

CROCODILES

Proceedings of the Second Working Meeting of Crocodile Specialists
Sponsored and arranged by the Survival Service and Ecology Commissions
of IUCN

with the support of the Natal Parks, Game and Fish Preservation Board
and the New York Zoological Society,
and held at Ndumu and Lake St. Lucia, Zululand,
20-27 March 1973



International Union for Conservation of Nature and Natural Resources
1110 Morges, Switzerland
OCTOBER 1973

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SECOND WORKING MEETING OF CROCODILE SPECIALISTS

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SECOND WORKING MEETING OF CROCODILE SPECIALISTS

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INTRODUCTORY MESSAGE

from

Dr. Gerardo Budowski,
Director General of IUCN, Morges, Switzerland

For the second time I feel very unhappy not to be present on the occasion of a meeting of crocodile specialists. Crocodile conservation is a subject to which IUCN devotes great attention and, in close collaboration with the World Wildlife Fund, aims to carry out a series of projects throughout the world for safeguarding the crocodilians - many of which are at present endangered.

My own first experiences with the crocodilians go back to the 1940s in Venezuela, Colombia and nearby Brazil, where I had ample opportunities to see the burgeoning hunting operations which have today led to the virtual disappearance of crocodiles over wide areas. A similar situation is found throughout the world.

Of course, the maintenance of species is still our main concern - and you will certainly review progress on IUCN's Red Data Book on reptiles - but it should not be the only one. We seek nothing less than the recognition of the crocodiles as useful animals, of great interest to science and to education, ecologically important as a vital link in natural relationships, and economically valuable natural resources in themselves. Crocodilians can and should contribute to the overall essential natural balance and quality of life - as important assets to man and his environment. I do not want to be unrealistic and I am the first to acknowledge that we still have to go a long way to reach this objective, but your Working Group, more than any other entity, can greatly contribute to making our common goal easier to reach.

Since your last meeting, two years ago, new developments have taken place, many of them spurred by your activities. Better surveys are being promoted throughout the world. In Latin America Professor Medem's inventories in various countries have led to worthwhile action. Some promising initial results have also been achieved with a small breeding stock of Morelet's crocodile in Mexico. But continuous depletion of crocodilian species in African countries has also been reported: although there has been some progress in restocking in Natal, the overall picture appears very grim in natural habitats and, of course, this is why so much emphasis has been put on breeding programmes based on experience accumulated throughout the world.

Farming crocodiles in captivity or semi-captivity may ultimately prove to be an effective tool to alleviate pressure on wild crocodiles. Whether this can best be realised through

small farms as in New Guinea or through large breeding centres as in Bangkok and Ndumu may well be worth examining in relation to all the social, cultural and economic conditions of the various regions.

Major development of the crocodile leather industry is, undoubtedly, a very grave potential threat, and any moves to promote this industry without carefully planning the utilization of resources should be critically reviewed by your Group. We are, for instance, apprehensive about the scheme to build up a large leather industry in Sudan under the aegis of UNIDO, since at this stage there seems to be no reliable information as to the availability of a sustained supply of the basic resource.

Finally, there are legal aspects, both at a national level, such as the action being undertaken to introduce new legislation in Botswana, Rhodesia, Mozambique and some Latin American countries, and on an international level. In this last-mentioned respect, the most important development has been the recent signing of a Convention on trade in endangered wild fauna and flora, resulting from the international conference just concluded in Washington D.C. The convention includes two appendices of scheduled species, which will be coming before you for review. As you will see under Appendix 1, 18 species of crocodilians and their products will be virtually eliminated from trade, while another 9 species are severely restricted under Appendix 2. I very much hope that this meeting will support this Convention and carefully consider the two appendices, so that if need be recommendations can be made for modifications in future revisions, which are provided for under the terms of the Convention.

In concluding, I should like to extend a very special expression of thanks to the New York Zoological Society, which has made this meeting possible. As you know, the New York Zoological Society was also the key organization for the first meeting of crocodile specialists held two years ago at the Bronx Zoo in New York. If, as we hope, the crocodilians eventually recover their rightful place in the balance of nature, much credit will certainly go to the Society, which at critical moments has been able to rally financial and moral support to make these meetings possible and thus to generate effective programmes for action.

Our thanks also go to the Natal Parks Board for making facilities available at Ndumu. There is no doubt that the next few days will be an important landmark in international scientific co-operation in a cause which can benefit all mankind. I wish you every possible success in your deliberations.

SUMMARY OF THE MEETING

1. Introduction

Dr. H.B. Anthony, a Founder Member of the Natal Parks, Game and Fish Preservation Board, opened the meeting by welcoming the participants on behalf of the Board. An introductory message from the Director General of IUCN was read by Miss M. Björklund, Executive Officer of IUCN's Commission on Ecology, and the apologies of members of the Survival Service Commission's (SSC) Crocodile Specialists' Group unable to attend the meeting were presented. Dr. Anthony was elected Chairman of the meeting and Mr. R.E. Honegger and Miss Björklund as the rapporteurs.

The Agenda as adopted after some amendments included several items relating to Group procedures and policies, which are briefly mentioned in the immediately following section of this Summary. They were recorded in detail in the Group's Minutes and, together with supporting memoranda, including two especially prepared for the meeting by Mr. M.C. Downes (on the Group's functions) and by Dr. R.H. Chabreck (on endangered species programmes in general), and six recommendations mainly directed to future organization of Group activities, were referred for consideration by the SSC and the secretariat officers concerned.

Sections 3 - 5 of this Summary, under the three general headings into which the papers submitted for the meeting were grouped, cover the scientific discussions, decisions made and advice given, thus bringing up to date the Group's assessment of crocodile conservation problems and studies. It should be noted, however, that, on the Group's recommendation, points made in discussion arising directly from one or more of the papers contributed, are summarized at the end of the paper(s) concerned. The account which follows is therefore mainly confined to supplementary discussions and agenda items on which only verbal reports are given.

2. Group business

Membership and special committee or individual appointment matters discussed, included:-

- (a) Dr. H.B. Cott's request to be relieved of the chairmanship of the Group, regretfully noted;
- (b) recommendations for the appointment of new members and consultants to the group, referred to the SSC;

- (c) agreement by Mr. J.H. Powell to take over compilation of the Group's Newsletter and by Dr. F.W. King to arrange for its duplication and distribution, in succession to Mr. A.C. Pooley;
- (d) appointment of sub-committees or individuals to -
draft the recommendations arising from the meeting;
advise on the revision and classification of the crocodilian Red Data Book sheets; prepare a (popular) Red Book on crocodiles; complete or undertake IUCN monographs on selected species; and to bring to fruition the captive breeding projects for certain species (Crocodylus cataphractus, C. moreletii, C. rhombifer, C. intermedius, Caiman crocodilus apaporiensis, Gavialis gangeticus and Osteolaemus tetraspis) at the Crocodile Foundation, Bangkok, and, for the first and last-mentioned, also at Ndumu (see Part 4 below).

Main topics of discussion were the procedures and classification problem involved in the preparation of the IUCN Red Data Book sheets for crocodilian species, in the light of a verbal progress report presented by Mr. Honegger, and secondly the general functions of the Group itself, based on Mr. Downes's paper to which reference has already been made. There was also a good deal of discussion of plans for future publications. Various recommendations were drawn up accordingly for submission to SSC.

It was recommended that the Third Meeting of the Group should be held at IUCN Headquarters, Morges, in May or early June, 1975.

3. Conservation review: 1971 - 1973

As previously indicated, the discussions on the reports submitted about the changes that had taken place since the First Meeting of the Group in 1971, are recorded after each regional paper or group of papers in Section A of these Proceedings.

Altogether ten reports were presented and some seventeen decisions, recommendations and suggestions were recorded. In the absence of Professor Medem, Dr. Wayne King summarized the latest information received from him about the South American crocodilians and arrangements were agreed for improving the circulation of future reports to Group members and IUCN secretariat officers concerned. In other regions, the countries at present causing anxiety to the Group and in which IUCN/SSC intervention to promote remedial action was recommended, seemed to be mostly African (Mali, Zambia, Natal and Swaziland), although in the Central America region additional conservation measures in Mexico were also considered to be particularly important.

4. Controlled breeding of crocodiles

Three papers were presented under this head and, in addition, Mr. M.C. Downes submitted a Bibliography of all published references to crocodile 'husbandry' (in the broad sense of keeping or 'farming' crocodiles and the conditions required to achieve success). The Bibliography, selected from a comprehensive working guide to 'the Literature of the Living Crocodilians', the preparation of which is being financed by the New York Zoological Society with a view to publication by the Department of Agriculture, Stock and Fisheries of Papua New Guinea towards the end of 1973, was welcomed by the Group as a most valuable contribution. It is included as an Appendix to the Proceedings.

The recommendations arising from the discussion of the papers were concerned with the problems involved in the breeding of the Cuban crocodile C. rhombifer, the status of which was believed to be somewhat precarious and, in particular, with the problem arising from its reported hybridization with C. acutus.

In subsequent discussion a proposal was endorsed for the preparation of a list or register of crocodile farms, indicating their various objectives and modes of operation. This would be organized by Mr. Pooley, to whom all available information should be directed (zoo breeding units qualify for consideration if serving an effective educational purpose). The first stage would be to produce a check-list, supported by a tentative ranking list, for the consideration of IUCN/SSC, only such farms as are recommended by the group and accepted by IUCN being finally registered. It would be desirable for ranking to be up-dated annually, implying on-site inspection and the regular review of farm objectives and assessment of the educational content of an operation. The Group would, of course, keep a copy of the register and its Newsletter might well be a convenient vehicle for publishing additions or other changes to the list.

There was also considerable discussion of the Crocodile Foundation, the endangered species breeding project established at the Yangprapakorn Crocodile Farm, Bangkok, following the recommendation of the Group's first meeting in 1971. Progress had not been as good as expected, since so far only C. novaeguineae, a species whose status was not considered critical, had been shipped to Thailand. Approaches made to AAZPA and to holders of crocodile collections in the U.S.A. had indicated general support for such projects and some interesting facts had come to light; for example, there are 11 specimens of the black caiman Melanosuchus niger in 11 different U.S. zoos, all of them animals suitable for propagation purposes, if only they could be brought together in one or several locations.

The Group considered that high priority should now be given to sending a few key species, especially C. moreletii, to the Bangkok farm, and it was understood that Mr. Yangprapakorn was ready to pay transport costs: an early approach should be made to the Thailand authorities with a view to easing importation formalities. Reference was also again made to the captive breeding by the Foundation of C. rhombifer, of one or more African species and of Alligator sinensis, though Bangkok was possibly too warm for the last-mentioned and an alternative possibility was to arrange for zoo exchanges to build up a stock for a breeding project in Australia. In general, the value of such exchanges should not be discounted, though zoo breeding units were unlikely to be able to mount such large-scale recovery programmes as were possible at the Yangprapakorn Farm or Ndumu Rearing Station. Another recommendation of the Group was that these two institutions should be replicated in South America as soon as possible, although Professor Medem's proposal for a C. intermedius breeding station had not yet received the hoped for support.

Meanwhile, one of the highest priorities was still the 1971 recommendation for the survey, capture and breeding in the Thailand and Zululand farms of Osteolaemus tetraspis and C. cataphractus, for which an application to W.W.F. for a \$7000 grant had already been made and was fully supported. It was also strongly recommended that Recommendation 6 of the 1971 meeting, urging Game Department involvement in rearing and re-stocking projects, should be followed up by letters to individual departments. Mr. Attwell was asked to draft suitable letters and furnish the necessary background information. The possibility of obtaining stocks from Ndumu should also be brought to the attention of suitable countries. In this connection approaches from Rhodesia and Uganda were reported, but it was felt that the latter country should be able to rely on its own stocks. Finally, a major NYZS project in Florida was noted, which hopefully should result in a crocodile survival centre in two years' time.

5. Other aspects of crocodile conservation and ecology

A number of other interesting papers and contributions were presented. The former covered:- some of the peculiar difficulties of conservation education in relation to crocodiles and the specialized techniques which were advocated or already being tried to overcome them; the important changes in the general crocodile conservation situation which is likely to come about when the international Convention to control trade in wild fauna and flora recently negotiated at Washington D.C. is ratified and brought into force (discussion of this item suggested that some modifications in the allocation of crocodile species to the Appendices of the Convention, providing for varying degrees of control, may in due course have to be recommended by the Group); and, thirdly, tied in

with the 'Scientific Day' of the meeting and a visit to St. Lucia Bay, a paper reviewing the current status and ecology of the very important C. niloticus population of the area.

Two other matters based on verbal contributions received attention. It was noted that the preparation of a policy statement on the crocodile hide industry was still not completed, but agreed that further efforts should now be made to obtain a consensus of the Group's views on the subject. Meanwhile, the Group had been specifically asked for their comments on the UNIDO crocodile tannery project in the Sudan. The general view was that considerably more consultation should take place before the project is implemented. Dr. King reported that the chief Sudanese delegate at the Convention negotiations had seemed genuinely interested in the conservation of the crocodile resources of his country and thought that a reasonable population of C. niloticus still existed, but also mentioned that there is a tremendous international trade in crocodile skins in the Sudan and it was estimated that 90 percent came from outside the country. In view of this and the obvious fact that a tannery in the Sudan is therefore unlikely to sustain itself from the crocodile resources inside the country, an essential prerequisite of the project, meriting careful consideration and any assistance which can be given by the Group, might well be the establishment of a crocodile farm.

The other topic discussed, based on a verbal report by Mr. Attwell, was the value to conservation of the capture of nuisance animals and their translocation. Such operations usually had a favourable reaction from the public and Press and they were now made relatively simple by the use of the drug flaxedil as an immobilisation agent, which had more or less eliminated casualties (see the report by Loveridge and Blake in Arnoldia 40(5) of Nov. 72).

Crocodile Specialists,
Second Meeting
Paper A.1.1

POPULATION STATUS SURVEYS OF THE AMERICAN ALLIGATOR IN THE SOUTHEASTERN UNITED STATES

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This survey was begun in 1971 with the idea of establishing a base line from which gross changes in the population status of the American alligator (Alligator mississippiensis) could be detected. The count is not randomized and the data collected cannot be used for comparing populations between states or counties within states. The main function of the survey will be to evaluate differences between years and, even then, comparisons can only be made in areas where observations have been repeated periodically and where the method of surveying has been standardized.

METHODS AND MATERIALS

The range of the American alligator includes all or parts of 8 states; consequently, the survey can only be made with the cooperative efforts of a large number of individuals. Personnel of the various State Game Departments and National Wildlife Refuges make most of the counts. University personnel, students and other interested persons also assist in the survey and provide input from key locations. The following is a general description of the guidelines developed for the survey:

Cooperative Alligator survey

A survey is planned to determine annual trends in the population of the American Alligator. Night counts will be made in selected areas and over predetermined survey lines.

The survey line should be about 10 miles long and in suitable alligator habitat. A detailed description of the survey line should be provided, so that effort can be easily duplicated by others in later years.

The count should be made during the dark of the moon and should begin about one hour after sunset. Alligators can

be classified while travelling along at a fairly rapid pace. However, the observer should adjust the speed to make certain that animals are not overlooked.

The number of alligators seen should be tabulated by one-foot size classes. The distance from the nose to the eye in inches provides a reliable estimate of the total length in feet.

One count of the survey line is to be scheduled each year, thus requiring only a few hours of time from each cooperator. Multiple counts will be made in a special study to determine the variation in the procedure.

The count should be made when the temperature is above 70°F and on any day from May to October. Counts in following years should be made on approximately the same date.

This survey was planned for developing an index to the alligator population in different parts of its range. Annual counts of alligators along the survey lines may be used as a means of determining population trends. The survey is not intended as a means of determining total numbers of alligators in any state or locality and information must be gathered for a period of years before any trend will be evident.

Since the survey will not be used to determine a total number of animals in a given area, random selection of lines is not essential. Survey lines should be established in the areas with suitable alligator habitat and preferably areas having alligator populations. It is not essential that alligators be found on the survey line.

Lines selected for counts should be on water bodies which are representative of the area, and will reflect annual changes in alligator population. Areas given intensive protection, such as areas on refuges (particularly those adjacent to refuge headquarters) will not reflect hunting pressure.

The areas selected for the survey should be in habitat conditions which will remain fairly unchanged year after year. Shallow water areas which may be dry at certain times should be avoided; also areas which may be blocked by vegetation, such as water hyacinth (Eichhornia crassipes), should not be used. The lines may be established on marshes, rivers, lakes or swamps, in fact counts in all habitat types (in relation to their abundance) would be ideal.

The main point about the survey is that the procedure used along a particular line be standardized. The exact route should be checked about the same time each year, using similar equipment and the same observer, if possible.

In addition to the areas surveyed in 1971, the counts were expanded in 1972 to include areas not previously

surveyed. As shown in Table 1, 93 lines were counted in 1972, an increase of 37 over the previous year. The total number of miles surveyed was increased from 773.85 in 1971 to 1023.8 in 1972. Many of the areas added in 1972 were on the outer edge of the alligators' range and will provide valuable information after a period of years.

RESULTS

The results of the 1972 survey are set out in Table 2. During 1972, 4,025 alligators were observed along the survey lines. Even though this was an increase from the 3,964 observed in 1971, the alligators per mile actually declined as a result of the additional survey routes. Many of the new survey routes were in areas on the margin of the alligators' range and contained low populations; hence, the lower average for 1972.

On a number of lines counted in 1971, less alligators were observed in 1972. Most cooperators attributed this decline to the abundant rainfall during 1972, which raised water levels in streams and lakes and caused alligators to disperse into backwater areas. On other lines a greater number was observed in 1972 than 1971. However, the observations should be continued over a period of years before any conclusions can be drawn from the surveys.

Table 1. Location and intensity of areas surveyed for alligator, 1972

State	No. Lines surveyed	No. Miles surveyed
Alabama	8	146.0
Arkansas	1	9.0
Florida	12	96.9
Georgia	6	52.0
Louisiana	32	281.6
Mississippi	3	31.0
South Carolina	10	131.8
Texas	21	275.5
TOTAL	93	1,023.8