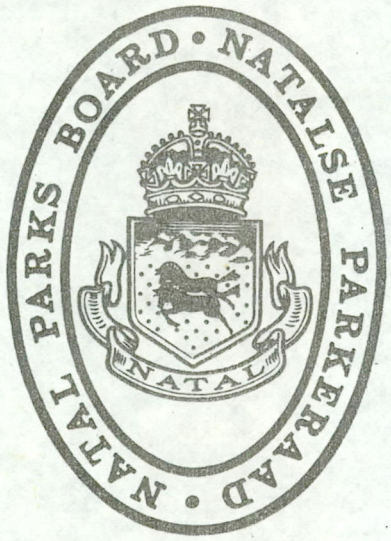

Author POOLEY A C

Title OBSERVATIONS ON THE LAKE ST LUCIA CROCODILE POPULATION

Source 1976 PROC. ST LUCIA SCIENTIFIC ADVISORY COUNCIL WORKSHOP: CHARTER'S CREEK: FEB 1976

Keywords CROCODILES*

PAPER 19

668

OBSERVATIONS ON THE LAKE ST.LUCIA CROCODILE POPULATION

A.C. Pooley
Natal Parks Board

OBSERVATIONS ON THE LAKE ST. LUCIA CROCODILE POPULATION.

A.C. POOLEY

Warden, Crocodile Centre, Natal Parks Board.

ABSTRACT.

Aerial counts are beginning to give us an idea of the crocodile population of Lake St. Lucia and the seasonal movement that occurs between the winter basking sites and summer breeding grounds. Other factors such as seasonal flooding of rivers, drought conditions and feeding habits that may influence seasonal movement, are discussed. Mortality due to natural and unnatural causes is described and the known breeding grounds with basic data on breeding biology are reported. The few documented records of the diet of crocodiles indicate more than anything how little is known of basic biology of crocodiles in the lake system. Management recommendations suggest a capture and marking programme of problem crocodiles, strict control over the breeding grounds and co-operation from all field staff in gathering data on all aspects of crocodile biology.

INTRODUCTION.

Lake St. Lucia and the complex river systems connected to it, harbours the largest concentration of crocodiles in Southern Africa. This is a particularly valuable population for conservation purposes because some of the breeding grounds rank among the largest known in Africa that fall within a completely protected area. The Nile Crocodile Crocodylus niloticus; is considered to be an Endangered Species by the IUCN (International Union for Conservation of Nature). There has been a dramatic decline in populations throughout its range in Africa mainly as a result of commercial hunting for the leather trade and a rapid erosion of habitat. This decline in numbers is particularly evident in our neighbouring countries of Mocambique, Swaziland, Botswana and Angola.

Whilst our population is relatively secure, there are considerable pressures in the form of disturbance by man, who enjoys the spectacle of large groups of basking crocodiles, but

also wants the animals destroyed in the vicinity of recreational areas. The Nile Crocodile in former times occurred in all the major rivers and estuaries right down into the Eastern Cape Province. The St. Lucia population now represents the southern-most limit of importance in Africa.

1. THE POPULATION.

Without any counts prior to 1972 we have not established whether the population is declining or increasing. The highest count to date was during July 1974 when 401 crocodiles estimated at between 1.5m to over 4.5m were recorded.

The most effective census methods are aerial counting from a fixed wing aircraft and night counting using a spotlight from a boat, but over such a large area this latter method is impractical. Watson, et al (1971) summarised some of the problems involved in aerial counting and these have been experienced locally.

1(A) Distribution and Seasonal Movement.

Because of seasonal movements when animals move between the lake, pans, swamps, lagoons and dams, and up and down the seven river systems connected to the lake, it is difficult from the limited data so far obtained, to determine whether there is in fact a resident population.

It is interesting that crocodiles are well distributed along the eastern shores of the lake but only seasonally found on the western shores and we find that there are three concentrations in the system. During the winter months they congregate at specific basking sites. These are the Umfolozi River sandbanks in the south, on the eastern shores off Vincent Island in the central area and in the Mkuzi swamps in the north.

The most obvious seasonal movement occurs between these winter basking grounds and the main breeding grounds. An aerial count over the Mkuzi swamps during July/August will show 78-86 crocodiles and 60-100 for islands in the Umfolozi/Umsinduzi river systems. Summer populations at the same localities drop to 15-34 for the swamps and to below 10 for the river system. Examination of the main breeding grounds during mid-winter shows these areas to be almost deserted.

Dispersal of crocodiles is such that covering the same area where 401 crocodiles may be counted in winter, one may find that in summer (4/2/1975) only 46 crocodiles can be found.

During the summer months females are nest guarding lying up very often under shade and not visible from the air. At this time of year crocodiles are found in the sea and along the beaches in the vicinity of Mapelane and northwards to Cape Vidal about 40 km from the Estuary mouth. Adults have been observed as far south as the St. Lucia lighthouse. There is a record intered in the logbook of the S.S. Kathiawar (1917) of a crocodile sighted an estimated 11 km out to sea off the S. Lucia Estuary.

During February/March 1975, 34 hatchlings were found by visitors between Mapelane and First Rocks and brought in to the Natal Parks Board office. A juvenile was netted in the surf at First Rocks and two juveniles were captured north of the Estuary Mouth in January 1976, whilst adults were regularly seen in the surf. These crocodiles generally move over the dunes into the lagoon area and presumably back up the lake when the floods have subsided.

During summer flood periods crocodiles also move considerable distances upstream from the lake to areas where they are not observed in winter. They appear in farm dams and irrigation canals often more than a kilometer from the river and take up residence usually till March or early April when water levels subside and colder weather commences. Crocodiles are basically shallow water feeders, avoiding the turbulence of wave action in deep water, and when lake levels are high this may well account for their appearance at localities not frequented in winter. During drought periods and periods of high salinity levels they congregate near fresh water streams and seepage inlets. Seasonal movement is also thought to be further influenced by arrival of shoal fish such as Mullet, Grunter and perhaps Kob, but more evidence is needed.

2. BREEDING.

Physical conditions at the main breeding grounds and some records of former nesting sites have been described by Pooley (1969a and 1973). The choice of a nest site depends upon lake levels at laying times.

As many as 66 nests have been found at the Otoneni/Ngema beach during normal years. During seasons of high water levels, prior to laying, these sites, or many of them, are abandoned in favour of alternative sites which may be one kilometer from water beyond the normal beaches. If however flood levels rise after egg deposition at the normal nest grounds has taken place, many clutches are destroyed. The known nesting sites are as follows:

Mkuzi swamps, Eastern shore entrance to Selley's lakes, Ndhlozi pan, Hell's Gates, Nibela peninsular, Otoneni, Ngema, Tawati, Potters Channel, Mpate River mouth, Nkazamo stream, Eastern shore opposite Fanies Islands, nSengeni, Dead Tree Bay, Hehlehle stream Fanies Islands, Back Channel Umfolozi River, Lagoon at Estuary mouth, False Bay stream, Umfolozi flood levee.

In Zululand the laying season has been established as between November 3rd to December 26th. Hatching occurs between February 1st to March 31st. Incubation ranges between 84 to 96 days, and examination of 50 clutches at St. Lucia shows a variation of 18 to 73 eggs with an average of 45 eggs per clutch. Preliminary nest counts indicate that there are a minimum of 110 known nests.

2(A) Natural Mortality.

Mortality is highest after egg deposition and over the following three years. Natural hazards such as flooding of rivers, and rises of lake levels inundate nesting grounds seasonally particularly the Mkuzi Swamps, Mpate river and Umfolozi river nesting grounds. The Mkuzi swamps are particularly vulnerable, 20 nests destroyed December 1968 and 12 in December 1971.

Heavy rainfall during November/March 1974/1975 resulted in heavy losses. Of 11 nests examined, only 17 out of 520 eggs were healthy. Prolonged drought conditions are also adverse to successful htaching. Modha (1967).

The Water Mongoose, Atilax paludinosus is an egg predator locally, whilst the Water Monitor Lizard Varanus niloticus is by far the most important predator of eggs and hatchlings. An example of nest raiding is that in January 1968, 44 out of 77 examined had been dug open by Monitor Lizards.

Nest trampling by Hippopotami was recorded in 1970 when high salinity levels caused these animals to spend most of the time out of water along the main breeding beaches, but this form of nest destruction is unusual.

Ants are a particular problem at some nest sites and whole clutches may be destroyed by these underground marauders. Failure of the parent to open the nest is also an occasional cause of mortality.

Numerous predators of the young, all of which occur locally have been recorded from elsewhere in Africa. Cott (1961) lists Catfish, Clarias sp. and Marabou Stork, Leptoptilos crumeniferus. Modha (1967) noted Goliath Heron Ardea goliath, Grey Heron Ardea cinerea and Sacred Ibis Threskiornis aethipicus as predators of hatchlings. He also observed brooding females chasing Little Egret Egretta garzetta and Great White Egret Casmirodius albus from the breeding beaches. Pooley (1969a) observed that the Spotted Eagle Owl Bubo africanus, Fish Eagle Haliaetus vocifer, Rusty Spotted Genet, Genetta rubiginosa and Hinged Terrapin Pelusios sinuatus prey upon the young.

Numerous other birds are suspected predators, and during floods when young are washed out to sea, it is likely that sharks and other marine fishes will readily feed on crocodiles.

At the age of 3 years or at a size of 1m the young are considered safe from predators, but cannabilism is well documented in the crocodilians.

Territorial combat between adult males results in occasional death of the weaker animal. To date there are 7 known local records of death attributed to fighting.

High salinity levels accounted for the death of 40 adults during July/September 1970 (Pooley 1973) and doubtless there was a corresponding reduction of the juvenile population.

In the literature there are also reports of crocodiles attacked and killed by Hippopotami and finally, Cott (1961) also notes that crocodiles may carry a heavy parasite load of leeches and nematodes in some areas, but we have no local data as to whether parasites contribute to mortality of old animals.

2(B) Mortality due to other causes.

Following the fatal attack on a european youth in False Bay Park (December 1957) and the tremendous public outcry afterwards, a policy of destroying crocodiles in the vicinity of Rest Camps, public jetties and angling sites was implemented. Records indicate that 39 were killed at the Estuary, 20 at Charters Creek, 26 at Fanies Island and 7 at False Bay. These were almost

without exception adult animals and in addition a large number were wounded or possibly killed but the carcases were not found.

Prior to introduction of the Reptiles Protection Ordinance no. 32 of 1968, crocodiles were classed as vermin in Natal. European hide hunters operated along the five rivers flowing into the lake and in the Mkuzi swamps. Farm lands were cleared, riverine vegetation including nesting sites destroyed and crocodiles shot because of the danger to livestock. Old residents of the Umfolozi area report how farmers used baited hooks attached by steel cable to a floating drum, to snare crocodiles in this river. Crocodiles were also snared by Africans for medicinal properties.

In recent years there are records of 10 deaths in snares and fish traps set by tribal peoples, and 7 deaths from gill nets, seine nets and experimental shark nets. There are records of crocodiles (2) killed by anglers on the beach and hatchlings are found by tourists and taken away as pets or for sale.

The increase in the number of power boats may well contribute to x the overall mortality, whilst suction dredgers, pumps and dams in some instances are death traps to crocodiles.

In a discussion with the Water Baillif at Hluhluwe Dam (January 1974) he mentioned finding dead crocodiles on the rocks below the dam wall. These had been swept over during flood periods.

3. DIET.

Records for the lake are scanty but the following have been recorded:

CRUSTACEA

Crab Sesarma sp.

REPTILES AND FISH.

Grunter, Pomadasys sp., Kob Argyrosomus sp., Mullet Mugil sp., Barbel Clarias sp., Perch Acanthopagrus berda, Eel Muraena mossambica, Shovel-nosed Shark Rhinobatos sp., River Shark Carcharinus sp., Water Terrapin Pelusios sp., Nile Crocodile - numerous reports of crocodiles feeding on dead adults.

MAMMALS.

Common Reedbuck Redunca arundinum, Bushbuck Tragelaphus scriptus, Hippopotamus Hippopotamus amphibius, Square-lipped Rhinoceros Ceratotherium simum (Carcase), as well as Domestic cow, horse,

dogs, pigs etc.

HUMAN FATALITIES.

These are included for the lake and environs because the victims have been eaten or partially eaten. Nyalazi River (1952), St. Lucia Estuary (1956) False Bay Park (1957), Brodies Crossing (1961), Lake Bangazi (1963), Mkuzi Swamps (1969), Sengwane (1972) Nodhlembe area (1972). This last victim lost an arm, the other attacks were fatal.

4. MANAGEMENT TECHNIQUES.

Largely because of reports from staff working on the lake who claimed that crocodile populations were declining (1966/1967) three experiments were undertaken. The first involved protecting nests from predators, using wire screens. The second was collection of eggs, artificial incubation and rearing of hatchlings which were restocked into chosen habitats in the lake. The third method involved attempts at trapping Monitor Lizards to remove them from the breeding grounds. The first two methods were successful and are discussed in Pooley (1969a, 1973). Trapping of Monitor Lizards proved to be time consuming and not very successful.

Between the period July 1967 and January 1976 a total of 486 crocodiles were re-introduced into the lake and swamp areas. These were largely hatched from eggs that would have been destroyed by flood waters. Many of these young animals were marked with plastic discs attached to their tails, but observations on similarly marked specimens, retained in captivity, has shown that this method was not successful as a permanent means of marking. We have no data on survival rate of the young crocodiles re-stocked into the lake.

A recent programme initiated is the capture of adult crocodiles in the near vicinity of camps, jetties and beaches and the removal of them to more remote areas. These individuals are being permanently marked by removal of a dorsal tail scute for field identification. It is hoped that in time data will be obtained on territoriality, seasonal movements and the distances covered by these individuals. At the same time it is a method of managing a potentially dangerous predatory animal that shares habitats used by man for recreational activities.

An important conservation consideration is that crocodiles have been discovered to use artificial sandbanks built as a result of dredging operations, for nesting sites. This means that suitable breeding areas could be artificially created if this should prove to be necessary in the future. Secondly it has proved to be feasible to induce wild captured adults to breed in captivity.

4(A) Management Recommendations.

1. The shooting of crocodiles at public jetties should cease, unless ALL attempts at capture by means of nooses and live traps designed for this purpose, have failed.

2. The main crocodile breeding grounds should be closed to ALL visitors between 30th September to 30th May each year. Game-guard patrols along these beaches should also be stopped during this period.

3. Aerial counts and monitoring of seasonal movements should be continued.

4. Field staff should participate in the request for data on crocodile biology by completing the forms supplied.

ACKNOWLEDGEMENTS.

I am grateful to many colleagues who have contributed observations over a number of years and in particular Messrs. N. van Niekerk, G.W. Forrest, G.W. Schutte, D. Nash and W. Jacobs. Mr. D. McFarren, Governmnet Forester and Mr. G. Skinner, Natal Parks Board pilot have both been very helpful. Discussions with Mr. F. Joubert have greatly contributed to my understanding the complexities of the lake system and he is thanked also for commenting on a draft of this report. My wife Elsa is thanked for typing the manuscript. Finally, I thank Mr. R.S. Crass for his encouragement over many years.

REFERENCES.

1. Annual reports of Natal Parks, Game and Fish Preservation Board no.s 1 - 25, April 1948 - March 1973.

2. Cott, H.B. Scientific Results of an Enquiry into the

Ecology and Economic Status of the Nile Crocodile Crocodylus niloticus in Uganda and Northern Rhodesia. Trans. Zool. Soc. Lond. 29(4) (1967) p. 211 - 356.

3. Dunsterville, M. In "Pirates and Predators", The Lammergeyer no. 8 (1968) p. 53.

4. Dutton, T.P. In "Foods and Feeding". The Lammergeyer Vol.11 No. 1 (1962) p. 69.

5. Modha, M.L. The Ecology of the Nile Crocodile Crocodylus niloticus Laurenti on Central Island, Lake Rudolph. E.Afri. Wildl. J. Vol. 5 (1967) p. 74 - 95.

6a. Pooley, A.C. Preliminary Studies on the Breeding of the Nile Crocodile Crocodylus niloticus in Zululand. The Lammergeyer No. 10 (1969) p. 22 - 44.

6b. _____ Some Observations on the Rearing of Crocodiles. The Lammergeyer. No. 10 (1969) p. 45 - 57.

6c. _____ Notes on the Ecology of the Lake St. Lucia Crocodile Population. "Crocodiles". IUCN Publ. New Series: Suppl. Paper No. 41 (1973) p. 81 - 90.

7. Watson, R.m., Graham, A.D., Bell, R.H.V. and Parker, I.S.C. A Comparison of Four East African Crocodile Crocodylus niloticus Laurenti Populations. E. Afri. Wildl. J. 9: (1971) p. 25 - 34.