

# CROCODILES

**The status of crocodiles in Africa**

H. B. Cott and A. C. Pooley

A paper contributed to the  
First Working Meeting of Crocodile Specialists.  
Sponsored by the New York Zoological Society and organized  
by the Survival Service Commission, IUCN, at the Bronx Zoo,  
New York 15—17 March, 1971

Volume 2

Published with the financial assistance of UNESCO



International Union  
for Conservation of Nature and Natural Resources  
1110 Morges, Switzerland  
JANUARY 1972

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The International Union for Conservation of Nature and Natural Resources (IUCN) was founded in 1948 and has its headquarters in Morges, Switzerland; it is an independent international body whose membership comprises states, irrespective of their political and social systems, government departments and private institutions as well as international organizations. It represents those who are concerned at man's modification of the natural environment through the rapidity of urban and industrial development and the excessive exploitation of the earth's natural resources, upon which rest the foundations of his survival. IUCN's main purpose is to promote or support action which will ensure the perpetuation of wild nature and natural resources on a world-wide basis, not only for their intrinsic cultural or scientific values but also for the long-term economic and social welfare of mankind.

This objective can be achieved through active conservation programmes for the wise use of natural resources in areas where the flora and fauna are of particular importance and where the landscape is especially beautiful or striking, or of historical, cultural or scientific significance. IUCN believes that its aims can be achieved most effectively by international effort in co-operation with other international agencies such as UNESCO and FAO.

The World Wildlife Fund (WWF) is an international charitable foundation for saving the world's wildlife and wild places. It was established in 1961 under Swiss law and has headquarters near those of the International Union for Conservation of Nature and Natural Resources (IUCN). Its aim is to support the conservation of nature in all its forms (landscape, soil, water, flora and fauna) by raising funds and allocating them to projects, by publicity and by education of the general public and young people in particular. For all these activities it takes scientific and technical advice from IUCN.

Although WWF may occasionally conduct its own field operations, it tries as much as possible to work through competent specialists or local organizations.

Among WWF projects financial support for IUCN and for the International Council for Bird Preservation (ICBP) have highest priority, in order to enable these bodies to build up the vital scientific and technical basis for world conservation and specific projects. Other projects cover a very wide range, from education, ecological studies and surveys to the establishment and management of areas as national parks and reserves and emergency programmes for the safeguarding of animal and plant species threatened with extinction.

WWF's fund-raising and publicity activities are mainly carried out by National Appeals in a number of countries, and its international governing body is made up of prominent personalities in many fields.

# FIRST WORKING MEETING OF CROCODILE SPECIALISTS

## VOLUME 2

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## THE STATUS OF CROCODILES IN AFRICA

### Introduction

The former distribution and present status of the Nile crocodile Crocodylus niloticus has been studied or reported upon, in some cases in considerable details, in others only very superficially, in the twenty-eight countries or major sub-divisions of countries indicated in the Table of Contents. Its numbers have been drastically reduced almost everywhere, largely in the last 20 years, and all reports are in agreement, whether specifically stated or implied, that they can only be restored by stringent conservation measures.

Less is known about the status of the two other African species, the Long-nosed crocodile Crocodylus cataphractus and the stumpy, Broad-fronted or Dwarf crocodile Osteolaemus tetraspis, for which some information has been collected for twelve and six countries, respectively, but they seem to be becoming more scarce within their restricted range.

In the following compilation of the data, the information is set out under each of the countries concerned, which, for ease of reference, are listed in alphabetical order. As far as possible, although there is sometimes an overlap and for a few countries so little is known that it can be summarized in a few lines, the information is grouped under the following headings :

- Legal Status (degree of legal protection accorded, if any, etc.).
- Conservation Measures (with special reference to reserves).
- Reasons for Decline (including any statistics available on exploitation).
- Condition of Habitat (with data on past and present ranges).
- Remarks (habits, ecology, prospects, etc.).
- References (main sources of information : others are referred to in the text or grouped in a short bibliography at the end of the volume).

## STATUS OF CROCODYLUS NILOTICUS

### ANGOLA

#### Legal Status

Protected throughout Angola by Decree No 14 539. Hunting in all forms is prohibited and so is the export of skins. This has been in force since 1969.

#### Conservation Measures

Attempts have been made by private enterprise to have the Government Game policy changed so that shooting of crocodiles might be allowed. However, this move was opposed by the Council for the Protection of Nature. The prohibition will be in force until the population has increased to what the Council consider a suitable level.

#### Reasons for Decline

Professional hunters have operated along all the major rivers and have to a large extent reduced crocodile populations, as hunting was allowed for many years.

#### Condition of Habitat

Two dams have been built, one on the Quanza, the other on the Cuene River, but these are not regarded as a threat to the ecology of the crocodile. There have been no other major habitat changes.

#### Remarks

No population estimates past or present are available, and nothing is known of the breeding success or of the general ecology of the animal.

Crocodiles occur in the following major rivers: Congo, Mbridge, Loge,

Bengo, Cuanza, Longa, Cubal, Cunene, Cubango, Cuando, Zambezi, Cuango, as well as in their smaller tributaries.

It is not known for certain whether hunters succeeded in exterminating populations in any given area, but present-day observation indicates that the known distribution has not been altered.

Angola shares many of its rivers with neighbouring countries, and borders South West Africa/Botswana/Zambia/Congo. The small staff of conservation officers cannot effectively patrol the borders. Hunting is known to occur in the Caprivi strip on the South West Africa/Botswana/Zambia/Angola border and along the Cunene River.

Small numbers are no doubt also killed by fishermen. There are no records of crocodiles breeding in captivity.

#### References.

Veterinary Department of Angola; Instituto de Investigacao Cientifica, Angola.

van der Riet, W. 1965 . Canoe trip on the Cuenen River. African Wildlife, Vol. 19, Dec. 1965, pp. 293-294.



## BOTSWANA

### Legal Status

Crocodiles are scheduled under the Fauna Conservation Proclamation of 1961. This covers Game Reserves, Sanctuaries, Private Game Reserves and Controlled Hunting Areas.

A permit is required to kill any animal in either a Game Reserve or Sanctuary, with the proviso that the purpose must be for education, research or use by a scientific institution.

No person may capture or kill any animal in a Private Game Reserve without a permit. The export and import of Animals, Trophies and Meat and the sale and manufacture of articles from trophies is prohibited without a permit.

The country is divided into controlled hunting areas, in each of which there is a quota allowed.

Crocodiles are shot on a Supplementary licence costing £ 15 per animal for a non-resident and £5 per animal for a resident. There is no limit to the number of supplementary licences that may be issued to any one person during any one open season.

A 'Package licence' may be bought for £250 for the purpose of hunting crocodiles, the number of animals to be determined by the department.

The capture of live crocodiles for export is controlled by permit. An export fee of 10/- is levied in respect of each crocodile skin exported.

There is one commercial crocodile operator whose quota has been cut from 2000 crocodiles per year to 1000 (1970). During 1971 it will be cut to 500. Depending on the estimated crocodile population, this quota will either be continued at 500, or else his Package licence will be cancelled.

### Conservation Measures

Crocodiles are protected in Game Reserves and Private Sanctuaries. The area is a vast one and policed by a very small staff of conservation officers.

The crocodile is the totem of several tribes and is not molested by them in localized areas.

### Reasons for Decline

Private and commercial hunting, which was first allowed on a large scale in 1956, mainly in the Okavango swamps. Exploitation was very extensive and a considerable drop in the number of legally hunted skins, and a decrease in average size of crocodiles shot, was noted. This led to the introduction of protective measures.

Along certain rivers many small crocodiles are destroyed when caught in fishing gear.

The population of the Chobe River was decimated by commercial hunters some 15 to 20 years ago and has not recovered. The situation here is complicated by the fact that the river is an international boundary and hunting is permitted in the Caprivi strip (Angola/Botswana border). Populations in the Limpopo River (Botswana/South Africa border) have been greatly exploited and few survive.

Population expansion and agricultural development, particularly along the Limpopo River, and the drying up of Lake Mababe have also contributed to a reduction in numbers.

The extent of crocodile exploitation may be gauged by the fact that one operator, with several boats and trained hunting crews, accounted for some 40,000 mostly adult crocodiles, during his career.

### Condition of Habitat

The Okavango Delta (6000 sq. miles or 15,540 km<sup>2</sup>) is the main habitat. Much of it is dense papyrus growth which is difficult to penetrate by boat. This habitat has been the crocodiles' greatest protection and appears to be stable at present.

A projected plan of pumping water from these swamps to South Africa may seriously alter the ecology of this area if ever put into operation.

### Remarks

According to the Game Department no census has been done to determine the crocodile population.

Estimates are in the region of 25,000 crocodiles. There are two

companies interested in commercial crocodile farming. Neither has yet commenced operations.

No data is available on the ecology of the crocodile in Botswana.

Reference

Ecologist and Chief Game Warden: Department of Wildlife and National Parks (pers. comm.).

## CAMEROUN

### Legal Status

Said to be fully protected throughout the country.

### Conservation Measures

Fully protected in the game reserves, Benone, Uayo Rey, Boubaudjidja, Faor in the northern territory. However, it appears that control of these reserves is not very effective.

### Reasons for Decline

Hunting. Apparently, crocodiles are openly sold in Yaounde and Douala to skin merchants although this is illegal.

### Condition of Habitat

Unknown.

### Remarks

Insufficient information for this country. The species is considered to be scarce in the north and has almost disappeared from inhabited areas.

### Reference

Prof. J. Dragesco, Faculty of Science, B.P. 812, Yaounde, Cameroun.

CONGO DEMOCRATIC REPUBLIC

PROVINCE OF KATANGA

Legal Status

Protected by Ordinance 6G -074 of 8 March 1968, Chapter one, Section one (amending the decree of 21 April 1937).

1. Without the permission of the administration no person may hunt, capture, sell, offer for sale, buy, give, receive by any means, transport or hawk crocodiles or their skins or any part of these creatures.
2. Article one does not apply to hunting carried out by persons holding hunting permits and hunting for their own or their families' benefit. Permits are issued by the Department of Agriculture.
- 3,4 & 5. All skins, or crocodiles are required to be registered at a fee of 10 K each. A separate certificate is issued for each animal or skin. These certificates are tendered to the customs officer at the point of departure when skins are exported.

Conservation Measures

Protected in Katanga Province as above.

Reasons for Decline

Systematic hunting by professional hunters for belly skins. Slaughter by local peoples who considered crocodiles harmful (bounties were apparently paid for heads and eggs collected).

Condition of Habitat

There has been no appreciable deterioration of habitat.

Remarks

The species is considered to be rare in Katanga Province. No figures are available for numbers remaining in the wild state or numbers slaughtered prior to 1968. Breeding is said to commence after the heavy rains, i.e. in November. A few specimens are kept in captivity in the Lubumbashi Zoo, but breeding has not been recorded.

Reference

J. C. Heymans, Service de Zoologie, Université Officielle du Congo,  
Lubumbashi.

## ETHIOPIA

### Introduction

The Report on this country varies from the others in that it was specially contributed by Mr Colin M. Chapman, being a summarized account of the results and recommendations of the survey he carried out for the Imperial Ethiopian Government from May 1967 to May 1968. Some additional information kindly supplied by Mr Melvin Bolton, research biologist attached to the Ethiopian Wild Life Conservation Department under a bilateral aid programme, and by Brigadier Mabratu Feseha, head of the Wild Life Conservation Department, has been interpolated in double brackets at the appropriate points in Mr Chapman's report.

### Background to Survey

It seems probable that most of the hunting of the crocodile in Ethiopia has taken place in the past 15 years. Initially concessions were granted by the Ethiopian Government to various people and in 1963 DOFAN Ethiopia Share Company obtained concessions on several rivers. Under a supplemental agreement of 15 March 1966, DOFAN were given sole rights on most major rivers providing that:

- (a) they built a tannery in Ethiopia in which all crocodile skins were to be processed (this was completed in 1968);
- (b) a biologist was employed to carry out a survey of crocodile resources in Ethiopia. Reports were to be submitted to DOFAN Ethiopia S.C. and the Ethiopian Wild Life Conservation Department, and were to include recommendations for future control and management of commercial concessions, in order to avoid over-exploitation, and also concerning crocodile farming.

### Results of Survey

The records made for the assessment of royalties of the numbers and sizes of skins exported were not made available.

((...

### Trade in Skins

The total number of skins exported during the past six years is 26,045 . Of these only ten skins were exported by sport-hunters; the rest were hunted commercially. Figures for these years are:

1965/66	1966/67	1967/68	1968/69	1969/70	1970/71
4,334	3,704	2,002	7,000	5,001	4,003

Brig.Gen. Mabratu Feseha, Head,  
Wild Life Cons. Dept, Addis Ababa,  
in litt. 31 March 1971

...))

The results were obtained by making day and night counts from a powered boat.

Until more is known about the seasonal behaviour of crocodiles it is not possible to be certain of the reliability of the results obtained at different times of year.

#### (a) Awash River

The Awash River, although 1200 km long, is nowhere very wide. A few crocodiles are found in the Koka Dam, at an altitude of over 5000 ft (1500 m).

The upper reaches have been accessible by road since the Italian occupation, since which time indiscriminate hunting has greatly reduced numbers. (( DOFAN hunters are now reported to be barely making a profitable catch and DOFAN are talking about withdrawing them, Melvin Bolton, in litt. 1968.)) A small part of the upper Awash is now included in a game park, and a further 100 km is in an area designated as a Game Reserve. Densities of about 70 crocodiles/ 10 km were recorded. There are reports of several lakes lying west of the river containing large numbers of crocodiles, which have been hunted during the past three years .

The middle reaches of the Awash River and two adjacent lakes were hunted for about six years prior to 1967. In this area a complicated set of results was obtained because of the onset of the rainy season and large local variations produced by the hunting. Numbers ranging from 30 to 200 crocodiles / 10 km were found, most of them about 2 m long, and only three as large as 4 m in length.



Further downstream the middle reaches of the river are remote and inaccessible, but only 50 crocodiles / 10 km were recorded. The presence of the Koka Dam upstream has probably greatly altered the seasonal variation in water level in recent years.

The lower reaches of the Awash have also been accessible by road and hunted for many years. A density of only 20 crocodiles / 10 km was observed by night (also during the rainy season). There has been further hunting in this area since 1967.

It was not possible to reach the lakes in which the Awash River ends, although they are reported to contain large numbers of crocodiles.

#### (b) The Rift Valley Lakes

Lake Margherita (Abaya) is connected to Lake Chamo by a short river. The two lakes have shore lines of 250 km and 120 km respectively, although much of this is rocky.

These lakes were intensively hunted several years prior to the survey.

Day counts showed a good distribution of sizes up to 5 m, but night counts showed an average of only about 12.5 crocodiles / 10 km for Lake Margherita, and scattered groups in Lake Chamo.

Lake Stephanie is reported to have dried up, and the five other Rift lakes are reported not to contain any crocodiles.

(( Several thousand skins were taken from these lakes between 1960 and 1966. Chapman recorded a few hundred crocodiles left on each Lake and noted the absence of young ones. I can confirm that this situation prevails on both of these lakes. The level of Lake Chamo has risen by two or three feet in recent years. This must have flooded traditional nesting grounds and may have something to do with the present paucity of young ones. There is no (legal) hunting of crocodiles on the lakes at present but DOFAN are pressing hard for a concession. This has been opposed and fortunately the local Governor is also strongly opposed to hunting. I do not think it likely that a concession will be granted. Melvin Bolton, in litt. 1968. ))

(c) The Webi Shebeli, Dawa Parma,  
and Ganale Doria Rivers

These rivers all flow southeast into Somalia, through an area where there is intermittent warfare.

They were not surveyed but it was learned that they had been hunted between about 1959 and 1963, and that even at that time there was considerable poaching from Somalia. It is doubtful whether these rivers have many crocodiles left.

(d) Omo River

This remote river contains the greatest number of crocodiles to be found in Ethiopia and was surveyed under ideal conditions in December 1967.

The river flows through a deep valley for most of its length before emerging into the open plain and ending in Lake Rudolf. 330 km of river between the Mwi tributary and Lake Rudolf were surveyed. The upper 120 km had never been hunted. A small part bordered an area designated as a game reserve. The lower 210 km had been hunted intensively for four years prior to the survey, and further hunting has been reported since 1968 .

Figures of size distribution clearly show the effects of hunting. For 1 and 2 m long crocodiles there was on average little difference between areas hunted and not hunted (about 40 crocodiles/10 km). However, crocodiles 3 m and over had a density of 35 / 10 km in the area hunted most recently before the survey, 60 crocodiles/ 10 km in an area hunted three years previously, and up to 170 crocodiles/ 10 km in one area not hunted.

On average, for the river surveyed, hunting appeared to have reduced the numbers of crocodiles more than 3 m in length by at least one third.

(( The lower Omo (and Lake Dipa) still contains the highest density of crocodiles in Ethiopia. I spent several weeks there a year ago and 12 ft specimens were quite plentiful -- as were very young ones. Crocodiles there still provide a real tourist spectacle. Unfortunately, hunting pressure is heavy and is likely to be stepped up as stocks elsewhere continue to decline. Melvin Bolton, in litt. 1968. ))

(e) The Baro, Gilo, and Akobo Rivers

These rivers all flow west to the White Nile and are subject to poaching from Sudan.

The Baro River was hunted by various people in the years prior to the survey. It is reported to have few crocodiles left.

The Gilo River was surveyed from a small aeroplane and considerable numbers estimated to be present over a limited area. Further downstream the river enters a swamp and no crocodiles were seen there from the air. Neither were any crocodiles seen in the Akobo River which is entirely a channel through the swamps.

Hunting is reported to have taken place on the Gilo River, both before and after the survey.

(( Crocodiles are still present in small but viable numbers along these rivers. DOFAN hunters were certainly operating on the Gilo earlier this year and I believe they are still doing so. Melvin Bolton, in litt. 1968.))

(f) Blue Nile

This river was surveyed during the rainy season in August and September 1968, with the Great Abbai expedition. The river starts in Lake Tana 6000 ft above sea level. For much of the first 650 km to Sirba it drops rapidly in a deep and inaccessible gorge. Few crocodiles were observed, averaging between 20 and 40 / 10 km in the calmer stretches.

Near Sirba and beyond, the river is calm and very wide but a density of only 30 crocodiles / 10 km was observed.

There were reports of organized hunting from Sudan, by boat as far as Sirba, and by foot as far as Mabil (about 500 km by river from the Sudan border).

No crocodiles longer than 5 m were seen.

### Recommendations

- (i) It was recommended that there should be no hunting during the breeding season and that this should be taken as 1 January to 1 May.
  
- (ii) In general it was suggested that on each river those areas which were best suited to breeding should not be hunted. This usually included lakes and swamps adjacent to the river.  
  
In addition those areas included in Game Reserves should be protected, particularly that part of the Omo River which has never been hunted.
  
- (iii) In the absence of other information on the controlled exploitation of crocodiles, and in view of the hunting that had already taken place, it was recommended that in general for each river, 8% of the population recorded could be shot annually for three years, followed by one year without hunting. (It had been estimated that the natural adult mortality rate was approximately 6% per annum.)  
  
The results of further hunting should be monitored.
  
- (iv) Prior to the survey it was permissible to shoot only crocodiles over 2 m in length, and a flat rate of Eth. \$ 25 per skin was charged as royalty.  
  
It was recommended that crocodiles of all sizes should be hunted and that a new system of royalties should be introduced, charging less for smaller skins, and more for larger skins.
  
- (v) The time of year at which the largest numbers of crocodiles can usually be seen should be ascertained (probably December-January), and the different rivers then surveyed at that time. The survey would probably best be made by aerial photography combined with sample night counts.
  
- (vi) If the crocodile population is to be exploited over a long period of time without severe depiction of numbers, it is probable that the numbers which can be shot annually will be comparatively small.

In view of this, it was strongly recommended that crocodile farming should be practised. If eggs were collected and the young reared in protected surroundings their survival rate could be markedly increased. If after a few years the percentage which would have survived naturally were returned to the river, the surplus could be taken for skins without the river population suffering. To encourage this, it was suggested that no royalties should be payable on skins obtained in this way.

A trial project was carried out in 1963, when 109 eggs were collected on Lake Margherita. Only 34 hatched satisfactorily, and only ten survived their first year of life, but these disappointing results were mainly due to inexperience.

The hot springs on Lake Margherita, Lake Hertale on the Awash River, and Lake Murie on the Omo River were suggested as particularly suitable sites for rearing the young.

(vii) Because of their investment in the tannery and the limited numbers which could safely be shot, it was recommended that DOFAN should be given priority in any concessions.

(viii) Special recommendations for each river:

(a) Awash River

It was suggested that there should be no hunting above Lake Cadebassa and that, although the middle Awash contained most crocodiles, in view of recent hunting it should not be hunted for two years. During this time the lower reaches, excluding the lakes, could be hunted.

(b) Lakes Margherita (Abaya) and Chamo

In view of the extensive hunting and small resulting populations, it was recommended that there should be no further hunting over these lakes.

(c) Webi Shebeli, Dawa Parma, Ganale Doria Rivers

These rivers should be surveyed, preferably by aerial photography, before recommendations could be made.

(d) Omo River

It was recommended that one year should follow without hunting

after which 8% (i.e. approx. 350 crocodiles) could be shot annually for three years .

(e) Baro, Gilo, Akobo Rivers

The Baro and Akobo Rivers should not be hunted.

The Gilo River could be hunted, following a survey to determine numbers.

(f) Blue Nile

No hunting should be allowed on the Blue Nile, and steps should be taken to prevent the poaching.

### Conclusion

Hunting and poaching have greatly reduced the numbers of crocodiles in all but a few areas in Ethiopia.

If, in the long term, the crocodile is to be protected, the number which can be shot each year must be strictly controlled and the results monitored.

The crocodile population will probably be most efficiently exploited by rearing young crocodiles with good quality skins in areas where an abundance of fish is available as a cheap source of food.

Poaching should be stopped where possible. Important breeding areas should be protected. The Omo River east of Mazi should be protected, being one of the few places left in Africa where the Nile crocodile can still be seen in its undisturbed condition.

(( ... I can say that exploitation has not yet gone beyond the point of no return on all Ethiopian waters. ... DOFAN are extremely anxious to locate new hunting areas and I have accompanied them on air surveys of possible rivers. So far no new supplies of crocodiles have been located nor do I believe they ever will be -- in the sort of numbers which DOFAN are seeking. DOFAN are determined that their tannery shall not be idle and I would support the suggestion that they should be allowed to import crocodile skins from other African countries for tanning here, provided that all imported skins are registered with the Wild Life Department so that we still know exactly how many Ethiopian skins are being exported when the Export Licences are issued. Melvin Bolton, in litt. 1968. )) (( The crocodile is considered not to be rare or endangered, but seriously depleted. Brig. Gen. Mabratu Feseha, Head, Wild Life Conservation Department, in litt. 31 March 1971.))

## GABON

### Legal Status

Protected by Decree No 0032/PR/MEF/SF 5234 dated 11 January 1966. Crocodiles are protected not only in National Parks and reserves but also throughout the entire country during the breeding season. However, permits are issued each year for commercial operators.

### Conservation Measures

As above. Previously crocodiles were not protected outside of National Parks and there is no doubt that, but for the protection in the breeding season, they would have been inexorably doomed.

### Reasons for Decline

Commercial exploitation. Over the past few years a quota of 20,000 skins has been exported annually and up to five years ago this figure was higher, but it became clear that it was absolutely necessary to limit the massive slaughter, which was bound to lead to the total extinction of both species. What proportion of C. niloticus is and was included in the quotas is unknown.

### Condition of Habitat

The natural range of C. niloticus extends throughout the country (Iguéla, Sette Cama, Ouanga, Middle Ogooué, Nyanga).

### Remarks

Information from this country is still rather scanty, but it is to be feared that the stocks of niloticus have been decimated and that action

taken by the Government to protect the remnants cannot yet be considered as fully effective.

### References

E. Ossinga, Directeur des Eaux et Forêts, Libreville, Republic of Gabon.

Maurice Patry, Guide de Chasse, B.P. 240, Port Gentil, Republic of Gabon.



## GAMBIA

### Legal Status

None. However, "it is felt that the crocodile population in the Gambia is in urgent need of complete protection, having seriously declined to a very low level over the past three or four decades -- due mainly to incessant hunting for skins ." ... "Happily the Commissioner of Police has seen the 'red-light' and is endeavouring to introduce legislation to give all crocodile species complete protection from hunting, etc. for an initial period of five years -- after which the position will be reviewed." (E . Brewer, in litt. 24 October 1970.)

### Conservation Measures

"It is doubly fortunate for us that ABUKO Nature Reserve is one of the few places left in the Gambia where crocodiles (no C. cataphractus) may more or less be relied upon to make an appearance -- and they are of course strictly protected both from hunters and from disturbance so we have a re-stocking potential there." (Brewer, ibid.)

### Reasons for Decline

"The Nile Crocodile used to be quite abundant but over the last 30 years intensive and constant hunting for skins (and sometimes flesh) by Gambian hunters, the population has become very much reduced and it is possible now to travel by boat from Bathurst to Basse and return by boat and not see a single specimen. They do still occur but are very distinctly 'under pressure' -- to put it mildly." (Brewer, ibid.)

### Condition of Habitat

"C. niloticus is the most common of the three species, all of which occur in the Gambia. The country still provides conditions under which the reptile could flourish -- and the size of the country would make a general survey fairly attainable." (D.M. Diment, in litt. 2 June 1968.)

Remarks

Reference

E. Brewer, Government Forest Superintendent, Bathurst, Gambia.

## GHANA

### Legal Status

"Under the current Ghana Wildlife Act crocodiles receive no protection at all and are classed as vermin and may be killed without licence at any time." (Mrs Anna Merz, in litt. 19 September 1970.)

"The present laws of Ghana (The Wild Animals Preservation Act, 1961) place crocodiles among 'genera as to which measures may be taken to reduce the numbers'. There has thus been no legal protection for crocodiles." (E.O.A. Asibey, in litt. 30 September 1970.)

### Conservation Measures

"Since May, 1970, an attempt has been made to accord them legal protection. There has been no reaction to the suggested amendment to the laws. Unless there is some amendment of these laws the present critical situation may become worse before long. Until the crocodiles are fully protected there is no law to be enforced." ... "It is significant to note that in Ghana all wildlife is to a greater or lesser degree endangered but this Department is not large enough for effective work outside reserved areas. There are even some reserves which have not been manned." (Asibey, ibid.)

"I understand that the Department of Game and Wildlife is pressing to have all three species of crocodile placed on the protected list but as of yet no reply has been forthcoming from the Government. ... All three species are in need of protection and are more likely to receive it if pressure can be brought to bear on the Ghana Government by some external agency such as IUCN." (Merz, ibid.)

I am pleased to add that the Regulation on hunting and capturing wild animals are now in process of revision, and crocodiles are to be placed on the schedule of completely protected species. ((Mrs V.A. Sackey, in litt. 14 December 1970, for Chief Game and Wildlife Officer, Accra.))

### Reasons for Decline

"There are no trade figures for skins obtainable, but I am aware of a lucrative trade in crocodile skins." (Asibey, ibid.)

"Ministry of Trade has a record of one company exporting 28 skins to the Netherlands in 1968." ... "This figure takes no account of the crocodile skins which are made up into handbags, purses, etc. and which are sold inside Ghana." ... "Also there appears to be a considerable but unrecorded trade in skins across the border to neighbouring countries, particularly Togo and Upper Volta." (Mrs V.A. Sackey, in litt. 6 October 1970.)

"It seems they have been decimated both for their meat and by the Hausa traders for their skins. In Kumasi market, however, the 'bush-meat' traders say that they still get about four a month from the Bolgatanga area." (Merz, ibid.)

### Condition of Habitat

"It seems that C. niloticus is the most widespread and common species in Ghana, but does not grow to more than 6 ft (2 m) in length. They used to be seen in considerable numbers in the lagoons and lower parts of the Volta, Winneba and Ankobra Rivers both during and after the war. It appears they are seldom seen now. Ten years ago I saw about 30 in the Tamale reservoir; now there are none. I also saw them in considerable numbers near Bolgatanga and in the sacred pool at Paga. Now there are supposed to be none near Bolgatanga and only four kept as a tourist attraction at Paga. The flooding of the Volta River as a result of the building of the dam at Akosombo has resulted in the creation of a lake of approx. 4 ½ thousand sq. miles, much of the shore line of which is totally uninhabited. The fishermen at Yegi when questioned say there are crocodiles in the lake. ...The creation of the lake could well create ideal conditions for their increase." (Merz, ibid.)

"... used to be found from the coastal lagoons to the extreme north of the country. ... It is sometimes found in isolated ponds and dams. Often local people protect such groups on traditional and religious grounds. As long as this holds, the units will survive but tradition is changing rapidly." (Asibey, ibid.)

### Remarks

### Reference

E.O.A. Asibey, Department of Game and Wildlife, P.O. Box M 239,  
Accra, Ghana.

## HAUTE - VOLTA

### Legal Status

Protected in National Parks and in certain tribal sanctuaries. Not specified in the hunting or fishing regulations.

### Conservation Measures

No conservation measures outside of National Parks, but in some areas tribal peoples protect the crocodile because of superstition and for religious reasons. Also protected in a few lakes as a tourist attraction.

### Reasons for Decline

The crocodile is hunted in most areas by local people, as well as those of neighbouring tribes, because of its valuable skin. The flesh is well liked and the eggs are also collected and eaten. Twenty years ago it was found commonly in all the lakes and rivers, but in recent years has disappeared from most localities.

### Condition of Habitat

Large areas of suitable habitat remain.

### Remarks

No figures are available of animals remaining in the wild state. There have been no suggestions that crocodiles should be protected and no crocodiles are known to be in captivity.

### Reference

B. Roman, Scientific Director, The Marine Research Station, Margarita, Venezuela.

## KENYA

### Legal Status

Crocodile hunting is limited by annual licence to two animals. Licence per animal costs Shs. 50/- and is issued by Game Department.

The crocodile is fully protected in National Parks, Game Reserves, local sanctuaries, Lake Rudolf and Lake Victoria. (M.L. Modha, in litt. 30 December 1970.)

### Conservation Measures

As above.

### Reasons for Decline

Hunting pressure. In the past it was the practice to exterminate crocodiles whenever they began to conflict with human interests. Nearly all the East African population have either undergone this treatment or been subjected to indiscriminate exploitation.

### Condition of Habitat

### Remarks

Lake Rudolf supports the last relatively undisturbed population in Kenya. Distribution and density was assessed by aerial counting -- two total counts carried out in February 1965 and June 1966. A total count was made to provide an index which would be consistent for the whole lake. An estimate of the actual numbers present was then made by correcting the day count by a factor derived from night counts. Density expressed as numbers per mile of shore is useful only for comparative purposes as the animals actually live in the narrow belt made up of the immediate shore and the littoral stretching 100 - 500 yards (90 - 460 m) from land, depending on the degree of shelter. Thus, although crocodiles occur in about 143 sq. miles (370 km<sup>2</sup>) of habitat

(571 x 0.24 miles or 920 x 0.4 km), the majority spend most of the time within 100 yards (90 m) of the shore and thus occupy only 34.3 sq. miles or 85 km<sup>2</sup> (571 x 0.06 miles or 920 x 0.092 km). Applying the latter figure to counts gave a density of about 360 crocodiles per square mile of habitat (or nearly 140 per square kilometre).

The total number of animals estimated to be in the lake in June 1966 was 12,439. This figure was obtained by multiplying the 5,654 animals actually seen by a factor of 2.2, being the average of the two factors obtained from night counts. 79.9% of the whole population occurs on the east shore of the lake, and 52.6% on the north-east section alone. The whole west shore supports only 12% of the population, and the three major islands 8.1%. Densities are high in sheltered water and low in exposed areas, varying from 90 to 1 crocodile per mile.

It is unlikely that on the basis of these figures, a crop of 10% (1200 animals) taken annually (worth approximately 140,000 Kenya shillings or £7,000) would result in any decline in the numbers of the population. But obviously the crop should exploit the population maximally, if at all, and possibly much greater numbers could be taken provided there was an adequate check upon the consequences.

Nevertheless, in overall terms, cropping the natural Lake Rudolf population cannot be regarded as a worthwhile venture in view of the small size of the population, the slow growth rate and low skin value (due to high incidence of 'buttons'), coupled with logistic and administrative problems of such an operation (the eastern shore which holds over 70% of the stock extends beyond the national boundary and the rest is divided between two local authorities). Another important point is that cropping activities must be limited to the quiescent phase of the reproductive cycle, since disturbance at such times as the incubation period might have serious consequences on recruitment. It is possible that a more useful way to exploit these animals is as an egg source.

## References

- M.L. Modha, Research Division, Game Department, Nairobi, Kenya.
- A, Graham. 1968. The Lake Rudolf Crocodile. M.Sc. thesis, University College, Nairobi (unpublished).

## LESOTHO

As far as is known no crocodiles have ever occurred in this country. The crocodile on the Lesotho stamps and the country's emblem does not imply former occurrence; it is the totem animal of the ruling house, the Ba-Koena, who originally came from further north where crocodiles did occur.

A place name, Koeneng, is usually translated as the place of the crocodile and implies former occurrence of the reptile in Lesotho. However, the name Koena means not only crocodile but also the plant 'mint' Mentha spp. which grows in profusion at Koeneng.

The only possible area where the crocodile may have occurred would be in the Orange River system but it is significant that the Bushmen tribes who left behind a comprehensive record of fauna and flora as depicted in their paintings, do not include the crocodile.

### References

Director: Kaffrarian Museum.

Director: Albany Museum.

Dr R. Jubb.



MALAGASY REPUBLIC

Legal Status

None.

Conservation Measures

Due to the popular attitude towards crocodiles, their inclusion among protected species is likely to be difficult. The Council for Nature Protection has suggested that among the measures that might be adopted are:

- (a) Increase in the export tax on skins of less than 35 cm in length from the present 13% ad valorem FOB to 35% in order to direct exploitation towards the larger animals.
- (b) Prohibition of hunting of crocodiles of under 80 cm in length.
- (c) Prohibition of destruction of nests and taking of eggs.
- (d) Fixing of an annual quota for the small-sized specimens allowed to taxidermists only for stuffing.

Reasons for Decline

Hunting, chiefly, also the destruction of nests, strongly reinforced by the anti-crocodile mentality of the Malgaches who class the crocodile as a noxious animal, have led to a serious reduction in numbers.

Condition of Habitat

In the past Sibree (1880) \* spoke of "these unpleasant looking reptiles" as swarming in every river and lake and even in many small pools... "During a journey down the Betsikoka River we saw as many as a hundred in a day, a dozen together being often seen basking ... on a sand bank, while other travellers have seen as many as a thousand in a short space of time.. Voeltzkow (1892) and Osborn (1925) \* also confirmed the very large numbers in the Betsiboka, the former regarding them as perhaps the commonest

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\* See short bibliography at the end of this volume.

vertebrates in the island. The species is still widespread, even in the waters of the high Central Plateau and remained extremely abundant up till about 15 years ago (c. 1955). It is not yet considered to be seriously threatened, but because of its economic importance (skins, taxidermy, tourist attraction, etc.), it will be absolutely essential that the stock be restored.

### Remarks

Statistics of exportation of skins:

<u>Year</u>	<u>Weight</u> (kg)	<u>Value FOB</u> (in FMG)
1957	37,500	838,578.00
1958	40,930	717,341.00
1959	38,761	908,205.00
1960	45,199	1,728,304.00
1961	48,835	2,105,128.00
1962	32,465	1,072,582.00
1963	34,184	1,272,748.00
1964	24,871	1,282,439.00
1965	19,962	867,252.00
1966	18,228	1,222,030.00
1967	14,119	945,947.00
1968	11,281	824,244.00
1969	8,192	705,037.00

### Reference

Ch. P. Blanc, Faculty of Science, Zoological Laboratory, Tananarive,  
République Malgache (pers. comm. 20 October 1970).

## MALAWI

### Legal Status

Protected under the Crocodiles Act (Laws of Malawi) Chapter 66:06, pages 1 - 8 of 1968 (which replaced the Ordinance of 1951).

Crocodiles are regarded as a common resource, the ownership of which is vested in the State. Under Section 3 of the Crocodile Ordinance, no person may hunt, rear, or be in possession of any crocodile or crocodile product, unless he is the holder of a licence. Such licences are issued by the Department of Fisheries, and are valid for specified areas.

### Conservation Measures

Protected in all waters of Malawi but the effect of control measures is uncertain because of the lack of field staff.

### Reasons for Decline

Hunting. During 1969, 404 crocodiles were killed on licence. Of these, 205 were adult (8 ft or 2,44 m in length and over). Exports were valued at £6,244. Licences are issued by the Department for an annual fee of £25 and in 1969/70 there were seven hunters operating.

Prior to this there was considerable trade in small hornbacks. Since 1967, it has been a condition of all licences that no crocodile under 5 ft (1,50 m) in length may be hunted and that no skin of less than 4 ft 3 ins or 129,5 cm in length (which is deemed to be the length of skin obtained from a 5 ft (1,50 m) crocodile) may be sold or exported.

On Lake Malawi there are a number of hotels with bathing beaches, and crocodiles appearing in these areas are shot. Gill net fishermen regard the crocodile as a competitor and doubtless numbers are killed by these fishermen.

### Condition of Habitat

Reed clearance at fishing beaches on Lake Malawi has removed shelter. Drying of Lake Chilwa in 1960 (refilled 1969), due to climatic fluctuations, temporarily removed crocodiles from there. Irrigation schemes at present being planned may reduce swamp areas in the future.

### Remarks

There has been no census of crocodiles in Malawi but it would appear from anecdotal information that the population is depleted (pers. comm. Chief Fisheries Officer). However, the Department still issues licences to hunters.

### References

Chief Fisheries Officer: Ministry of Agriculture and Fisheries, Zomba, Malawi.

Official Ordinance: Chapter 66:06 Laws.

## MOZAMBIQUE

### Legal Status

Completely protected within the Gorongosa National Park, the Maputo Elephant Reserve; also protected along a section of Lake Nyasa, and in southern Mozambique as defined in Official Bulletin No 17, Series I, of 1967, which came into operation in September 1967 .

In the southern area of Mozambique no crocodile below 1,50 m in length may be hunted or molested. During the period September to March inclusive, no crocodiles may be hunted in southern Mozambique.

### Conservation Measures

Protection is adequate only within the Gorongosa National Park and the Maputo Elephant Reserve. Hunting takes place freely in areas bordering these parks.

The Department of Fauna and Veterinary Services issues licences to hunt crocodiles. During 1968, 49 licences were bought by hunters and during 1969, a further 38 licences. The Department keeps no records of the number of crocodiles shot or captured under permit. The entire country is patrolled by only a few conservation officials and policing is hopelessly inadequate. Technical aid was given to the Department to start a rearing station but lack of finance, staff and official support, has not encouraged development.

### Reasons for Decline

Commercial hunting is a full time occupation with hunters who regularly take out licences. In addition, tribal peoples hunt, kill or trap crocodiles because of the damage caused to fishing gear, possible danger to livestock and humans and for medicinal reasons.

Licensed hunting and illegal poaching along the Usutu River, which rises in Swaziland and then forms the border of Natal and Mozambique, and also in the Umbeluzi and Inkomati Rivers flowing from Swaziland into Mozambique, is severe.

### Condition of Habitat

Enormous tracts of suitable habitat may still be found. There is no immediate danger of this deteriorating.

### Remarks

The Department concerned with wildlife has adopted the policy that it need only safeguard wildlife within its declared sanctuaries. Hunting of all species of wildlife is allowed because of revenue earned through licence fees and hunting concessions.

The Department is concerned by the drastic reduction in crocodile populations but unwilling to impose a total ban on hunting in some areas, although this is necessary. The decision to ban crocodile hunting would be unpopular because a number of people involved in the trade would be unemployed. It is suggested that any approach to improve the legal status of the crocodile would have to be made via Portugal and through Government; the main reason being that some of the officials in Mozambique have private interests in the crocodile skin and curio trade.

### References

Personal investigations at the request of the Director, Veterinary and Faunal Services.

Correspondence and interviews with the Director and Chief Fisheries Officer.

Ecologist, Gorongosa National Park.

Official Ordinances.

## NIGERIA

### Legal Status

None of the crocodile species are protected in the Wild Animal laws of Nigeria, and no protection is contemplated. In reserved areas (e.g. Yankari, Borgu and Upper Ogun Reserves) all species are protected.

### Conservation Measures

As above.

### Reasons for Decline

There is a considerable trade in crocodile skins and leather work (bags, cases, etc.). Most are sold by Hausa traders from N. Nigeria. Probably some of the skins originate in Nigeria, but undoubtedly others are imported from Niger, Upper Volta, and Cameroons. However, there is no way of knowing their origin.

### Condition of Habitat

Many specimens brought to the Ibadan University Zoo came from the region of Oyo southwards, extending towards Abeokuta. Others have come from the mid-west. Crocodiles are probably scattered throughout Nigeria, although it is unlikely that they are common.

### Remarks

In various parts of Nigeria, crocodiles are kept in enclosures in villages and towns. This is probably because of interest and curiosity, but also because of the supposed magical properties of the crocodile.

### Reference

D. C. D. Happold and R. R. Golding, Department of Zoology, University of Ibadan, Ibadan, Nigeria (pers. comm. 19 January 1971).

## RHODESIA

### Legal Status

The crocodile is scheduled under the Wild Life Conservation Act: Chapter 199, of 1961, which covers Game Reserves, Private Game Reserves, Non-hunting Reserves and Controlled Hunting Areas.

The animal is completely protected in Game Reserves but hunting is allowed and controlled by permit in certain areas. A resident may pay a licence fee of £ 1 per animal to kill a maximum of 2 per year. A non-resident's fee is £2 per animal.

Export and Import of animals, trophies and meat without a permit is prohibited. The capture of live animals for rearing or display purposes requires a permit and the harvesting or collection of eggs is prohibited without permit.

### Conservation Measures

The Department of National Parks and Wildlife Management allows a number of commercial crocodile farms to operate. The object of allowing commercial farming is:

- (a) To increase the existing populations of crocodiles in the wild state by releasing three-year-old animals that are not likely to be killed by predators. By doing this it is hoped to increase the normal survival rate of 2 to 5% in the wild state, to 10%.
- (b) To create a profitable industry and a steady supply of legitimate skins to discourage illegal hunting.

The farms operate under permit with the following conditions:

- (a) The individual farmer is granted a permit to collect a maximum number of 2000 eggs per annum from a specified area.
- (b) The holder of the permit must release 10% of the total number of eggs collected, i.e. 10% of 2000 eggs (200 live crocodiles) three years from date of collection. The crocodiles are released under supervision of a conservation officer in waters in the area where eggs were collected.
- (c) The holder of a permit submits monthly returns furnishing full information as to the number of eggs collected, deaths, the number slaughtered and the number of live animals on hand at each month end.



- (d) The farm may be inspected at any time by a conservation official and should a permit holder not comply with conditions laid down by the Department, his permit may be cancelled. Permits are not transferrable.

In addition to protection within the Game Reserves a large staff of conservation officers in the field patrol and conduct anti-poaching operations. These officers endeavour to capture and remove problem crocodiles wherever possible (thirty problem animals have been captured as at January 1971 and successfully translocated).

### Reasons for Decline

Prior to 1961 and the introduction of the Wild Life Conservation Act, the crocodile was not classified as Game and the only restriction on hunting was the permission of a landowner. The animal was hunted freely on private land and farms and in most native areas. Permission was granted because the animal was considered a danger to humans and livestock.

There was no restriction on the sale of skins and many professional hunters operated, particularly along the Zambezi River. No records are available to indicate numbers shot, or trapped by natives.

The damming of the Zambezi River to form Kariba Lake has certainly had an effect on breeding because of unseasonal flooding or spillage from the dam. This section of the river harboured the largest remaining concentrations and as the level of the lake rose, ancestral nesting sites were inundated. Of great importance is the fact that Rhodesia shares rivers and borders with four other countries -- Botswana, South Africa, Zambia, Mozambique. Illegal poaching is thus almost impossible to control.

### Condition of Habitat

The remoteness and inaccessibility of some stretches of rivers is largely the reason why crocodiles were not completely exterminated outside of Game Reserves, and today large areas of suitable habitat still remain.

### Remarks

Since crocodile farming was first allowed under permit, in 1965, six farms commenced operating. Some have changed ownership several times. Two of these farms are still operating with possibly a completely new farm (the seventh) to be built soon.

Four of the farms that closed down did so because of lack of finance, loss of interest or because of heavy mortality from disease.

No population figures are available for Rhodesia or Lake Kariba where all the farms were situated and little is known about general ecology or breeding biology of the crocodile on this lake.

It is considered that the Wildlife Department is unwise to issue permits to collect several thousand eggs annually, without knowledge of the breeding potential of the area, or of the disturbance factors involved in repeatedly raiding nests.

### References

Personal visits to some of the Game Reserves and all of the commercial crocodile farms.

Discussions and correspondence with Chief Research Officer and staff of Wildlife Department.

Examination of Game Ordinances.

Report on Crocodile Farming in Rhodesia prepared by the Department of Wild Life Management (1970).

Attwell, R.I.G. 1970. Some effects of Lake Kariba on the Ecology of a floodplain of the Mid-Zambezi Valley of Rhodesia. Biol. Cons. Vol.2, No 3.

Oryx X, No 6, December 1970; p. 361 (report of crocodile translocation by Rhodesian Wild Life Management Department).

## SENEGAL

### Legal Status

In the greater part of the country the crocodile is unprotected, though the hunting of it is controlled, being subject to a licence issued by the Service des Eaux et Forêts under Article D. 6 of the Hunting and Fauna Protection Law. The killing of crocodiles measuring less than 19 cm in breadth, or at the widest point between the horny flank scales, is forbidden. A register is maintained of the Permits issued each year. Crocodiles are of course fully protected in National Parks, strict nature reserves and forest reserves.

### Conservation Measures

As above.

### Reasons for Decline

Due to the exploitation of and trade in skins, even though these activities are strictly controlled under the Hunting and Fauna Protection Law. The figures for the export of skins from Sénégal in recent years are:

<u>Year</u>	<u>Skins</u>
1961	9,680
1962	31,329
1963	33,915
1964	34,259
1965	14,192
1966	11,194
1967	8,596
1968	6,284
1969	4,218

The significant fall in the number of skins registered for export in the last three years for which figures are available is basically due to the

closing of the frontiers by the Customs authorities to the former traffic in skins imported from Guinea, Mali and the Gambia.

#### Condition of Habitat

The two species which occur in Sénégal, C. niloticus and C. cataphractus, (unfortunately the information available does not distinguish between them) are still generally distributed along the Sénégal, Falémé, Gambia and Casamance Rivers and various smaller rivers and tributaries. The total population is rated as slightly reduced and at present thought to consist of about 30,000 individuals (less than the number of skins annually exported from 1962 to 1964).

#### Remarks

#### Reference

Mr Baba Dioum, Directeur, Département des Eaux, Forêts et Chasses,  
B. P. 1831, Daka, Sénégal (in litt. 14 December 1970).

## SIERRA LEONE

### Legal Status

In 1967, shortly before the N.R.C. military government assumed power, a bill entitled The Wild Life Conservation Act 1967 appeared as a supplement to the Sierra Leone Gazette (Vol. 98, No 31 of 30 March 1967). It listed the crocodile (unspecified) as a Game Animal and Dangerous Animal (in contrast with the Monitor Varanus, which was classified as a 'Prohibited' (=? protected) Animal). However, there is no evidence that the Bill ever became law or that protection of any sort has been extended to crocodiles.

### Conservation Measures

Even if protective legislation existed or was enacted, it would at present be ineffective in view of the ignorance about conservation on the part of 90% of the people and the lack of game rangers and police to enforce and explain the need for it (a situation which cannot be rectified at present because of the lack of funds).

### Reasons for Decline

In West Africa, reptiles are things to be feared and indiscriminately killed -- sometimes the skin may then be used, but this is not the original motive for slaughter. No statistics or the number of crocodiles hunted, killed, exported etc. are maintained.

### Condition of Habitat

*C. niloticus* is the common species (no records of cataphractus have been traced), both in the peninsula and up country, but no information is available on its numbers or ecology.

### Remarks

### Reference

Dr Jennifer Owen, Department of Zoology, the University, Freetown, Sierra Leone (in litt. 13 July 1970).

REPUBLIC OF SOUTH AFRICA

CAPE PROVINCE

Legal Status

All reptiles are automatically protected by the Cape Provincial Ordinance Nature Conservation Laws. The crocodile is, however, now extinct in the province.

Conservation Measures

No attempt has ever been made to re-introduce the species.

Reasons for Decline

Exterminated by early settlers. The species apparently never ever occurred plentifully and it is thought that climate and other conditions were never suitable for crocodiles.

The last specimen known to have been shot was in 1903 at the mouth of the Mncwassa River, Elliotdale District (32° 05' S. 29° 05' E.).

Prior to 1903, occasional specimens were recorded from the Keiskamma River mouth (76 km west of East London). An early painting of 1865, by Bowler and Thomson, depicts a crocodile in the Keiskamma River and a single tooth of a crocodile from this locality is in the Kaffrarian Museum, King William's Town. A skull of unknown antiquity from Uitenhage is in the Albany Museum, Grahamstown.

Condition of Habitat

Poor. It would not be practical to re-introduce the species into Cape Province. Climatic conditions are not always favourable and human pressure along the rivers is very concentrated.

Remarks

The scarcity of records seems to indicate that the few specimens recorded were well beyond the normal range.

References

Director: Kaffrarian Museum.

Director: Albany Museum.

Dr R. Jubb.

Director: Natal Museum.

Director: South African Museum.

Port Elizabeth Snake Park.

J . Hewitt, 1937. A guide to the vertebrate fauna of the Eastern Cape Province. Vol. 2, p.1.

## PROVINCE OF NATAL

### Legal Status

Protected throughout the province under the Reptiles Protection Ordinance, No 32 of 1968 (commenced 24 April, 1969).

Prohibits the killing or capturing, or export of crocodiles dead or alive, and including the skins and hides thereof, without a permit.

Provision is allowed for a landowner to kill a crocodile in defence of life or property.

An import prohibition clause will soon be added to this Ordinance.

### Conservation Measures

Protected completely throughout the province but the only areas remaining which harbour concentrations of crocodiles are the major game reserves as well as certain areas under the administration of the Departments of Lands, Forestry and Bantu Affairs.

A large staff of conservation officers regularly patrol most of the areas, checking on all forms of poaching and hunting.

A crocodile rearing station was established in the Ndumu Game Reserve in 1967. To date 520 crocodiles have been reared and distributed to chosen habitats within the game reserves under the control of the Natal Parks Board. This rearing station is to be enlarged and young crocodiles will be available for any country requiring them for restocking purposes.

Breeding grounds are mapped, population counts undertaken and data collected on the ecology of the crocodile, including research on methods of rearing crocodiles.

In addition to introduction of protective legislation and research, education is considered to be very important. For this purpose, articles and photographs are prepared for release to newspapers, magazines and journals; and radio programmes, aimed at stressing the importance and value of this animal, have been broadcast.



The crocodile was classed as vermin until recently. It is therefore encouraging to note that 20 were recently bought by a farmer for the purpose of restocking dams on his farm.

### Reasons for Decline

The crocodile occurred along much of the Natal coastal region in former times, a distance of some 300 miles between the Umtamvuna River (the Cape Province/Natal border) to Kozi Bay, bordering Mozambique.

Early settlers exterminated crocodiles along the Natal South Coast (Umkomaas River: 1868; Urngeni River, north of Durban: 1824). Today it is rarely found south of the Tugela River (Natal/Zululand border).

Prior to the introduction of the Reptiles Protection Ordinance, commercial hunters took a heavy toll on crocodile populations on the borders of game reserves where the main concentrations were found. Poaching and snaring by local indigenous peoples for medicinal purposes, and in defence of livestock, as well as indiscriminate hunting by sportsmen and farmers helped to reduce populations. Commercial hunting in the Usutu River, on the Natal/Mozambique border, is inconstant drain on populations otherwise protected in the Ndumu Game Reserve bordering this river.

### Condition of Habitat

Deterioration of habitat has recently been an important factor in reducing numbers. High salinity levels of Lake St Lucia, which contains the largest concentrations of crocodiles in Zululand, caused the death of 40 adult crocodiles recently.

It was necessary to capture the 40 remaining adult crocodiles from the Mkuzi Swamps area of St Lucia (September 1970) and these were airlifted some 40 miles further down the Lake, to the only freshwater stream flowing into the Lake. Over the past two years, breeding success has been very poor because of adverse conditions for crocodiles and most forms of life. The species was so abundant in 1957/1958, that numbers had to be destroyed in the vicinity of rest camps situated along this lake.

Habitats within the other game reserves are at present stable. However, the development of Richards Bay into a harbour and industrial centre eliminates a habitat which otherwise could have been restocked.

Remarks

The total adult population in Natal is considered to be less than 800 animals, found mainly in the Umfolozi, Hluhluwe, St Lucia and Ndumu Game Reserves, as well as in other lakes and river systems not well patrolled.

References

Records of Natal Parks, Game and Fish Preservation Board,  
Discussions with past and present members of staff.  
Personal research in Zululand.

## PROVINCE OF TRANSVAAL

### Legal Status

Classed as a wild animal under Schedule III of Ordinance 17 of 1967, and received protection to a degree under this Ordinance, as well as No 22 of 1968 and No 7 of 1969.

Landowners may hunt crocodiles without a permit on their property. Non-owners may hunt on the same basis, providing they have written permission from the landowner.

No person may possess, sell, buy, donate, receive consequent upon a donation, convey, keep in captivity or be in charge of any live crocodile, without being the holder of a permit.

No person may export or remove any animal from the province without a permit.

### Conservation Measures

Completely protected in all proclaimed National Parks, nature reserves and private game sanctuaries. A large staff of Nature Conservation Officers are responsible for patrolling the entire province. As is the case in other provinces and countries, the police are empowered to enforce game regulations .

### Reasons for Decline

Protective legislation for this animal is comparatively recent and, because of this, hunters have operated extensively along the major rivers . The position is complicated in that several larger rivers rising in the Transvaal, flow through protected areas and then into Mozambique: for example, hunters operated along the Crocodile, Sabie, Sand, Olifants, Letaba, Levubu and many smaller rivers and streams. The Limpopo River is another example as it is shared by Botswana/Rhodesia/Transvaal/Mozambique. Four different sets of regulations thus apply to crocodiles occurring in this river.

Within the Kruger National Park, and during the early days of its existence, carnivores were 'controlled' in the belief that this would promote a

healthy predator-prey relationship: crocodiles were shot at every opportunity, particularly in the period 1933 to as recently as 1960.

### Condition of Habitat

There are only a few rivers remaining in the Transvaal, outside protected sanctuaries, that are still suitable for crocodiles. Extensive irrigation schemes, dams, and water use for industrial needs have largely affected the present day habitat and distribution of this animal, and numbers certainly have been considerably reduced.

Within the Kruger National Park, which covers an area of 7340 sq.miles (19,000 km<sup>2</sup>), the species is found along all the perennial rivers and in most permanent waterholes, as well as in dams and water courses on private sanctuaries.

### Remarks

No data are available on former distribution, and no past or present population estimates. As in most countries, crocodile populations are confined to the National Parks or game reserves by virtue of the fact that they may be shot in defence of life or property outside these sanctuaries. This means that there is a constant drain on the population of such a sanctuary.

### References

Director: Department of Nature Conservation.

Game Conservation Ordinances.

Personal observations.

Pienaar, U. de V. 1966. The Reptiles of the Kruger National Park.

1969. Predator Prey relationships amongst the larger mammals of the Kruger National Park. Koedoe, No 12.

Stevenson-Hamilton, J. 1947. Wildlife in South Africa.

## SOUTH WEST AFRICA

### Legal Status

No permits are issued by the Department of Nature Conservation for hunting crocodiles. The species occurs in the Kunene and Okavango Rivers and is fully protected where it occurs.

The Game Ordinance 31 of 1967, regulation Chapter 7 states that a permit is required to keep crocodiles in captivity and lists specific dimensions permissible for pens. The crocodile is not classified in any other way, nor does it benefit by any legal protection under Ordinance 31 of 1967. However, poachers are fined heavily when they are caught.

### Conservation Measures

No conservation measures other than the normal routine patrols carried out by field officers. The species is considered to be endangered in South West Africa.

### Reasons for Decline

Poaching along the rivers where it occurs, particularly on the Angola border.

### Condition of Habitat

The greater part of the course of both the Kunene and Okavango Rivers is suitable habitat as well as some sections of smaller rivers.

Remarks

The Department of Nature Conservation considers this animal to be an endangered species where it still occurs along certain stretches of the Kunene and Okavango Rivers. No census figures are available, past or present.

References

Director: Department of Nature Conservation.

The Ecologist and Chief Nature Conservator (pers. comm.).

## SUDAN

### Legal Status

There was no legal protection for crocodiles before 1970. Commercial hunters were operating actively while the international markets were ready to accept any quantity of skins.

In September 1970, the crocodile was listed under Schedule III of protected wild animals in the Ordinance, where its killing is subjected to permission from the Director of Game and Fisheries Department.

### Conservation Measures

As above.

### Reasons for Decline

Crocodile populations have to be seriously depleted and this seems to have begun at least twenty years ago. Thus -- " On a 75 mile stretch of the Nile north of Malakal and south of Khartoum in 1948 50 crocodiles might be seen in a day's passage. In 1952 you may do this journey and see none. Crocodiles are being hunted for skins, marketed to Paris, having been killed with spears, clubs, or fowl-hooked on lines. The small skins were more in request than large skins -- the size preferred for export being about one metre in length." (R.E.Taylor, Fisheries Officer, Sudan, pers. comm. 15 October 1952).

### Condition of Habitat

Unknown.

### Remarks

### Reference

Mr Hassan M. Abdel Bagi, Game and Fisheries Department, Khartoum, Sudan (in litt. 2 February 1970).

## SWAZILAND

### Legal Status

Protected only in the two small sanctuaries that exist in this country. There is no Game Conservation Department and conservation in the whole country is controlled by one European, who is directly concerned with building and establishing these small sanctuaries, proclaimed in 1966 (General notice No 4). The crocodile is not mentioned in the existing Game Regulations (Chapters 195 and 198 of the Laws, 1960) and may be freely hunted.

### Conservation Measures

No conservation measures exist except in the two sanctuaries where a few crocodiles have been introduced during the past two years (1969 and 1970).

### Reasons for Decline

Extensive hunting which has taken place freely and still continues to take place, in addition to the capture of live young for sale by commercial hunters. No records are available to indicate former distribution or abundance. One hunter interviewed had shot 88 adult crocodiles in a year on the Usutu River. Crocodiles are also killed by trapping or snaring methods by indigenous people, because of the possible danger to livestock and humans and for medicinal reasons.

### Condition of Habitat

Large tracts of suitable habitat have been cleared in recent years for agricultural development and much destruction of riverine habitat has taken place. Sections of the Usutu, Umbeluzi and Komati Rivers are still, however, suitable.



### Remarks

Swaziland is apathetic towards conservation. Of the two recently proclaimed sanctuaries, one was a privately owned farm turned into a game reserve by its owner; the second was a farm recently bought by the S. A. Wildlife Foundation for conservation purposes, to try to stimulate the interest of the local governments and people. : .

The indigenous people fear the crocodile because of the danger to humans and livestock. Any measure to introduce protection would be unpopular .

### References

Personal interviews with the only conservation official.

Examination of existing game Regulations.

Observation in the territory.

## TANZANIA

### Legal Status

Crocodiles are protected specifically by the following subsidiary legislation under the Fauna Conservation Ordinance Cap. 302 of the Laws:

- i. Government Notice No 183 of 1959
- ii. Government Notice No 184 of 1959
- iii. Government Notice No 21 of 1960.

The text of these three Orders is as follows:

i. The Fauna Conservation (Hunting of Crocodiles)  
(Prohibition) Order 1959

1. This Order may be cited as the Fauna Conservation (Hunting of Crocodiles) (Prohibition) Order 1959.
2. The hunting of crocodiles is prohibited in the areas specified in the Schedule hereto except with a permit issued under Section 19 of the Fauna Conservation Ordinance.

### Schedule

#### Areas in which the Hunting of Crocodiles is Prohibited

1. The open waters of Lake Rukwa and its affluent rivers within ten miles of the high water mark of the said lake.
2. That part of the Rukwa River and its tributaries lying in the Southern Highlands Province.
3. That part of the Kilombero River and its tributaries lying in Ulanga District.
4. The Kagera River and its tributary lakes and rivers in Karagwe and Bukoba Districts .

ii. The Fauna Conservation (Hunting of Crocodiles)

(Permits) Order 1959

1. This Order may be cited as the Fauna Conservation (Hunting of Crocodiles) (Permits) Order 1959 and shall apply to all areas in which the hunting of crocodiles is from time to time prohibited by order made by the Game Warden under subsection (4) of Section 35 of the Fauna Conservation Ordinance.
2. Every permit to kill crocodiles issued under the provisions of Section 19 of the Fauna Conservation Ordinance shall be in the form set out in the First Schedule to this Order and shall be subject to :
  - (a) The General Conditions set out in the Second Schedule to this Order; and
  - (b) such special condition as may be imposed by the Game Warden and set out in such permit.
3. The Game Warden may endorse on any such permits a memorandum disapplying any of the General Conditions set out in the Second Schedule in respect of that permit.
4. A fee of ten shillings shall be payable at the time of issue of every such permit in respect of every crocodile the killing of which is authorized by such permit.

Provided that the fee thus paid shall be refunded in full in respect of any crocodile which the holder of the permit fails to kill during the validity of the permit.

iii. The Fauna Conservation (Hunting of Crocodiles)

(Prohibition) Order 1960

1. This Order may be cited as the Fauna Conservation (Hunting of Crocodiles) (Prohibition) Order 1960.
2. The hunting of crocodiles is prohibited in the area bounded by the high water level of Lake Maliwe in the Kilwa District, except with a permit issued under Section 19 of the Fauna Conservation Ordinance.

As can be seen from the texts, no limit used to be set on the number of crocodiles one could kill provided the regulations were observed, but according to Mr Myles Turner (pers. comm. 7 October 1970) a subsequent revision of the Game Ordinance in 1970 limited the number of crocodiles on a hunting licence to ten at a fee of twenty shillings each.

### Conservation Measures

Despite the legislation, the actual protection afforded to crocodiles is seriously affected by lack of sufficient staff and equipment. Complete protection is of course, given in the National Parks, Game Reserves and Controlled Areas.

### Reasons for Decline

As long ago as 1954, as recorded in the journal 'East Africa and Rhodesia' of 17 January 1957, p. 277, a decline had been noted in Kenya and traders were alarmed: the 1954 figures for the value of skins exported were: Tanganyika £146,206, Uganda £44,552 and Kenya £39,009, representing about 60,000 crocodiles shot. In general, uncontrolled and sometimes illicit exploitation decimated the stocks in the ten to 15 years following World War 2 and the scarcity of crocodiles makes hunting no longer profitable. The details available for various areas are as follows:

#### Lake Rukwa and Ruaha Valley

Formerly very abundant in Lake Rukwa (Elton 1879)\*; one European hunter killed several thousand a year, but by 1959 his licence was for 750 only and local inhabitants were allowed a further 750, the situation being described as 'very serious'. Many were killed while aestivating in caves in a torpid condition. Mr Miles Turner estimated (pers. comm. 7 October 1970) that a total of 35,000 crocodiles had been taken from the Lake and stated that hunting was no longer economic. The value of the industry in the 'Southern Highlands Province' as a whole (Game Dept Annual Report 1955-56) was estimated as "at least £30,000 and possibly as high as £70,000"; there was considerable illicit hunting on the Great Ruaha, from which 3000 skins went out through Mbeya alone.

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\* For references see bibliography at the end of this volume.

Kilombero River

In 1955-56 (Game Dept Annual Report) one European was reported as buying 400 skins per month in the Ifakara area and estimating this as about half the total off-take from the river.

Pangani River

The former large population of crocodiles had been almost eliminated by hunters by 1955-56.

Ugalla River

Only a few crocodiles left by 1970.

Kagera. River

All large crocodiles had been taken by about 1957, and breeding had apparently ceased (Boyle, 1958)\* .

Lake Victoria

Still numerous in places (e.g. Emin Pasha gulf, near Mwanza; near Nyamirembe on S.W. shore of the Lake, etc.) in 1949; most had disappeared by 1952, when hunting was beginning to be abandoned, and by 1955 it had come to a standstill. Lucas (in litt. 9 September 1955) considered there were only five left within 50 miles of Mwanza and no more than 50 in the whole Tanzanian sector of the Lake. Only on the Grumeti River flowing into the Lake on the east from the Serengeti National Park, Turner (in litt. 21 August 1959) reported that some exceptionally large crocodiles still existed (one of 18' 2" -- 5.49 m) had been shot there many years previously) and found evidence of breeding (a large female accompanied by ten young of about 35 cm in length).

Condition of Habitat

Large areas of suitable habitat still remain,

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\* For references see bibliography at the end of this volume.

Remarks

The latest (1970) situation in the whole country is summarized by the Game Department in the following Table:

<u>Region</u>	<u>River or Lake</u>	<u>Status</u>	<u>Reasons for Decline</u>	<u>Protective Measures</u>
Mbeya	Ulanga	Present	Hunting	Complete protection in Utengule Swamps
	Kiwira	"	"	Hunting regulated
	Mbaka	"	"	" "
	Lufirio	"	"	" "
	Songwe	"	"	" "
	L. Rukwa	"	"	Hunting prohibited L, Rukwa. Controlled area.
	L. Nyasa	"	"	Hunting regulated
	Momba	"	"	" "
-----				
Iringa	Ruaha (in Nat. Park	Abundant	--	Protected within Ruaha National Park
	Little Ruaha and Lukosi	Almost extinct	Hunting and poaching in last 10 yrs	Hunting regulated
-----				
Dodoma	Ruaha	Very few	Heavy hunting in last 25 yrs	Hunting completely prohibited
-----				
Tabora	L. Chada	Present	--	Well protected as both localities are in Katavi Game Reserve (Anti-poaching patrols)
	Ikuu	"	--	
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<u>Region</u>	<u>River or Lake</u>	<u>Status</u>	<u>Reasons for Decline</u>	<u>Protective Measures</u>
Kigoma	Malagarasi	Present	Hunting	Hunting regulated
	Rugufu	"	"	" "
	L. Tanganyika	"	"	" "
-----				
West Lake	Kagera	Present	Hunting and poaching	Anti-poaching patrols
	Ruvuvu	"	" "	" "
	L. Rushwa	"	" "	" "
	L. Victoria	"	" "	" "
-----				
Mwanza	L. Victoria	Present	Heavy poaching	Anti-poaching patrols
-----				
Musoma	Mara	Present	--	Completely protected within Serengeti National Park
	Grumeti	"	--	" "
	Orangi	"	--	" "
	Barageti	"	--	" "
	Rubana	"	--	Hunting regulated
-----				
Arusha	Ruvu	Almost extinct	Hunting and poaching	--
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Kilimanjaro	L. Jipe	Very few	Heavy hunting in last 3 yrs	Hunting completely prohibited
	Ruvu	" "	" "	" "
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<u>Region</u>	<u>River or Lake</u>	<u>Status</u>	<u>Reasons for Decline</u>	<u>Protective Measures</u>
Tanga	Ruvu	Very few	Hunting and poaching	Hunting regulated
-----				
Morogoro	Ruaha	Abundant	--	Regulated off-take in Selous Game Reserve
	Rufiji	"	--	
-----				
Coast	Wami	Present	Hunting and poaching	Hunting regulated
	Rufiji	"	" "	" "
-----				
Mtwara	Matandu	Present	Hunting and poaching	Hunting regulated
	Mbemkuru	"	" "	" "
-----				
Ruvuma	Ruvuma	Present	Hunting and poaching	Hunting regulated
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### Reference

Chief Game Officer, Game Department, Dar es Salam, Tanzania (in litt. 19 December 1970).



TCHAD

Legal Status

1. Ordinance 32 of 1965 for the control of the hunting of reptiles and the export of their skins is repealed and replaced by the following provisions:
2. Except for the controlled provisions described in Articles 5,6,7,8, the capture of reptiles for the sale of skins is free for all Tchad nationals.
3. Collectors of skins and agents must be licensed; they must make annual application to the Department of Forestry and Water Affairs in the district where they are carrying on their business .
4. A killing tax is levied on skins that are exported. This tax is payable by the exporter to the account of the Provincial Authority, Forestry Service or Customs, on submission of the permit issued by the representative of Forestry and Water Affairs. The exportation of reptile skins is permissible only through Fort Lamy or Fort Archambault aerodrome.
- 5, The hunting of reptiles is strictly forbidden in National Parks and Nature Reserves under the control of the conservation authority.
6. Crocodile hunting remains forbidden north of 16° N, which is in the district of B.E.T. and vicinity. It is also not allowed for a period of two years from 1 January 1968 in the waters of the districts of Bongor and Moundou.
7. No person may capture or export any skins of less than the following minimum sizes:

Monitors and lizards	20 cm total length.
Crocodiles	25 cm ventral size measured between the hornscales of the two sides.
Pythons	1,50 m in length.

8. Collecting of reptile eggs is forbidden throughout the Tchad Republic.
9. The capture of these animals or their possession or exportation alive is governed by the provisions of Ordinance 14 of 1968.
10. For 1968, the tax for killing reptiles shall be:

Monitors and lizards	10 F
Pythons	40 F
Crocodiles	100 F

The tax will be the subject of annual review.
11. Skins below the size shown in Article 7 will be confiscated.
12. Contraventions of this Ordinance will entail penalties fixed by Ordinance 14 of 1963.
13. After 31 December 1969, any renewal of measures for the protection of crocodiles will be subject to the advice of the National Committee for Nature Protection.
14. Three Ministries are charged with the implementation of this Ordinance.
15. This Ordinance will appear in the Official Gazette.

#### Conservation Measures

Protected in National Parks, as above,

#### Reasons for Decline

Hunting to satisfy demand for skins. It is estimated that about 30% of the skins exported are done so illegally. There are three licensed dealers (French) who hold the monopoly of the export trade. Some figures of the business done by one of these dealers shows that during the years 1966 to

1970, he exported 21,159 skins. It is considered that the remaining two dealers handle about the same numbers of skins. During the period 1951 - 1954 these dealers exported a minimum of 100,000 skins.

One of the problems is the illegal trade with neighbouring countries such as Central African Republic, Cameroun, Nigeria and Niger.

In 1940 or thereabouts, the crocodile population of Tchad could be estimated at more than several hundred thousand and perhaps as many as one million individuals. It is considered that 90% of the population has now gone (1970).

### Condition of Habitat

Still entirely satisfactory. The two main rivers Chari and Lagone, with all their tributaries, that flow into Lake Tchad, as well as other lakes such as Iro, Fittri, Lere, Tickem, and Fianga, provide ideal ecological conditions at present.

The process of increasing desert conditions, moving down from the north, poses some eventual threat to the southern parts of the country.

### Remarks

Total protection for five years has been sought several times by the conservation body, without success (it ought to be 20 years). On the one hand there are those who feel that Tchad must export all those riches which can bring in a measure of income even if small and temporary. On the other hand there is effective opposition of the commercially interested who are against all conservation.

From the 21,159 skins handled by the one dealer between 1966-1970, an amount of 2,115,900 F was paid in hunting licences and 5,057,480 F in customs charges.

### Reference

M. Anna, Director, National Parks, Fort Lamy, Republic of Tchad.

## TOGO

### Legal Status

No law or regulations provide protection. In Ordinance No 4 of 16 January 1968, which governs the protection of fauna and the conduct of hunting in Togo, the crocodile is included in the list of predators, of which the killing is normally allowed in inhabited and agricultural areas, under the conditions laid down for customary hunting, that is to say by holders of all types of hunting licence or in defence of cultivation or domestic stock; it is subject to regulation only in zones set aside for the protection of fauna. These provisions are based on the thesis that all crocodiles, especially *C. niloticus*, are dangerous to mammals including man.

### Conservation Measures

None, outside the faunal reserves.

### Reasons for Decline

Although not yet considered to be on the way to extinction, crocodiles have certainly suffered a marked decrease in the last 12 years and, particularly, in the last five. This is because, although formerly left in relative peace, since the local riverine people did not eat their flesh and in many areas held them in awe, except when certain individual animals showed themselves to be dangerously disposed towards the villagers who then banded together to rid themselves of the pest, the immigration of a large number of Yoruba and Hausa settlers has entirely altered the situation. Some of these eat crocodile meat and others have organized a trade in the skins, which were previously of no commercial interest to the indigenous inhabitants.

### Condition of Habitat

Despite the slaughter of thousands of crocodiles in recent years, many lakes, lagoons and rivers still support a stock. Apparently most rivers in the north of the country dry up for 5-7 months a year.

Remarks

1000 crocodiles are thought to survive. About ten are known to be in captivity, but are destined for sale to skin merchants or for research, some interest having also been shown in breeding in captivity for these purposes.

Reference

Mr B. Gnrofon, Ingénieur des Eaux et Forêts, Lomé, Togo (in litt.  
14 December 1970).

## UGANDA

The material on this country falls into two parts, mainly referring to the 'Reasons for Decline' and 'Condition of Habitat'; the first part reviews the past and present situation in the various waters; the second comprises a summary of the recent review of crocodile distribution and status by Parker & Watson (1969). Details of this and other sources of information are given in the supplementary bibliography at the end of the volume.

### Former Distribution and Present Status

#### Lower Semliki River

A dozen on sandbank near camp. Six shot one after the other. "The scene was an animated one; the animals tumbled over each other in their hurry to hide their huge, ugly bodies in the water, which splashed and foamed as though it were boiling ..." (Mecklenburg, 1910).

Pitman was informed by Lieut.-Commander Gordon Brown, Marine Survey, that "at its mouth exist an unprecedented number of crocodiles which far exceed in number the hundreds which are always present on the right bank of the Victoria Nile in the vicinity of the Murchison Falls" (Pitman's files, note dated 2 November 1929).

Still extraordinarily abundant in 1948. 30 shot in a morning (Tony Henley, pers. comm. 11 June 1952).

In 1952, a professional crocodile hunter working for TUFMAC (Searle) shot only 1-3 per week. TUFMAC abandoned the area as no longer profitable (Cott & Searle, 1952).

Aerial count 1969: 22 crocodiles (Parker & Watson, 1969).

#### Lake Albert

Exceedingly numerous. "Wherever a sandy beach invited them to bask, several monsters were to be seen, like trunks of trees, lying in the sun" (Baker, 1866).

"The lake literally swarms with crocodiles ... I came upon a number lying as closely packed as sardines ..." (Lugard, 1893).

Aerial count 1969 of eastern shore: 7 crocodiles (Parker & Watson, 1969).

#### Murchison Falls National Park (Victoria Nile below the falls)

Density of crocodiles has always excited comment (Baker, 1866; Churchill, 1908; Worthington, 1929; Cott, 1961), but little quantitative data available until recent years.

Former spectacular congregations of crocodiles at Mugungu, below Paraa, have been exterminated since about 1958 (Cott, 1968).

Seasons 1968 and 1969: fewer than 200 nesting females; number of nests, 1968 - 174; 1969 - 176 (Cott, 1969).

Aerial count of population 1969 (all sizes): 595 crocodiles (Parker & Watson, 1969).

#### Lake Victoria

Johnston (1902) records an official desire to eliminate crocodile in Uganda; "The carrying away of a man or woman by a crocodile was at one time a daily occurrence at Entebbe". Bounty offered for crocodile eggs which were then destroyed.

Pitman (Game Warden in the 1930s) implemented a policy of extermination on Lake Victoria.

Kelsall, Chief Fisheries Officer, LVFS (pers. comm. 1952), reports excessive hunting -- in one area 426 crocodiles shot at rate of 20 a night.

In one bay near Entebbe where, in the late 1940s, 30 crocodiles were hooked in one night, in 1952 only six were taken in a month in the same place.

Ax present time, breeding stock appears to be exterminated (P.H. Greenwood, pers. comm. 1970).

## Lake Kyoga

Formerly abundant: in 1955, some 7000 were taken (Temple Perkins, 1955).

Aerial survey 1969 of Lakes Kwania and Kyoga: no crocodiles (Parker & Watson, 1969).

## Exploitation of C. niloticus in Uganda and its Results

With some conservation recommendations; taken from the Report by Parker & Watson (1969):

"Information from one of the major crocodile skin buyers in East Africa indicates that from 1950 until 1965 the number of crocodile skins coming out of Uganda was at least 7200 annually, and that this is probably a low estimate. ... In the 15 year period minimally 108,000 crocodile were exported from or through Uganda. It would not be unreasonable to suggest that at least half of these (54,000) originated in Uganda. Since 1965 the crocodile trade has dwindled to a mere trickle as ... Uganda's stocks have gone."

"The destruction of crocodile for their skins has been a source of considerable revenue to Uganda in the past two decades. However, this exploitation has been so uncontrolled, or in some instances so deliberately directed, that it has destroyed a valuable natural resource."

The Report presents the results of a survey of the status of the Nile crocodile in the major waters of central and western Uganda. The intentions of the survey were to assess crocodile distribution, numbers and status of populations, and to make recommendations for the future conservation and exploitation of the species in Uganda.

Crocodile numbers and distribution were assessed by diurnal aerial counting and by nocturnal ground counts. A sample night count was made from a helicopter using a spotlight, for purposes of comparison with night counts made from a boat. Daylight aerial counts by helicopter were made for comparison with results obtained from conventional aircraft. Inaccessible areas of dense papyrus were searched from a helicopter.



Results of aerial counts (crocodiles over 5 ft or 1,50 m in length):

Lower Semliki and Delta	22
East Shore Lake Albert	7
Albert Nile	22
Victoria Nile below Murchison Falls	595
Victoria Nile above Falls to Karuma	242
Karuma to L. Kyoga	1
Lakes Kwania and Kyoga	0

"Fisherman at Rwengara, Ntoroko, Ndaiga, Kaiso and Tonya fishing villages on Lake Albert were questioned for information on crocodile. Their answers were very uniform and indicated that until the late 1950s crocodile were numerous wherever there were sheltered beaches and bays. They claimed that in the past very substantial damage was done by crocodile to nets set in such areas. However, since the late 1950s they had been methodically hunted for their skins to the point where they are no longer considered a menace to gill-net fishing activities."

The analysed results of aerial and ground counts give estimates of less than 100 crocodile outside the Murchison Falls National Park, indicating that the species is reduced to the status of an 'occasional' or 'rare' animal.

"The disappearance of crocodile from the major waters of western and central Uganda outside Murchison Falls National Park has been hastened by the demand for their skin. However, in view of the conflict between human and crocodile interests, it is our opinion that this was inevitable. As a result of predation on humans, their interference with gill-net fishing and human competition for optimal crocodile habitats, we consider free-ranging crocodile incompatible with human populations. Any attempt to reintroduce crocodile into the major waters of central and western Uganda, which support large expanding fishing industries, would be similar to reintroducing wolves and bears to England and, as such, a waste of time and money ...

We are of the opinion that the conservation, management and exploitation of the Nile crocodile should be based on free living populations in areas denied to human settlement. Such areas in Uganda comprise the National Parks and Game Reserves .

Within the National Parks the crocodile population in the Victoria Nile is the largest in Uganda. Nevertheless, it is comprised of relatively few individuals. Being numerically small, it is particularly vulnerable to poaching. Unquestionably the most profitable way of exploiting this population is through tourism, as at present. We consider that any removal of living crocodile (other than eggs) would decrease the tourist potential, and that with numbers at present levels the idea of taking crocodile for skins in the Victoria Nile should not be entertained ...

The population within the Victoria Nile below Paraa is below the optimum. In the interests of conserving the species we recommend that efforts be made to re-establish the population at a naturally maintained level.

First, this will require adequate control of the human element. At present, permission to import crocodile skins from neighbouring States affords cover for those obtained illicitly within Uganda. Though Customs revenues etc. are obtained from such traffic, it must be pointed out that the price paid by Uganda is the destruction of its own crocodile resource. We recommend, therefore, that until such time as the crocodile situation in Uganda has reached a point of productive stability, the import of skins from other countries be banned entirely. Further, private traffic within Uganda in skins obtained in the country should be banned entirely and all skins should be saleable to the Fisheries Department only or through such single channel as the Department considers desirable. Within the National Parks the current level of anti-poaching efficiency must be increased.

Secondly, crocodile numbers could be increased artificially, i.e. by collection of eggs and hatching under predator-free conditions."

## ZAMBIA

### Legal Status

Crocodiles are a game animal under the present Fauna Conservation Ordinance, and are completely protected in National Parks and Game Reserves.

Prior to 1966, unlimited numbers of crocodiles were allowed to be hunted on licence from the Wildlife, Fisheries and National Parks Department. A further requirement was a special permit to hunt at night (the most efficient method) and the numbers of such permits was controlled by the Department. None of these permits of this nature have been issued since 1966.

Crocodiles may be hunted on an ordinary or National Game licence with a limit of one crocodile only per licence annually. But a supplementary licence can be purchased to cover the hunting of one additional crocodile.

Under the new Wildlife Act (still to be introduced) crocodiles will be protected in National Parks and some of the proposed major Game Management areas (Game Reserves as a category of land are being abolished under the new Act: the best of the present reserves will become National Parks and others Game Management areas).

Crocodiles may be killed in defence of life or property without licence. Trapping or snaring is prohibited.

### Conservation Measures

Crocodiles will continue to be protected in the National Parks and all hunting will be controlled by permit. A supplementary licence fee will be payable in addition to the National Game licence.

### Reasons for Decline

Commercial hunting prior to 1966, notably in Lake Mweru and Kafue River. Crocodiles were heavily hunted in the Zambezi and particularly along that stretch which is now Lake Kariba, the Lusiwashi River and Lake Lusiwashi, as well as in some smaller rivers.

In Lake Kariba, it is considered that the damming of the Zambezi has adversely affected crocodile breeding, ancestral nest sites having been flooded. Crocodiles come into conflict with fishermen and cause damage to nets. It is not known how many are captured and killed at the nest annually.

### Condition of Habitat

There are extensive areas of suitable habitat.

Pollution has caused concern at times in the Copperbelt reaches of the Kafue River, because of the effluent from the new industrial area.

### Remarks

No census has ever been carried out in the past and present populations are not known. Breeding is said to commence about September.

A pilot crocodile farm on an experimental basis is in operation at Kabwe, run more as a hobby than a research or commercial project.

Despite hunting pressure in the past, the range of the crocodile has not been materially altered as far as is known.

In National Parks, populations are still considered to be reasonable to good.

Breeding of captive animals has been recorded in the Livingstone Game Park.

### References

Director, Wildlife, Fisheries and National Parks Department (pers.comm.)

H.B. Cott. 1961. Trans. zool. Soc. London, 29(4).

J. Rutledge. 1969. Black Lechwe, Vol. 7(4) and 7(5).

D. Hadley. 1969. Puku, 5.

STATUS OF CROCODYLUS CATAPHRACTUS

ANGOLA

Legal Status

Protected throughout Angola by Decree No 14539, which prohibits hunting in all forms and prohibits export of skins.

Conservation Measures

A total ban on the hunting of all species of crocodiles is at present in force.

Reasons for Decline

Professional hunters, who have operated for many years throughout the country.

Condition of Habitat

Unknown.

Remarks

The species is considered to be very rare and seems to occur only in the enclave of Cabinda. No information is available on numbers in the wild state, breeding biology or general ecology.

Reference

Veterinary Department of Angola: Instituto de Investigaçao Cientifica,  
Angola.

## DAHOMY

### Status

It was still very common in 1959 along the lower Oueme River and its tributaries, but did not appear to be present in the upper reaches of the river. The best area found for the species was about 45 km north of Djidja (W. Ted Roth, in litt. 29 January 1971).

## GABON

### Legal Status

Protected by Decree No 0032/PR/MEF/SF 5234 dated 11 January 1966. Crocodiles are protected in National Parks and Reserves, and throughout the entire country during the breeding season. However, permits are issued each year for commercial operators.

### Conservation Measures

As above. Previously crocodiles were not protected outside National Parks,

### Reasons for Decline

Commercial exploitation. Over the past few years a quota of 20,000 skins has been exported annually, and five years ago this figure was higher (it is not known how many skins of this species are included in the total).

### Condition of Habitat

Suitable areas are found throughout the country (e.g. Iguela, Sette Cama, Ouanga, Middle Ogoué, Nyanga).

### Remarks

Information from this country is very scanty, but it is clear that this species, although it still occurs, has been greatly reduced in numbers and that no effective measures have yet been taken by the Government of the Gabon to give the remnants some protection.

### References

- E. Ossinga, Department of Water and Forests, Libreville, Republic of Gabon.  
Maurice Patry, Guide de Chasse, B.P. 240, Port Gentil, Republic of Gabon.

## GHANA

### Former Distribution and Present Status

"The long-snouted crocodile is apparently sometimes found in coastal lagoons and the larger rivers of the forest zone such as the Densu and Pra. Little seems to be known about it, but it has probably never been very common" (Mrs Anna Merz, in litt. 19 September 1970).

"Its distribution is not fully known, although reports are mainly from the larger rivers in the forest zone. Specimens have been seen in the Volta Lake and also in Mole River and its tributaries" (E.O.A. Asibey, in litt. 30 September 1970).

"Three species of crocodiles, Crocodylus niloticus, C. cataphractus and Osteolaemus tetraspis occur in the Volta Lake and the rivers that flow into the lake. The two species of Crocodylus are found in the lake itself although they are not common. All three species are found in the Obosum River and its tributaries, the Dwija River and tributaries, and the Sene River and its tributaries, which flow into the lake on the western shore. Inland from the lake, these rivers flow through gallery forest, surrounded by savanna, and some patches of true forest" (Gilbert Child, FAO Wildlife Officer, Volta Lake and Kainji Lake Research Projects, in a report on the proposed Volta Lake Game Reserve).

C. cataphractus was seen in 1970 on the Kainji Lake near the dam (D.C.D. Happold, in litt. 5 February 1971).



## HAUTE - VOLTA

### Legal Status

Protected in National Parks and in certain tribal sanctuaries. Not specifically mentioned in the hunting or fishing regulations .

### Conservation Measures

No conservation measures outside of National Parks, but in some areas tribal peoples protect the crocodile because of superstition and for religious reasons. They are also protected in a few lakes as a tourist attraction.

### Reasons for Decline

The crocodile is hunted in most areas by local people as well as those of neighbouring tribes because of its valuable skin. The flesh is well liked and the eggs are also collected and eaten. Twenty years ago it was found commonly in all the lakes and rivers, but in recent years has disappeared from most localities.

### Condition of Habitat

Large areas of suitable habitat remain,

### Remarks

No figures are available of the numbers of this species remaining in the wild state. There have been no suggestions that crocodiles should be protected and no crocodiles are known to be in captivity. No data available on distribution, ecology or breeding biology.

### Reference

B. Roman, Scientific Director of the Marine Research Station, Margarita, Venezuela.

## LIBERIA

### Former Distribution and Present Status

"Still in great abundance, and can be observed in the following areas:

- (a) The St Paul River - Monrovia, Montserrado County.
- (b) The St John River - Buchanan, Bassa County.
- (c) The Maa-fa River - Robertsport, Capemount County.

Besides, they can be observed in other places as well" (Ben Page, Tourist Division, Monrovia, in litt. 6 June 1968).

"There has never been any survey about the crocodile species in Liberia hence adequate information is lacking. However, there are two species that occur in Liberia, namely C. cataphractus or narrow-snouted and Osteolaemus tetraspis or broad-fronted ... Presently poaching or hunting for crocodile is very rare" (T. Hector Milton Gorgla, Acting Secretary of Agriculture, Monrovia, in litt. 2 July 1970).

NIGERIA

Former Distribution and Present Status

"Probably rare. No specimens have been brought into the University of Ibadan zoo since 1964. The old specimen came from the Mid-west area, and although other species of crocodiles have come from the Mid-west in recent years, none have been of this species. It also occurs in the Yankari Game Reserve in the Gaji River, S.E. of Bauchi, about 10° 19' N. and 09° 50' E ." (D.C.D. Happold, Department of Zoology, Ibadan University, in litt. 5 February 1971).

SENEGAL

See under Crocodylus niloticus.

(Baba Dioum, in litt. 14 December 1970.)

TANZANIA

First recorded at mouth of Luichi River south of Ujiji in about 1902 and still well-known in that area in 1930 (A. Loveridge, 1940, Tang. Notes & Records, 10, p. 41).

"Not uncommon off the shores of Kigoma" (D. Keith Thomas, 1961, Tang. Notes & Records, 56, p. 37).

Occurs between Karago and Iragala on Malagarasi River (East Lake Tanganyika) i.e. a few miles south of the Tabora to Kogoma railroad (D. Keith Thomas, pers. comm. 23 February 1971).

## TCHAD

Refer to C. niloticus for information on legal status, conservation, etc.

Crocodylus cataphractus is thought to occur on the border of Tchad and the Central African Republic, and in tributaries of the river Chari, namely the Aouk, Aoukale and Bangoran. The species definitely occurs in Central African Republic.

### Reference

M. Anna, Director, National Parks and Game Reserves, Fort Lamy,  
Republic of Tchad.

## TOGO

Reports from the northern regions of Togo describe a 'Savannah Crocodile' said to exist more in the savannah than in the well-watered areas. It is smaller and narrower than Crocodylus niloticus and is thought to be this species.

### Reference

Mr B. Gnrofon, Water, Forestry and Game Engineer, Lome, Republic of Togo.

## ZAMBIA

### Legal Status

Classed as a game animal under the present Fauna Conservation Ordinance, Protected in Game Reserves and National Parks.

### Conservation Measures

As above.

### Reasons for Decline

Commercial hunting, prior to 1966, notably in Lake Mweru.

### Condition of Habitat

Extensive areas of suitable habitat remaining.

### Remarks

The species is apparently confined to Lake Mweru and the Luapula River. No population figures are available, nor data on its breeding biology or ecology in Zambia.

Successfully hunted on Kalungwishi River (which flows from the east into Lake Mweru) in 1956 (Cott, pers. obs.).

### Reference

Director, Department of Wildlife, Fisheries and National Parks (pers. comm.).



STATUS OF OSTEOLAEMUS TETRASPIS

ANGOLA

Legal Status

Protected by Decree No 14539, throughout Angola, which prohibits hunting in all forms and prohibits export of skins.

Conservation Measures

A total ban on the hunting of all species of crocodile is at present in force.

Reasons for Decline

Professional hunters have operated along all the major river systems for many years and have reduced crocodile populations to a large extent.

Condition of Habitat

Unknown.

Remarks

The species is considered to be very rare and seems to occur only in the enclave of Cabinda. No information is available on numbers in the wild state, breeding biology or general ecology.

Reference

Veterinary Department of Angola: Instituto de Investigaçao Cientifica,  
Angola.

## DAHOMY

In 1959, this species was very common in the higher regions. Considered to be harmless and very stupid, it was regularly eaten by the local people (W. Ted Roth, in litt., 29 January 1971).

## GABON

### Legal Status

Protected by Decree No 0032/PR/MEF/SF 5234 dated 11 January 1966, which protects crocodiles in National Parks, Reserves and throughout the country during the breeding season. Permits are however issued each year to commercial operators,

### Conservation Measures

As above. Previously crocodiles were not protected outside National, Parks.

### Reasons for Decline

Commercial exploitation. Over the past few years a quota of 20,000 skins has been exported from Gabon, but it is not known how many skins of this species are included in this total.

### Condition of Habitat

Suitable. The species is considered to be plentiful in the swampy and flooded areas known as Woleu N'tem and Ogooué Ivindo.

### Remarks

Information from this country is still insufficient, but it is clear that this species, because of its small size and peculiar habits, has so far escaped the slaughter which has decimated C. niloticus and cataphractus. It is not, however, often seen.

### References

E. Ossinga, Directeur des Eaux et Forêts, Libreville, Republic of Gabon.

Maurice Patry, Guide de Chasse, B.P. 240, Port Gentil, Republic of Gabon,

## GHANA

### Former Distribution and Present Status

"The Dwarf crocodile, maximum length 4 ft (1.20 m), seems to be found in small streams rather than rivers of the high forest area. It may still be reasonably plentiful. Mrs Sonia Jeffreys has seen them in snares and offered for sale as meat in the Bia River Tributaries area. Two small ones were caught in the Offin River near Kumasi last year, when forest was being cleared for the Barakese Reservoir" (Mrs Anna Merz, in litt. 19 September 1970).

"This crocodile is not very common. It is found mostly in smaller streams and rivers, although it has been observed on the shores of Lake Volta. Traditional conservation of streams and rivers has not its hold. Cultivation is now done right into streams and rivers. This very adversely affects the preferred habitat of this animal. This coupled with its use as food does not give it any brighter a future than the other species" (E.O.A. Asibey, in litt. 30 September 1970).

"Osteolaemus evidently occurs in the Volta Lake since six very recently hatched specimens were found on Obeng Island (on the drawdown) on 17 May 1970 (lat. about 7.12 N.). Two of these baby Osteolaemus are now in the Accra Zoo" (Gilbert Child, FAO Wildlife Officer, Volta Lake and Kainji Lake Research Projects, 1970).

## HAUTE - VOLTA

### Legal Status

Protected in National Parks and in certain tribal sanctuaries. Not specifically mentioned in the hunting or fishing regulations.

### Conservation Measures

No conservation measures outside National Parks, but in some areas tribal peoples protect the crocodile because of superstition and for religious reasons. Also protected in a few lakes as a tourist attraction.

### Reasons for Decline

The crocodile is hunted in most areas by local people as well as those of neighbouring tribes because of its valuable skin. The flesh is well liked and the eggs are also collected and eaten. Twenty years ago it was found commonly in all the lakes and rivers, but in recent years has disappeared from most localities.

### Condition of Habitat

Large areas of suitable habitat remain.

### Remarks

No figures are available of the numbers of this species remaining in the wild state. There have been no suggestions that crocodiles should be protected and no crocodiles are known to be in captivity. No data available on distribution, ecology or breeding biology.

### Reference

B. Roman, Scientific Director, The Marine Research Station, Margarita, Venezuela.

LIBERIA

See notes under C. cataphractus (p. 84 above).

## NIGERIA

### Former Distribution and Present Status

A forest species. About six adults or young are brought to the University of Ibadan Zoo each year. It is interesting that adults are brought in, whereas this is not so for C. niloticus. Osteolaemus is probably rare in the Western State, and is supposed to be commoner in the Mid-west and Rivers areas; but no exact details are available. This species is probably held in some esteem since the Mid-west government recently presented an Osteolaemus to General Gowon, the Head of State, during his official visit to the Mid-west (D.C.D. Happold and R.R. Golding, Department of Zoology, University of Ibadan, in litt. 19 January 1971).

At Abua in Ahoada Division of Rivers Province, Mr Major in 1948 started to farm O. tetraspis. A tank of water, with a shelf at one end, communicated with a dry tunnel to a pit where the crocodiles laid their eggs in a heap of rotting vegetation. Young were placed in separate quarters and fed on fish. "An animal that is big enough to eat now sells for about thirty shillings" (King, 1953).

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