross River, virgin rainforest has virtually disappeared except for some small, remote and isolated stretches. Secondary growth is more abundant, particularly north-west of Port Harcourt.

The present rainforest zone in Eastern Nigeria formerly extended much further north and covered areas now classified as derived savanna. Only in limited districts can remnants of mature climax rainforest be found. Traditional methods of farming have resulted in wholescale destruction and decimation of the tropical rainforest. The preservation and cultivation of the oil palm (Elaeis guineensis) has produced a man-induced plant community called oil palm bush (Floyd, 1969).

Derived savanna is a product of persistent slashing and burning of second-growth rainforest to create farm plots. As the fallow period between repeated clearing is shortened, the soils become increasingly impoverished and the vegetational cover develops into an open woodland. Grasses then invade the farmlands until the original high forest is replaced by a scrubby derived savanna, with only vestiges of the former plant associations. The savanna grasses Andropogon, spear grass (Imperata) and elephant grass (Pennisetum purpureum) are ravaged annually by fires. With increasing invasions of plant species, the fires become fiercer until, among trees, only the most fire-tolerant species remain. Derived savanna covers much of the northern part of Eastern Nigeria.

In Eastern Nigeria, montane vegetation occurs on the Obudu Plateau. The forest vegetation ceases at about 5,000 feet elevation and is replaced by montane grasses. The grasses

represent the fire-climax vegetation resulting from many centuries of human influence (Floyd, 1969).

Land Use and Animal Life

Shifting cultivation is characteristic of the region. The agricultural economy is mainly one of individual smallholder farms which average between one and five acres. Hand tools are employed in most cases; there are very few mechanized farms. The basic food crops of cassava, yam, cocoyam, rice (Oryza sativa) and maize (Zea mays) are supplemented by cash crops like oil palm, cocoa (Theobroma cacao), and rubber (Hevea brasiliensis).

When the high forest of tropical hardwoods is destroyed and put under cultivation, the open land created is useful especially for root crops. The original fertility lasts for two or three years. Arboreal animals tend to disappear and the ground-dwelling mammalian fauna consists mainly of small rodents which can easily find shelter in holes and under fallen trees. Farmlands, however, may ve visited by hoofed and other larger mammals (Rosevear, 1953).

When farm plots are abandoned, a dense tangle of herbs, shrubs and tree seedlings rapidly occupies the ground and become woven together by creepers. As the ground becomes shielded by encroaching vegetation, humidity rises and growth opportunities are afforded also for climbing vines and an increasing number of woody species (Rosevear, 1953).

Fires occur in the derived savanna zone during the dry season. After the fires, the grasses sprout even before the

arrival of the first rain showers. Except for goats and some muturu cattle, diseases carried by the tse-tse fly (Glossina spp.) have prevented large scale cattle-rearing in the Eastern States.

Government-sponsored agricultural projects have been concentrated on plantations of oil palm, rubber, cashew (Anacardium occidentale) and coconut (Cocos nucifera). In forest management, the trend is toward replacement of wild timber with plantations of teak (Tectona grandis), gmelina (Gmelina) and Eucalyptus.

Objectives of the Present Study

Of the several meat-production studies of African wildlife, only those conducted in West Africa and Botwana (see discussion) have attempted to analyze the harvest of the small fauna by indigenous people. This study is an attempt to stimulate further investigations and adequate management of the important bushmeat and other wildlife resources in Eastern Nigeria. It was conducted in order to learn more about:

1. The extent of bushmeat use and the economic values of bushmeat and wild animal products.
2. Wildlife's contribution to tourism.
3. The attitudes of local populations toward wildlife.
4. How administration and management of the wildlife resources might better be accomplished.

METHODS

In light of the resources and time available for this survey, it was considered best to employ a random sampling technique. Care was taken to sample the states and districts in proportion to their varied population densities. It was not sensible, however, for rural and urban dwellers to be represented in their correct proportions. Since it was easier and faster to sample the concentrated urban inhabitants, only about 30 percent of the sample were from the rural population. Rural sampling involved a lot of travelling in areas that often were inaccessible.

In 1970, a literacy estimate of 25 percent was obtained by the Nigerian Government. This survey yielded a literacy estimate of 34.58 percent. The difference may be an indication of inadequate sampling but the literacy rate certainly has increased during the past few years.

Interview Schedule

A total of 1,200 family heads from all political divisions, and covering urban and rural areas, was interviewed by detailed questionnaire. Housewives were interviewed but where a male

householder occasionally did grocery shopping, he was consulted for figures. Where the respondent was literate, two questionnaires were used so that both interviewer and interviewee could read simultaneously. The interviewer was accompanied by a local resident in each locality visited. These assistants acted as interpreters where necessary and also assured the local people that the project was in their interest.

In East Central State 738 Family heads were interviewed, while 277 in South Eastern State and 185 in Rivers State were questioned. Using a table of random numbers, streets and houses were selected in urban areas. In each house, the first two family heads with whom the interviewer came in contact were interviewed. In rural areas, families were selected from church or tax registers, again using random numbers (Fig. 1).

To determine the total value (B) of bushmeat and animal products for all of Eastern Nigeria, average values of bushmeat per se and of snails, skins and products made of skins were determined per sampled household. These were applied to the average number of households in the region according to the formula:

$$B = \frac{E}{H} \times \frac{P}{h}$$

Here E is the sum of expenditures for the population sample; H is the number of households sampled; P is the total population and h is the mean size of all households. Data on meat preferences and public attitude toward wildlife were based on the 1,200 households sampled.

Fig. 1 - continued

1.	Enugu	11.	Okundi	21.	Afikpo	31.	Ahoada	41.	Bori
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6.	Ameke	16.	Awgu	26.	Owerri	36.	Aba	46.	Umuahia
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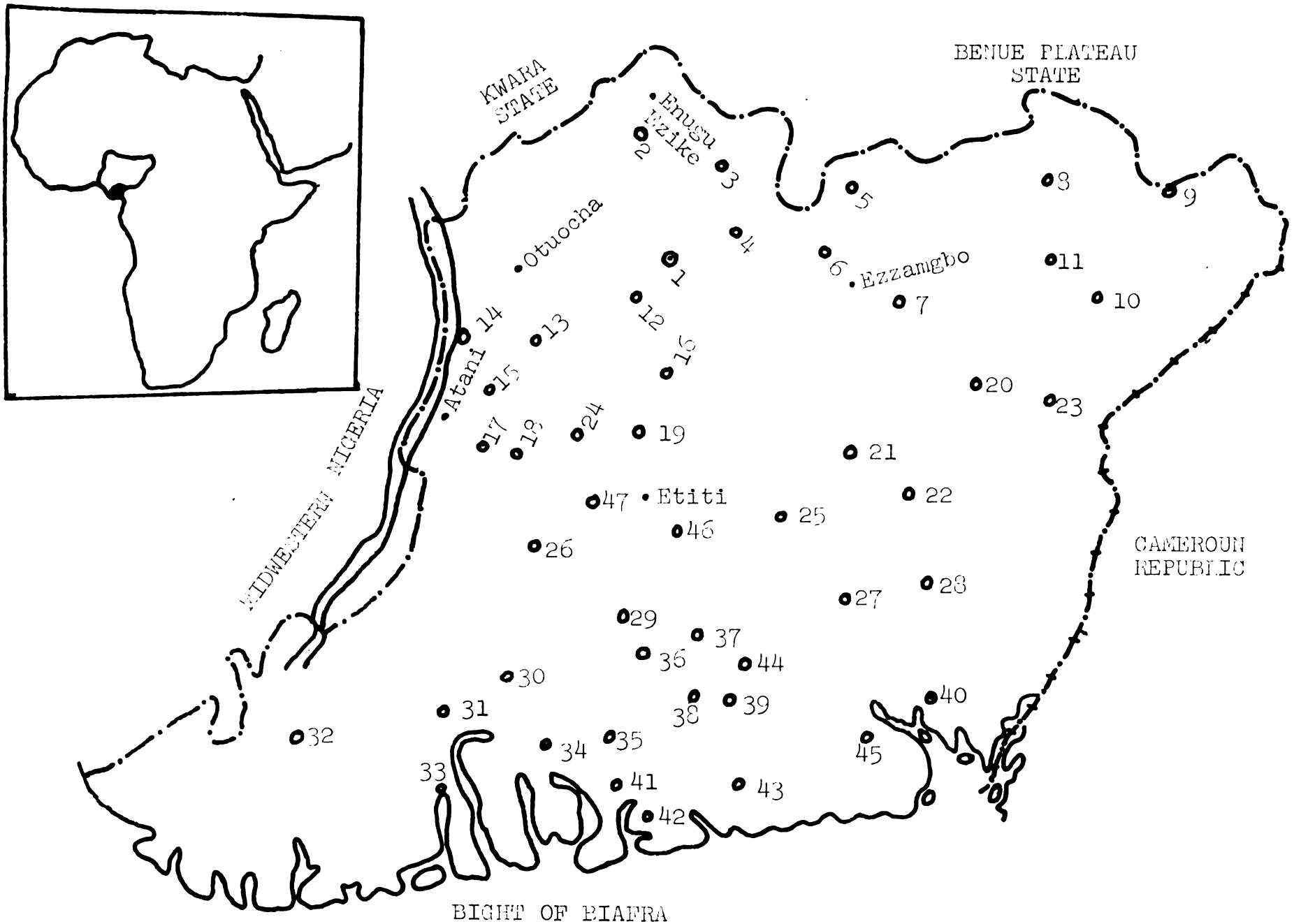

Figure 1. EASTERN NIGERIA SHOWING AREAS COVERED BY THE SURVEY

Market Survey

Twelve local markets were visited at intervals during the study period. Using a Salter Pocket Balance, dry meat, fresh meat and whole carcasses were weighed. Species of animal and retail prices were recorded, and the average price per pound for each species was determined. Snails were weighed with their shells intact. Prices of different meats and fish were obtained from the government cold store in Enugu. The prices of different animal proteins were determined from these surveys.

Tourism

In order to determine wildlife's contribution to tourism, the existing zoological gardens, game departments and wild areas were visited. Records of visitors, revenues, and wildlife status were collected where they were available.

Administration

In an effort to ascertain how administration and management of the wildlife resources might better be accomplished, a broad review of the existing management techniques and administrative procedure was carried out.

RESULTS

Wildlife as a Source of Meat and Marketable Products

The animal protein requirements of residents in Eastern Nigeria have not been met by domestic animals alone because tsetse fly-borne diseases make cattle-rearing difficult and expensive throughout Southern Nigeria. Almost all cattle slaughtered in Eastern Nigeria are imported from the North and neighboring African countries.

Game meat is sold publicly in urban and rural markets throughout the Eastern States of Nigeria. When people are starved for meat they eat almost anything. Termites (Isoptera), locusts (*Schistocerca gregaria* and *Nomadacris septemfasciata*), various snails (Gastropoda), agama lizard (*Agama agama*), monitor lizard (*Varanus* spp.), various snakes, tortoises (Testudines), rats (*Cricetomys* and *Rattus* spp.) and squirrels (*Funisciurus*, *Helioscirus*, and *Anamalurus* spp.) are some of the small animals utilized for meat. The larvae and pupae of various insects are considered delicacies. A saving grace for some species is their local rejection by some ethnic groups. There are various methods of preparing insects as food. They may be used, powdered, by mixing with corn flour and water and made into cakes. Sometimes insects are boiled, smoked, roasted, fried or stewed whole. Then they are eaten with

rice or yams.

Despite the depleted wildlife resources of Eastern Nigeria, bushmeat has played (Petrides, 1965) and still plays an important role as a source of animal protein. On a value basis, this resource (including snails) accounts for 25.84 percent of all animal products consumed in Eastern Nigeria (Table 1). By far the most preferred bushmeat species was the grass cutter or cane rat (Thryonomys swinderianus). Bush pig or red river-hog (Potamochoerus porcus), wild birds (unspecified), antelopes and the brush-tailed porcupine (Atherurus africanus) were chosen next in that order (Table 2). The giant African snail (Achatina spp.) was the major gastropod eaten and was found in markets, restaurants and other eating places throughout Eastern Nigeria.

The total annual value of bushmeat (including snails) was about ₦17 million (Table 1). For the same area, the survey indicated that domestic animals yielded about ₦24 million of meat annually. Protein foods from fish and stockfish (imported dried cod) were estimated at ₦18.1 and ₦6.7 million, respectively. The market value of snails was about ₦4.3 million (U.S. $7.0 million) (Table 1).

The most expensive source of fresh animal protein in the markets of Eastern Nigeria was fresh fish. The average price per pound of fresh fish was ₦0.98 (U.S. $1.60). The average price per pound of domestic meat was U.S. $1.18 as against $0.67 for bushmeat (Tables 3 and 4). The corresponding price per pound of dry bushmeat was $1.58 (Table 5). A pound of fresh duiker (Cephalophus spp.) meat sold for $0.69. Snails

(with shells) at $0.51 per pound were the cheapest and one of the most abundant sources of meat (Tables 1, 3 and 4).

TABLE 1. VALUES AND PERCENTAGES OF DIFFERENT SOURCES OF ANIMAL PROTEIN CONSUMED IN EASTERN NIGERIA BETWEEN OCTOBER 1974 AND JANUARY 1975

SOURCE	VALUE (₦) *	PERCENTAGE
Domestic Meat	24,341,157.00	36.66
Stockfish	6,769,230.50	10.19
Other fish	18,112,980.00	27.31
Bushmeat	12,850,961.00	19.36
Snails	4,310,095.00	6.48

* ₦1.00 = U.S. $1.633

TABLE 2. PERCENTAGES OF 1200 HOUSEHOLDERS INTERVIEWED WHO MOST PREFERRED ONE TYPE OF BUSHMEAT IN EASTERN NIGERIA BETWEEN OCTOBER 1974 AND JANUARY 1975.

TYPE OF BUSHMEAT	PERCENTAGE PREFERENCE
Grass cutter (*Thryonomys swinderianus*)	69.25
Bush pig (*Potamochoerus porcus*)	15.33
Wild birds (unspecified)	7.69
Antelopes (unspecified)	3.9
Brush-tailed porcupine (*Atherurus africanus*)	3.83

TABLE 3. PRICE PER FRESH POUND WEIGHT FOR SOME BUSHMEAT SPECIES IN EASTERN NIGERIA BETWEEN OCTOBER 1974 AND JANUARY 1975.

SOURCE OF MEAT	WEIGHT IN POUNDS	TOTAL PRICE ₦	PRICE PER POUND ₦	PRICE PER POUND $
Grass Cutter	1950	853.00	0.44	0.72
Snails	2295	804.00	0.31	0.51
Monitor Lizard	210	100.00	0.47	0.77
Duiker	140	60.00	0.43	0.69

TABLE 4. PRICE PER FRESH POUND WEIGHT FOR DIFFERENT MEATS IN EASTERN NIGERIA, OCTOBER 1974 TO JANUARY 1975.

PROTEIN SOURCE	PRICE PER POUND IN ₦ AND	$
*Fresh fish	₦0.98	$1.60
*Chicken	0.83	1.35
*Pork	0.70	1.14
*Beef	0.66	1.07
Monitor Lizard	0.47	0.77
Cane Rat	0.44	0.72
Duiker	0.43	0.69
Snails	0.31	0.51

*Based on figures extracted from records of the East Central State Agricultural Development Authority Cold Store, Enugu, Nigeria. December 1974.

TABLE 5. RELATIVE AMOUNTS SOLD AND DRY WEIGHT MONETARY VALUES OF BUSHMEAT SPECIES IN EASTERN NIGERIA. OCTOBER 1974 TO JANUARY 1975.

SOURCE OF MEAT	WEIGHT IN POUNDS	PRICE PER POUND ₦	PRICE PER POUND $	TOTAL VALUE IN NAIRA
Grass Cutter	1889	1.20	1.95	2266.00
Bush Pig	632	0.75	1.22	474.60
Hippopotamus	352	0.64	1.04	225.50
Antelopes (unspecified)	284	0.83	1.35	235.00
Monkeys (unspecified)	281	0.68	1.11	191.30
Monitor Lizard	177	0.56	0.92	100.00
Mean Values (Totals)	(3615)	0.97	1.58	(3492.40)

In Eastern Nigeria, there is no taboo prohibiting the eating of bush pig or monkeys as there is in the Moslem North. Of those who were interviewed, 61.5 percent preferred bushmeat to domestic meat. Eighty-one percent and 30.8 percent, respectively, of the people queried preferred bushmeat to beef and chicken (Table 6). Snails were eaten by 76.92 percent of those interviewed. Of those who preferred bushmeat to meat from livestock, 75.1 percent did so because of taste while 3.8 percent were so inclined because they considered it to be more nutritious. The other 21.1 percent had reasons ranging from cost to availability (Questionnaire Results 1).

The carcasses of harvested animals are usually transported by various means to the villages for domestic consumption or for sale. Whole unskinned carcasses are sold to bushmeat dealers who in turn process them by burning off the hair, cutting the meat into pieces and finally drying them in mud ovens. The viscera are usually sold fresh while dried bushmeat is often transported to distant markets. Both wholesalers and retailers are involved in bushmeat distribution. Retailing is mainly by the head-load with sales at the roadside.

Where the skins were intended for sale, the traders usually skinned the carcasses and removed most of the flesh and fat from the pelt. The skin would then be stretched on the ground, fur downward, and sprinkled with sand to absorb moisture. Salt was rarely used. After drying in the sun, the skins would be stored for domestic use or sold. Sometimes skins were not processed but sold for consumption as food.

TABLE 6. COMPARATIVE PREFERENCES FOR BUSHMEAT VERSUS OTHER MEATS, EXPRESSED AS PERCENTAGES OF 1200 PEOPLE INTERVIEWED DURING OCTOBER 1974 TO JANUARY 1975 IN EASTERN NIGERIA.

	OTHER MEAT	BUSHMEAT
Domestic meat	38.5	61.5
Beef	18.5	81.5
Chicken	69.2	30.8

The marketing system is unsanitary and inefficient. Poor handling and storage practices lead to spoilage, reducing both the quantity and quality of bushmeat, hides and skins. Post-harvest deterioration is responsible for large losses.

The amount of wild protein, including the meat, viscera and skin eaten by the people varied locally. The residents in Calabar, Ogoja and Anambra Divisions have more bushmeat available to them because those areas are remote, less densely populated and therefore have more wild areas than other areas. The inhabitants of riverine and coastal areas derive a greater proportion of their animal protein from fish. They harvest terrestrial wildlife for meat, nevertheless, especially during floods.

The different methods of capture of wild mammals included shooting, trapping and hunting with dogs and clubs. Other methods involve burning of savanna grasses to drive the game to hunters, or encircling game with flames and thus injuring them. The latter procedure is known in some parts of Africa as ring-firing (Petrides, 1965).

Traps used for harvesting wildlife include wire snares, bamboo-spoked wheel traps, steel "gin" traps, fall logs and nets. Large animals such as hippopotami, buffaloes, elephants, waterbucks and large cats are usually shot with rifles by professional hunting parties. Sometimes large mammals are trapped along game paths, salt licks or lured with baits. Crocodiles seem to be the commonest victims of baiting.

These practices are carried out regardless of the age, sex, or physical condition of the animals. Night hunting is

practiced widely and each village has several professional hunters. Communal hunting parties were encountered in several villages. Hunting is heaviest during the dry season when animals are concentrated near water and is light during the rainy season when farming is intensive and the animals are scattered.

QUESTIONNAIRE RESULTS 1

Availability of Bushmeat and Game Eggs

1. What wild animal meat did you eat in the past month?
   (Several)

2. What parts of these animals did you eat?
   (all parts including head, intestine, organs and skin)

3. Is bushmeat more readily available than domestic meat?
   Yes (3.9%) No (96.1%)

4. Do you feel that bushmeat is becoming more or less plentiful in your area?
   More -- Less (100%) Same --

5. Are game eggs more readily available to you than domestic meat?
   Yes -- No (100%)

Meat Preferences

1. Have you ever eaten bushmeat? Yes (100%) No --

2. Do you still eat bushmeat? Yes (100%) No --

3. Do you eat snails? Yes (76.92%) No (23.08%)

4. Have you eaten eggs from game birds? Yes (100%) No --

5. Do you prefer bushmeat to domestic meat? Yes (61.5%) No (38.5%)

6. Why do you prefer bushmeat to domestic meat?
   (Taste 75.1%, more nutritious 3.8%, other reasons 21.1%)

7. What species of wild animals do you eat most often?
   (cane rat, bush pig, wild birds, antelopes, porcupine, snails).

8. What wild animal meat do you like to eat most?

(cane rat 69.25%, bush pig 15.33%, wild birds 7.65%, antelopes 3.9%, porcupine 3.83%)

9. Do you prefer game eggs to domestic eggs?
   Yes (53.83%) No (46.17%)

10. Do you prefer bushmeat to chicken?
   Yes (30.75%) No (69.25%)

11. Do you prefer bushmeat to beef?
   Yes (81.0%) No (19.0%)

Food Expenditures Per Family

1. How much did you spend on food for the past month?*
   (Average of ₦42.38; U.S. $69.20)

2. Out of that amount, how much did you spend on protein foods?
   (Average of ₦25.10 or 59.24%)

3. Out of the amount spent on protein foods how much did you spend on
   (a) domestic meat (36.66%)
   (b) other fish (27.31%)
   (c) bushmeat (19.36%)
   (d) stockfish (10.19%)
   (e) snails (6.48%)
   (f) insects (0%)

4. How much did you spend on game eggs during the past month?
   (Average of ₦2.07; U.S. $3.38)

*including food produced by the interviewee and his family.

Tourism

Eastern Nigeria has a good potential for developing a tourist industry based on its wildlife heritage. By 1974, the Enugu Zoological Garden had 95 reptiles, 138 birds and 380 mammals. In 1966, it recorded a total of 43,500 fee-paying visitors with a revenue of ₦2,000. The zoo was not functioning between 1967 and 1970 because of the Nigerian civil war. For the 1971-72 year, there were 8,000 fee-paying visitors and gate fees of ₦145.00 were collected. By 1972-73, the number of visitors had risen to 53,000 who paid ₦3,807.05 (Game Conservation Unit, Enugu). During 1973-74 period, fee-paying visitors had increased to 77,294 and fees collected at the gate amounted to ₦5,583.81 (Table 7).

The Forest Department's Game Preservation Unit in Enugu has no wildlife expert and is seriously under-staffed, with only 59 personnel in 1974. Its annual budget was about ₦14,000 for 1970-71, ₦30,000 in 1971-72, ₦35,000 in 1972-73 and ₦122,000 in 1973-74. Since the end of the Nigerian civil war in 1970, this unit had spent about ₦201,000 reconstructing the zoo and re-equipping its outstations (Game Conservation Unit, Enugu).

The Game Department in Calabar has a staff strength of about 50 most of whom are deployed in the zoo. In 1972, the Calabar Zoo recorded 27,116 fee-paying visitors and by the following year the number had increased to 48,200 (Table 8). By 1974, the total number of visitors to the zoo including fee-paying and non-fee-paying visitors was 75,316. Of this, 55.38 percent were children (Table 8) (Calabar Zoo Records).

TABLE 7. ANNUAL NUMBER OF ZOO VISITORS AND REVENUE OF THE GAME CONSERVATION UNIT, ENUGU.

YEAR	FEE PAYING VISITORS TO THE ZOO	AMOUNT ₦ COLLECTED/ZOO	LICENCES ₦	OTHERS ₦	TOTAL ₦
1966	43,500	2,000	------	------	2,000
1971-72	8,000	382.05	145.50	------	527.55
1972-73	53,000	3,807.05	104.50	28.65	3,940.15
1973-74	77,294	5,583.81	143.50	33.53	5,760.84

Source: Extracted from Annual Reports of the Game Conservation Unit, Enugu, East Central State, Nigeria.

TABLE 8. ANNUAL NUMBER OF VISITORS AND REVENUE, CALABAR ZOO

YEAR	NUMBER OF ADULT VISITORS	NUMBER OF VISITORS CHILDREN	TOTAL NUMBER OF VISITORS	REVENUE ₦
1972 (Oct.-Dec.)	15,815	11,301	27,116	1,073.00
1973	25,896	22,304	48,200	2,956.00
1974	33,605*	41,711*	75,316	3,575.00

* Fee-paying and non fee-paying

Source: Extracted from the records of the Calabar Zoo.

The number of zoo visitors is increasing annually in both Enugu and Calabar. 20 percent and 15 percent, respectively, of the people interviewed have been to zoos and game reserves. This indicates that there is a growing public interest in the wildlife resource and tourism. Operating costs for Enugu and Calabar zoological gardens exceeded the total revenues by a wide margin. This is expected because the two zoological gardens have been under reconstruction since the end of the Nigerian civil war. However, a steady reduction in capital expenditure and better efficiency should make the two zoological gardens self-supporting within a few years.

There are still wild areas of potential value as tourist attractions in the Eastern States if their remaining wildlife resources could be protected and managed (Holsworth, 1970). Such areas include the Anambra Forest Reserve which still has a number of manatee (Trichechus senegalensis), hippopotamus (Hippopotamus amphibius), buffalo (Syncerus nanus), African elephant (Loxodonta africana), kob (Adenota kob), bushbuck (Tragelaphus scriptus), waterbuck (Kobus defassa), grass cutter, leopard (Panthera pardus), possibly chimpanzee (Pan troglodytes) plus small reptiles, mammals and birds (Henshaw, 1971). Other areas with similar wildlife species include Umuaro in Isiuzo Division, Onu Anyim Agelagu Forest Reserve in Izzi Division, the Udi-Nsukka proposed reserve, Ukpom Bende Forest Reserve and Mamu Forest Reserve. Abadaba Lake in Etiti Division has crocodiles which have been accused of being man-eating.

In the South Eastern State the proposed Boshi-Okwango game reserve has a population of wildlife sufficient to make it both a tourist attraction and a source of bushmeat if management can be planned to coordinate the two endeavors. Mammals in this area include the bay duiker (Cephalophus dorsalis), yellow-backed duiker (Cephalophus silvicultor), red-flanked duiker (Cephalophus rufilatus), bush pig, and various small mammals, birds and reptiles.

In the Rivers State there are two proposed areas known only as Game Reserve A and Game Reserve B. Large mammals found in these areas include the buffalo, hippopotamus, elephant, lion, leopard and situtunga (Limnotragus spekei). Crocodiles, manatees and possibly the pigmy hippo (Choeropsis liberiensis) are inhabitants of the Niger delta (Heslop, 1944, 1945; Okafor personal com.). The last species is unique because it occurs only in Liberia, Sierra Leone, Nigeria and southeastern Guinea except for zoo and museum specimens in different countries (Rosevear, 1953; Robinson, 1970). It has not been confirmed in Nigeria (Robinson, 1970).

QUESTIONNAIRE RESULTS 2

Tourism, Trophies and Rare Species

1. Have you ever been to a zoo? Yes (20%) No (80%)

2. Have you ever been to a game reserve?
   Yes (15%) No (85%)

3. Do you own any wild animal skin or product made of wild animal skin? Yes (38.4%) No (61.6%)

4. How much did you spend on wild animal skin and products in the past one year?
   (Average of ₦2.62; U.S. $4.27)

5. Do you own any ivory or elephant tusk?
   Yes (23.0%) No (77%)

6. Do you still have the following animals in your village area?

gorilla	Yes (2%)*	No (98%)
elephant	Yes (20%)	No (80%)
lion	Yes (15%)	No (85%)
leopard	Yes (4.5%)	No (95.5%)
crocodile	Yes (48.5%)	No (51.5%)

*These reports require confirmation.

Public Attitudes Toward Wildlife

The common Ibo term for wildlife is "anu ofia", meaning both untamed animal and game meat. Apart from a few species whose killing is forbidden by local custom, others seem to have no place in the society. Lion hunters are highly respected and admired in their communities and the name "Ogbuagu", meaning lion or leopard killer, is a special prerogative of those who have killed one of these beasts.

Of 1200 people interviewed, 7.67 percent regularly hunt for food and money. Among Eastern Nigeria residents 69.25 percent were aware of animals whose killing is forbidden according to local culture. Only 38.5 percent, however, were aware of the existence of wildlife laws in Nigeria (Table 9). 62 percent would support the restriction of hunting if bushmeat species were scarce; 88.5 percent would support the establishment of game reserves in their areas and 88.4 percent felt that wildlife should be preserved for future generations. About 92 percent agreed that Nigerian wildlife should be managed for tourism. 96.2 percent felt that wildlife management should be mainly used for meat supplies.

There were varied opinions (Questionnaire Results 3) on how to increase the supply of bushmeat in the region. While 7.5 percent of those interviewed did not know what should be done, 4 percent favored improved processing and refrigeration, 7.7 percent wanted urban expansion limited and 19.2 percent felt that hunting should be restricted. About 23.08 percent, however, thought that unrestricted hunting would result in

TABLE 9. PUBLIC ATTITUDES TOWARD WILDLIFE IN EASTERN NIGERIA

		YES %	NO %
1.	Aware of cultural restriction on killing of some wildlife	69.25	30.75
2.	Aware of existence of wildlife laws	38.5	61.5
3.	Aware of illegal hunting methods	34.6	65.4
4.	Support restriction of hunting when bushmeat species are scarce	61.5	38.5
5.	Support establishment of game reserve in their locality	88.5	11.5
6.	Wildlife should be preserved for future generations	88.4	11.6
7.	Wildlife should be managed for meat supply	96.2	3.8
8.	Wildlife should be managed for tourism	92.3	7.7

increased bushmeat supply. For this group hunting pressure has no effect on animal numbers. To another 38.5 percent, the answer lies in domestication of wildlife.

QUESTIONNAIRE RESULTS 3

Public Attitudes Toward Wildlife

1. Do you know of the existence of any wildlife law in Nigeria?
   Yes (38.5%) No (61.5%)

2. Do you know of any animal whose killing is forbidden by your culture?
   Yes (69.25%) No (30.75%)

3. Where bushmeat species are becoming scarce are you in favor of the government (or laws) restricting hunting until the supply is restored?
   Yes (62%) No (38%)

4. Do you approve of the establishment of a game reserve in your area? Yes (88.5%) No (11.5%)

5. Do you think that wildlife should be managed for tourism?
   Yes (92.3%) No (7.7%)

6. Do you know of any illegal hunting methods?
   Yes (34.6%) No (65.4%)

7. Where overhunting is identified as a cause of scarcity of bushmeat, do you feel that the government should regulate hunting to ensure that the supply is maintained?
   Yes (80.75%) No (19.25%)

8. Do you think regulations of hunting should be left to the local communities? Yes (47.57%) No (52.43%)

9. What do you think should be done to increase the supply of bushmeat?

   (Domestication of wildlife 38.5%, unrestricted hunting 23.08%, restricted hunting 19.25%, limit urban expansion 7.66%, improved processing and refrigeration 4.0%, don't know 7.5%).

10. Do you think wildlife should be managed as a source of meat?
    Yes (96.2%) No (3.8%)

11. Do you think that the government should protect Nigerian wildlife for future generations?
    Yes (88.4%) No (11.5%)

12. What is your education background?
    Literate (34.58%) Illiterate (65.42%)

Hunting

1. Do you hunt? Yes (7.67%) No (92.33%)

2. If so, do you hunt for fun or for food or for money?
    Fun (0) Food and Money (100%) All ----

3. Do you have more or less professional hunters in your village/community now than ten years ago?
    More (11.6%) Less (88.4%) None ----

4. Do you think that the decline in hunters is due to decreasing game? Yes (47.8%) No (52.2%)

DISCUSSION

Meat Production

Intensive studies of utilization of the wildlife resource in Nigeria are lacking. Petrides (1965) was evidently the first to report on the importance of bushmeat in Nigeria. Apart from his paper and a rural economic survey by the Nigerian Federal Office of Statistics in 1966, there seem to be no other works on the value of this important resource.

Elsewhere in West Africa, Jollans (1959) studied the meat preferences of the people of central Ghana and revealed that the giant African snail and fish were liked better than other forms of animal protein. Riney and Hill (1967) found that bushmeat accounted for over 80 percent of the fresh meat consumed in Ghana. Clottey (1958, 1969) investigated the production and utilization of animal products there as well as the protein value of the cane rat and the giant rat (Cricetomys spp). Asibey (1965a, 1965b, 1966a, 1966b) carried out valuable studies on Ghana's wildlife resources and natural reserves with particular reference to bushmeat. In the Butouri region of Cameroun a consumption of bushmeat of about 18 pounds per person per year was estimated (Riney and Hill 1967). Congo Brazzaville had a rough estimate of bushmeat consumption of about 8 pounds per person per year or 50 percent of the fresh meat consumed in that country (Riney, 1964). In Botswana,

Butynski (1973) reported that reliance upon wildlife as a protein and revenue source was very significant. The total contribution by wildlife to Botswana's economy amounts to an estimated U.S. $4.4 to $5.5 million per annum (Von Richter and Butynski, 1973). Von Richter (1969) estimated that about 60 percent of the protein consumed within Botswana is derived from wildlife.

In South Africa, more than U.S. $1,120,000 worth of bushmeat is sold annually on the Transvaal markets alone. In other parts of the world, too, wild animals are managed for harvest. Introduced species like the red deer (Cervus elaphus) are slaughtered commercially and their meat exported from New Zealand. The production of tinned tails of wallaby (Macropus rufogriseus) and kangaroo (Macropus giganteus) tails is a growing export business in Australia (Riney, 1964).

Studies dealing with the utilization of hoofed animals as an economic resource were reported as early as the 1950s. Petrides (1956), Darling (1960a, 1960b, 1961), Talbot et al., (1961, 1965), Harthoorn (1961), Riney (1961), Simon (1962), Stewart (1963), Ledger (1963), Dasmann (1963, 1964), Brown (1963, 1969), and Talbot (1963, 1964, 1967) all have discussed this topic. Petrides and Swank (1958) earlier advocated and, after them, Longhurst (1957) detailed a population reduction program for the Queen Elizabeth (now Ruwenzori) National Park, Uganda, and discussed the utilization of meat of harvested animals. Mossman and Dasmann (1962) demonstrated the feasibility of cropping and marketing wildlife in Rhodesia. Ledger et al. (1967) discussed wildlife and food production with special

reference to the semi-arid areas of the tropics and subtropics. These biologists concluded that wildlife could often have important place in extensive agriculture and that there is marked fundamental difference in carcass composition between wild and domesticated ruminants, namely that the former do not lay down fat when gaining live weight, but maintain a high and constant level of muscle in the carcass.

A rural economic survey (Federal Office of Statistics, 1967) showed that by 1966-67 bushmeat accounted for about 25 percent of the animal protein supply for all Nigeria. A later survey of annual consumption of animal protein revealed that bushmeat constitutes as much as 30 percent of animal protein consumed in the country (Henshaw, 1970). In the West and Mid-Western states the resource accounted for 20 and 25 percent respectively of animal protein diet. In Eastern Nigeria, bushmeat was also significant especially in Yenagoa, Enugu, Calabar and Ogoja provinces where it provided 14 to 18 percent of the animal protein eaten (Federal Office of Statistics, 1967). This study, however, indicated that bushmeat supplies 25.84 percent of Eastern Nigeria's animal protein.

In the southern states of Nigeria, bushmeat was valued at more than ₦18 million (U.S. $29.39 million) annually. For the same area, the rural economic survey of 1966-67 indicated that domestic animals provided only ₦22 million of meat annually. The 20 million people consuming bushmeat represented 80 percent of those in the south, or 40 percent of the total population of Nigeria (Holsworth, 1970). The value of bushmeat in Northern

Nigeria was estimated at ₦6 million to ₦12 million and ₦30 million in Nigeria as a whole. In addition, the production of fish and shellfish was valued at ₦70 million. The total value of naturally-produced animal protein was about ₦100 million annually or nearly 4 percent of the gross domestic product of Nigeria (Federal Office of Statistics, 1967).

Proper management is necessary if wildlife is to continue to provide badly-needed protein foods especially for the rural population. It will be difficult to persuade people with a 34.58 percent literacy rate and living near a starvation level to refrain from capturing a vital part of their already very low protein diet in the interest of conservation. The principal need will be to give practical and convincing evidence to the people that proper management will result in more meat.

An estimate of post-harvest spoilage of bushmeat and wildlife products is needed in Eastern Nigeria. Bushmeat consumption by urban and rural residents in the region should be determined. It is equally important that the existing Game Reserves in Nigeria should be reviewed and their successes and contribution to conservation ascertained. Periodic survey of these reserves is necessary in order to monitor the status of wildlife and trend of the ecosystem.

Administration of Nigeria's Wildlife Resource

The Nigerian government will gain economically and culturally if it undertakes wildlife conservation and the management of bushmeat for sustained production. To begin

with, in Nigeria the production and marketing of meat even from domestic animals are very inefficient processes. It has been determined that raising meat animals to market age takes twice as long there as in Europe and the animals are twice the age and half the carcass weight of those of the United States or Australia (Johnson et al., 1969).

In an area of serious protein shortage, wildlife could be managed as a primary or secondary product of the land either as wild, semi-wild or even as domesticated stock (Petrides, 1965). Wild animals show a very rapid growth rate and early maturity as compared with livestock (Petrides, 1965). The meat content of a carcass of a wild animal is higher than that of cattle or sheep (Riney, 1967; Curry-Lindahl, 1969a). The killing-out percentage (dressed carcass expressed as a percentage of the animal's live weight) for seven species of antelopes varied between 52.5 and 63.2 percent, while it seldom exceeds 50 percent in cattle, 45 percent in goats and about 44 percent in sheep (Curry-Lindahl, 1969a).

A higher proportion of wild animals can be culled annually and some combination of wildlife can thrive on land where domestic animals waste and die (Curry-Lindahl, 1969b). In the tsetse fly infested areas of Nigeria, wild animals will be a more reliable and cheaper source of meat than domestic stock (Petrides, 1965).

Wild animals tend to move more freely to avoid grazing heavily in any one place. In dry areas some species of wildlife do not drink water for long periods, obtaining much or

all of their water from their food. Those species that do drink do not require as much water as cattle. In the long run, wild animals make less demand on their habitats than livestock. Most wildlife is immune to tsetse fly-borne diseases that constitute an overwhelming obstacle to livestock production in southern Nigeria.

Tourist Traffic and Wildlife

In 1966, Kenya recorded 225,000 tourists who came primarily to view wildlife. These people brought Kenya foreign exchange worth ₦24.2 million or $39.5 million (Denney, 1968). In 1970 Kenya had a total of 262,000 tourists who brought K 16.7 million in foreign exchange and provided jobs for about 40,000 people. Income from national parks in East Africa probably yields a greater economic return per unit area than would any other use to which the land could be put (Petrides and Swank, 1958).

The increase in the number of visitors to the Zoological Gardens at Enugu, Calabar, Port Harcourt and the University of Nigeria in Nsukka indicates the desire of the population to view wildlife. Zoological gardens are a good initial avenue for raising interest in wildlife conservation among government officials and urban inhabitants.

The Yankari Game Reserve in the North-Eastern State has been recording increasing number of visitors since it was opened to the public in 1962. Whereas during the 1962-1963 year 220 visitors came to Yankari bringing a revenue of ₦240, by 1968-1969 period the number of visitors had increased to 2,731 and the revenue was ₦4,340 (Chief Game Warden, 1969).

At the end of the Nigerian civil war in 1970, a national Strategy for Agricultural Development 1970-85 emerged. This program, among other things, dealt with the contribution that the wildlife resource could make in the welfare and economy of Nigeria. This culminated in the birth of a National Committee on the Conservation of Wildlife and Recreational Forestry.

The committee projected that by 1985 Nigeria should have about one-tenth of the annual number of tourists currently visiting Kenya. These 25,000 visitors would bring ₦3,050,000 ($4.9 million) in foreign exchange and create jobs for about 4,000 people (Nigerian Federal Department of Forestry 1971). It is expected that national parks and reserves will attract money to the rural areas where the local population will provide goods and services to tourists. Jobs in anti-poaching and cropping schemes would become available to local professional hunters.

Export of Wildlife and Wildlife Products

The export of live wild animals for medical research, private collections and zoological gardens is big business in West and Central Africa. From Kano (Nigeria) airport alone during 1959-1960, over 6,500 gray parrots, canaries and love-birds were exported officially. The actual number of animals exported was probably considerably higher since from an earlier report, where official figures showed 23 monkeys, one British firm alone exported 250 monkeys a week from Kano airport

(Riney and Hill, 1967). Between 900 and 7800 live wild animals have been exported annually from Kano airport (Table 10).

Revenues from export taxes and from trophy and hunting fees must be considerable since the license for a chimpanzee requires payment of a ₦200 ($327.00) trophy fee and a ₦20 ($33.00) hunting license, in addition to the export tax (Holsworth, 1970). An export fee of ₦6 was charged for each gray parrot, mammal and reptile and ₦2 for other birds. In 1966, Nigeria exported ₦30,000 worth of undressed reptile skins and made a total ₦1,450,000 from wild animal skins (Table 11). In that same year, revenue from wildlife amounted to 0.2 percent of the total export duties earned by Nigeria (Holsworth, 1970). Illegal export of skins and trophies from any country means considerable loss of revenue as well as possibly endangering species survival. Revenue is also lost through faulty preparation of skins and hides.

The next wildlife law for Nigeria must ban the killing and export of animal products and live animals that are listed as endangered species by international authorities.

Factors Affecting Wildlife

Sociological

Meat from livestock is expensive and the poor peasants in the rural areas, who constitute about 80 percent of the Nigerian population, have resorted to indiscriminate slaughter of wildlife for their meat supply. Each person considers wild animals as resources he can utilize freely and for his

Table 10. Export of Live Wild Animals From Kano Airport, 1959-1969

Species	Year[1/]							
	1959-60	1963	1964	1965	1966	1967	1968	1969
Mammals								
Patas monkey	48	1511	2056	1231	1012	671	500	269
Chimpanzee	27	14	17	11	5	0	0	0
Baboon	18	0	0	0	0	0	0	2
Mandrill	17	0	0	0	1	0	0	0
Misc. primates	36	0	16	8	0	0	0	9
Lion	0	0	0	0	1	0	0	0
Cheetah	1	0	0	0	0	0	2	0
Misc. cats	0	0	0	0	0	0	1	0
Misc. civets	0	5	0	0	0	0	0	2
Other carnivores	0	5	0	0	0	0	0	2
Other mammals	11	4	5	0	2	0	4	10
Subtotal (Mammals)	158	1539	2094	1250	1021	671	507	294
Birds								
African gray parrot	1587	523	646	481	349	102	66	109
Misc. Psittacidae	1234	1	1	155	4	12	1	0
Crowned crane	428	109	590	222	192	177	310	189
Ground hornbill	0	2	4	0	0	0	0	15
Other hornbills	0	0	0	2	0	24	0	0
Bustards	0	1	0	4	0	10	2	0
Secretary bird	0	8	13	20	35	10	13	5
Ostrich	0	2	3	0	0	1	3	0
Pelican	0	0	0	4	7	3	16	8
Darter	0	0	0	0	6	0	0	0
White (European) stork	0	0	0	24	26	56	14	14
White-bellied stork	0	0	10	8	19	8	13	74
Woolly-necked stork	0	0	2	0	1	0	5	0
Open-bill stork	0	0	0	0	0	6	9	0
Jabiru stork	0	25	17	11	21	6	14	3
Marabou stork	0	9	10	34	18	11	41	28
Wood ibis	0	2	4	6	0	14	9	29
Unspecified Ciconiidae	0	0	3	14	17	7	0	0
Hammer kop	0	17	11	5	8	12	15	0
Sacred ibis	0	2	0	0	0	6	16	8
Spoon bill	0	0	0	0	0	2	0	0
Other Ciconiiformes	0	0	0	0	19	8	0	0
White-faced duck	0	119	92	10	29	74	122	36
Pygmy goose	0	11	35	18	32	4	113	5
Knob-billed goose	0	0	0	0	0	2	0	5
Spur-winged goose	0	2	0	10	0	0	0	0
Other Anatidae	0	0	1	0	54	4	0	1
Falcons, kestrels, hawks	0	2	0	0	6	27	117	36
Bateleur eagle	0	0	6	4	7	26	44	22
Misc. eagles	0	0	12	19	13	17	1	1
Vultures	0	0	0	0	0	1	12	17
Guinea fowl	0	4	0	0	0	0	1	2
Other Galliformes	0	0	0	0	4	10	4	0
Misc. Columbidae	0	12	0	0	0	0	4	1
Purple gallinule	0	0	2	3	0	0	0	0
Thick-knee	0	0	0	4	0	7	0	0
Croodile-bird	0	76	10	155	1	92	30	6
Other plovers	0	0	0	2	10	6	0	0
Plantain eater	0	4	6	8	1	24	18	12
Long-tailed starling	0	2	6	0	0	18	0	0
Crows	0	64	0	2	4	0	0	0
Canaries	3695	0	0	0	0	10	0	0
Other finches	784	0	0	0	0	20	0	0
Misc. birds, unidentified	0	248	0	2	2	9	17	4
Subtotal (Birds)	7728	1245	1484	1227	785	814	1030	630
Total	7886	2784	3578	2477	1806	1485	1537	924

*Source: Holsworth, W. H. 1970. Nigeria Wildlife Management (Table 7, p. 19). FAO, Rome.

TABLE 11. WILD ANIMALS AND ANIMAL PRODUCTS EXPORTED FROM ALL OF NIGERIA IN 1966*

ITEM	QUANTITY	DECLARED VALUE ₦	CUSTOMS DUTY RATE	ESTIMATED TOTAL REVENUE ₦
Live animals (non-domestic)	3,005 (probably only a portion of the actual export)	46,056	Animals (?) and Reptiles ₦6 Parrots ₦20 Other birds ₦2	18,030
Reptile skins	3,080 cwt	2,023,348	10k.-per pound	34,496
Fur skins	15 cwt	57,937	Lesser Cats 15K. per pound Others ₦1-per pound	252 (min.) 1,680 (max.)
Other hides and skins (other than reptiles and domestic animals)	87 cwt	265,662	10K. to ₦1	952 (min.) 9,520 (max.)
Crude animal materials	-	120,542	exempt	Nil
Total	3,182 cwt	2,512,554	Total customs Revenue	53,730 (min.) 63,726 (max.)
Cattle and goat hides and skins	127,596 cwt	7,514,000		778,000

*Source: Adapted from Holsworth, W. H. 1970. Nigeria Wildlife Management (Table 8, p. 20). FAO, Rome.

own personal benefit. Poaching for survival, therefore, is a serious problem to conservation.

One socio-political factor affecting wildlife was the Nigeria-Biafra war of 1967 to 1970. The East derived most of its animal protein from wildlife during this period. The result was a depletion of the already threatened species. It will take close protection from hunting to return the wildlife population in Eastern Nigeria even to its pre-war level.

Government development plans are often concentrated on projects that give quick returns and prestige. Unfortunately, the results of wildlife conservation usually cannot be seen overnight and neglect of the wildlife resource has been the rule.

Inadequate Legislation

Protection of Nigeria's wildlife has been encouraged by the wild animal laws of the East, North and Western regions. The 1916 "Wild Animal Preservation Laws" for Western Nigeria was followed by other in 1933 and 1947. Recently Northern Nigeria published its 1963 Wild Animals Law while the East had its own law in 1965. Although the East and the North had their laws revised more thoroughly and more recently, basically they are the same as the Western Law. These laws are almost entirely concerned with hunted (game) animals, not with wildlife in general. They do not consider the ecosystem in which the animals live and are not concerned with the all-important matter of habitat management.

The basic philosophy of the laws is that wildlife is scarce or on the verge of becoming scarce and should be preserved. Rare species are given protected status. The wildlife laws in Nigeria do not consider that wildlife is a resource that could be utilized on a sustained and renewable basis. The authors of those laws saw game reserves and sanctuaries as the only places where wildlife could be preserved.

Holsworth (1970) stated that the only wildlife management-oriented legislation in the Nigerian laws prohibits the collection of eggs of protected bird species and the killing of female antelope or immature elephants and rhinoceri. The same law, in a negative sense, provides for killing wildlife species damaging crops or endangering human life. Even apart from the inadequacy of these laws, most people in Nigeria do not know of their existence. From all indications, the existing laws are obsolete. They are not in line with modern trends in wildlife management.

Overhunting

It is normal in Nigeria to see men carrying guns as they move along the roads. Actually, there are only a few places outside the cities where gunfire is not heard frequently at night (Petrides 1965). In addition to the very-effective night hunting, wire snares, ring fires, pits and wheel traps are commonly used.

Petrides (1965) stated that destructive practices that affect wildlife in Nigeria include:

"1. Year round hunting, with no closed season

2. Night hunting, often with greater intensity than in daytime

3. All-species hunting, except possibly for the elephant, regardless of abundance, reproductive rate, or wariness

4. Widespread use of traps and snares of several kinds

5. Widespread ownership of muzzle-loading guns, which are unlicensed and with which hunting is unrestricted

6. Hunting of animals of both sexes and all ages

7. Regular open sale of bushmeat for its high market value

8. Burning of savanna grasses to drive game to hunters, or to encircle and injure animals with flames ("ring-firing")."

Overhunting is evidently the most serious factor affecting wildlife in Nigeria. Under proper hunting regulations, the number of animals shot each year is less than the number replaced by reproduction annually (Petrides, 1965). But as it is, Nigerians tend to harvest more animals than are replaced by reproduction.

Habitat Destruction

In most countries it is not overhunting, but the destruction of wildlife habitat through intensive land use that is most harmful to wildlife (Petrides, 1965). However, the two factors seem to be working simultaneously against wildlife in Nigeria. Pesticides have been used in large quantities in many parts of Nigeria to control noxious insect pests, and their impacts on wildlife and its habitats including fresh water and marine environments have yet to be determined. DDT has been determined to reduce the reproductive capabilities

of birds, to kill fish and to cause a high rate of abortion in some mammals (Ray, 1972).

Land use trends seem to be toward increased plantations of oil-palm, cocoa, rubber, and cashews in the forest zone. Food production seem likely to require increased acreages (Petrides 1965). Road systems are being extended, new industries are springing up and cities are growing. All these claim more land and further restrict wildlife to smaller and often unsuitable habitats. The present reckless land use is bound to have adverse effect on animals that require natural habitats.

Lack of Personnel

Nigeria lacks trained wildlife personnel. Wildlife management is both a science and an art and its effectiveness requires qualified and dedicated personnel. It should be in the hands of men and women whose interests include wildlife on all lands and in all vegetation types. Wildlife is a product of savannas, deserts, marshes and of agricultural and pasture lands and marine and fresh water, as well as of forests.

RECOMMENDATIONS FOR MANAGEMENT OF THE WILDLIFE RESOURCE

Administration

Resource conservation in Nigeria should be the concern of everyone. Recognizing the social organization in the country and being aware that public participation is vital, it becomes necessary that all segments of the country be involved. It seems desirable that there should be a national Conservation Commission which should include representatives of the following:

The Head of State

Natural Rulers (3 members)

Federal Department of Forestry (1 member)

Federal Department of Forest Research (1 member)

Federal Department of Agriculture (2 members)

Federal Department of Wildlife and National Parks (3 members)

Federal Department of Fisheries (1 member)

The Nigerian Universities (3 members)

The Nigerian Environmental Protection Agency (1 member)

The Nigerian Customs Department (1 member)

The Nigerian Union of Teachers (1 member)

The Nigerian Armed Forces (1 member)

The Nigerian Police (1 member)

The Commission should have a seal and be empowered to raise funds and seek international assistance for conservation. It should draw-up guidelines and policies for conservation.

The Commission should have control over a new Federal Department of Wildlife and National Parks. This should have equal status with the already existing federal departments. It should have scientists trained in wildlife management and should cooperate with the wildlife departments in the states.

A central department will help ease the staff problem of many states to ensure a uniform standard of management and avoid duplication of effort. The existing Game Reserves should be upgraded so that they meet international standards and can be designated National Parks. They should be placed under the Department of Wildlife and National Parks.

Any conservation program in Nigeria which does not involve the local people is bound to fail. Each national park or reserve should have a local board made up of natural rulers and representatives of the various interest groups in the area. Pride of sponsorship, especially if combined with local benefits can be used to good advantage for the protection and control of wildlife and other resources, both within and outside the parks and reserves. It is necessary for the local districts or councils to retain part of the revenue that comes from the nationally administered parks and reserves.

The complete prohibition of hunting would meet with stiff resistance. Locally-controlled hunting zones should be established to avoid disrupting the already-entrenched hunting

traditions.

A National Conservation Week should be observed each year. This period should serve to bring together all people involved in conservation, and should feature lectures, seminars and symposia for exchanges of ideas and experiences.

Legislative Protection

The existing wildlife laws in Nigeria were written many years ago and mainly for guidance of the foreign game hunter. These laws need to be reviewed. Legal protection should be by area, by species, and by general restrictions on certain methods of hunting and trapping.

Tribal hunts normally take place at intervals of one year or more in different places. Where these customs prevail, good populations of animals survive. Most tribal hunting methods in Nigeria prohibit killing pregnant and young animals, yet some species should not be killed at all. National laws should be reinforced by local legislation. Moreover, local laws are easier to enforce in Nigeria where the population views the national government as an abstract entity.

Education

Effective conservation of natural resources requires that trained personnel be assigned at all administrative levels. Conservation education should make every citizen realize that man is an inseparable part of the ecosystem and is dependent on it. Every Nigerian should understand the relationships between

living things and the environment. Any successful conservation education program should span the entire school system, from primary levels through high school and university.

Primary schools should teach nature study while high school programs should deal with principles of conservation of soil, water, vegetation and animals. The universities should teach resource ecology, wildlife management, soil conservation and range management. Nigeria (perhaps in cooperation with Ghana and Sierra Leone) should establish a school for wildlife management similar to the one at Mweka in Tanzania and Garoua in Cameroun but with emphasis on local problems. Additional schools for tanning and leather-working methods such as the one at Oji River in East Central State will be assets. Handcraft schools aimed at the manufacture of authentic Nigerian articles would contribute to tourism.

Food Technology Research

Quality deterioration and spoilage is responsible for losses of much useable bushmeat in Nigeria. Reductions in the values of perishable products now range from 10 to 50 percent in Nigeria (Harrimann, 1968). The practices of head-load transport, roadside sales and ready-to-eat food sales are all inefficient and unsanitary.

Nigeria should evolve commercial food processing procedures and improve distribution by using refrigerated trucks and modern packing methods. Bushmeat can be made more attractive, useful and profitable if deterioration due to insect infestation is prevented.

SUMMARY

In an effort to ascertain the importance of wildlife to the economy of Eastern Nigeria, an investigation was undertaken to determine the trend in consumption and value of bushmeat and other wild animal products, the contribution of wildlife to tourism, the attitude of local populations toward wildlife, and the administration and management of the wildlife resource.

The study was conducted between October 1974 and January 1975 in the Eastern States of Nigeria. 1,200 family heads, from all political divisions covering urban and rural areas, were interviewed. Twelve local markets were visited at intervals. Species of animals utilized for food and the average price per pound for each species was determined.

Although bushmeat is an important source of animal protein in Eastern Nigeria, precise figures on its consumption are difficult to obtain because some products are not exchanged through organized markets. Game meat is sold publicly in the markets of both urban and rural areas. On a value basis, bushmeat (including snails) accounted for 25.84 percent of animal protein consumed in Eastern Nigeria. 61.5 percent of the persons queried preferred bushmeat to domestic meat. The most preferred bushmeat species was the grass cutter (*Thryonomys swinderianus*). Bush pig (*Potamochoerus porcus*), wild birds,

antelopes, and the brush-tailed porcupine (Atherurus africanus) were next, in that order. The giant African snail (Achatina achatina) was widely eaten.

Hunting is heaviest during the dry season and light during the rainy season when farming is intensive and the animals are scattered, rather than concentrated near water. Retailing of bushmeat is mainly by the head-load with sales at the roadside. Poor handling and storage practices lead to spoilage, reducing both the quantity and quality of bushmeat.

Areas that are of potential tourist attraction in the Eastern States include the Anambra Forest Reserve, Umuaro, Anu Anyim Agelagu Forest Reserve, the Udi-Nsukka proposed reserve, Ukpom Bende and Mamu Forest Reserves. The crocodile population in Abadaba Lake deserves protection. In the South Eastern State, the proposed Boshi-Okwango Game Reserve has a population of wildlife sufficient to make it a viable tourist attraction and a source of bushmeat. Game Reserves A and B proposed in the Rivers State would contribute to tourism if their remaining wildlife could be protected and managed. National parks and reserves will attract money to the rural areas where the local population will provide goods and services to tourists.

Apart from a few species protected by tribal custom, wildlife has not been assigned a proper place in the Nigerian society. Poaching for survival is a serious problem to wildlife conservation. Other factors contributing to the rapid decline of wildlife populations include inadequate legislation, habitat

destruction, lack of trained management personnel, and a negative public attitude toward wildlife.

Nigeria needs a central organization for the conservation of wildlife resources. Conservation of wildlife must be planned at a national level as well as in local districts. A system of parks, reserves, and sanctuaries representative of all vegetational types and protecting threatened animal species and characteristic groups will earn recognition for Nigeria in the world community and will comprise a basis for the support of tourist industries. Perhaps the most effective method to ensure local participation in wildlife conservation practices is to provide that a good proportion of the revenue from wildlife utilization be returned to the locality which produced it. The export of live animals and animal products, game cropping schemes, game hunting and bushmeat harvesting all may be involved. Above all, conservation programs should be arranged so as not to conflict in any serious way with local customs and traditions.

In Nigeria, the production and marketing of meat from domestic animals are very inefficient processes. Raising hoofed livestock to market age takes twice as long there as in Europe and the animals are twice the age and half the carcass weight of those of Europe or Australia. Wildlife shows a very rapid growth rate, early maturity and a higher killing-out percentage than cattle, goats and sheep. Wild animals can thrive in marginal lands where livestock cannot survive. Besides, wild animals make less demand on their habitats than livestock and

can be managed as a primary or secondary product of tse-tse fly infested areas of Nigeria. In consequence of these, wildlife seem to be a more reliable and cheaper source of meat than domestic stock.

By increasing the sustained production of meat from wildlife through controlled cropping, Nigeria can attain an improved nutritional level with a minimum diversion of resources from other projects and with a reduction in the costs of imported animal protein.

The preservation of land and wildlife resources are not only sound ecological concepts but also good economic investments. Though nature reserves have intangible values which cannot be measured in money, they also can be important sources of revenue. Because of its economic importance, nutritional value, ecological considerations, aesthetic, cultural and scientific values, the place of wildlife in all land-use planning must be most carefully reviewed. Only the most critical circumstances can possibly justify large scale game reduction.

Nigeria should embark on conservation education at all levels. Perhaps in cooperation with Ghana and Sierra Leone, Nigeria should establish a school for wildlife management. Schools for tanning and leather-working methods and handicraft schools aimed at the manufacture of authentic Nigerian articles would be good assets and contribute to tourism. Quality spoilage and deterioration would be avoided if the country evolves commercial food processing procedures, improves distri-

bution and transportation and eliminates the inefficient and unsanitary roadside and ready-to-eat food sales.

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