

PN-AAR-887
LSN = 38351

#3CV

Biological Conservation 29 (1984) 183-189

Crocodile Conservation in India

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ABSTRACT

The accomplishments of the Government of India/UNDP/FAO Project in the conservation of three species of crocodiles during the period 1975 to 1982 are reviewed. Sixteen crocodile rehabilitation centres and eleven crocodile sanctuaries have been established. A total of 879 gharials, 190 estuarine crocodiles and 493 mugger have been released. A viable breeding population of gharials now exists in the National Ghambal Sanctuary. A Crocodile Breeding and Management Training Institute was established by the Government of India in 1980 and has trained 48 managers of crocodile stations. Improvements are required in the management of crocodile sanctuaries and the evaluation of crocodile habitat. Releases of crocodiles in the wild require monitoring of survival and movements. There is a need for educating the public about crocodile conservation.

INTRODUCTION

The author was invited by the Government of India and UNDP/FAO to evaluate the progress which has been made in crocodile conservation since a UNDP/FAO Crocodile Breeding and Management Project was launched in 1975 in co-operation with the Government of India and various State Governments. This paper reports the findings of a three-month study from February to May 1982.

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Biol. Conserv. 0006-3207/84/S03-00 © Elsevier Applied Science Publishers Ltd, England, 1984. Printed in Great Britain

The status of Indian crocodilians in 1974

Prior to the start of the project in 1974, Dr H. R. Bustard was asked to make a survey of the status of Indian crocodiles (Bustard, 1981), which produced the following results:

Gharial *Gavialis gangeticus*

This species, which was formerly abundant in the rivers of North India, was considered in danger of extinction because of habitat destruction, the lethal effect of set nylon nets and poaching activity. It was found that the surviving populations were extremely small.

Estuarine crocodile *Crocodylus porosus*

This species was formerly common along the shores and rivers of the sub-continent, but by 1974 it had become extinct in the States of Kerala, Tamil Nadu and Andhra Pradesh. A small population remained in the Brahmani-Baitarani deltaic area of Orissa, the Sunderbans of West Bengal and the Andaman islands.

Mugger *Crocodylus palustris*

By 1974 this species, formerly widespread and very abundant, was greatly depleted in numbers and considered rare in most, if not all, of its former range. It was considered that in South India/Tamil Nadu, Karnataka and Andhra Pradesh remnant populations could show a rapid response to management combined with protection and that this could also be the case in Rajasthan and Gujarat. Much of the mugger habitat has been affected by dam construction resulting in less favourable conditions for crocodiles and conflict with fisheries because of crocodiles getting caught in nylon gill nets. However, the species' adaptability to a wide range of habitats, including small ponds and tanks, and its ability to move long distances overland, tends to reduce its vulnerability.

Objectives of the project

The objectives of the project were:

- (1) to collect and transport crocodile eggs to rehabilitation centres for incubation and rearing of young until they were of a size suitable for release in the wild; and

- (2) to locate, establish and manage a network of crocodile rehabilitation centres and also sanctuaries in suitable habitats for the three crocodylian species.

RESULTS

Sixteen crocodile rehabilitation stations have been established throughout the country since the initiation of the project. Crocodiles have been released in eleven specially gazetted sanctuaries and, in addition, in eight other sanctuaries or national parks. At the time of writing (April 1982) a total of 879 gharials, 190 estuarine crocodiles and 493 mugger have been released in the wild (Table 1). All these crocodiles were three years old on release. Successful breeding of mugger has taken place in ten centres, of the estuarine crocodile in two and of the gharial in one centre. Further details about the conservation status of the mugger can be obtained from Choudhury (1982), of the estuarine crocodile in Bustard & Choudhury (1981) and of gharial in Singh (1978).

No doubt the greatest success was obtained with the re-establishment of the gharial. Viable breeding populations now exist in the Chambal and Satkosha Gorge sanctuaries, both exhibiting a satisfactory rate of recruitment.

Soon after the initiation of the project it became apparent that a crocodile conservation programme could not be successful in the absence of well-trained managerial and research staff, and for that reason a Crocodile Breeding and Management Training Institute was established by the Government of India in Hyderabad in 1980, which has trained 46 managers for crocodile stations, most of whom are now working at the various rehabilitation stations. In addition, under a cooperative effort between Dr H. R. Bustard, the FAO adviser, and several universities, four students obtained their PhDs in various aspects of crocodile biology and ecology, and two are still working towards that goal. The results of their work and also subsequent findings have been published (Singh, 1978; Choudhury, 1982).

The Government of India is now supporting the work of rehabilitation stations on a 50-50 basis on capital expenditure, provided that State Governments have requested such funds in aid.

TABLE 1
Crocodile Sanctuaries and Number of Crocodiles Released in Them

Name of sanctuary	Area in km ²	Number of crocodiles released up to 1982			State
		Gharial	Estuarine crocodile	Mugger	
National Chambal	12 568	758			U.P. M.P./Rajasthan
Katerniaghat	400 (approx.)	14?			Uttar Pradesh
Bhitarkanika	650		125		Orissa
Satkoshia	796	107			Orissa
Kinnersani ^a	635.4			33	Andhra Pradesh
Hadgarh	191				Orissa
Krishnagiri	?			130	Tamil Nadu
Coringa	236			3	Andhra Pradesh
Papikonda	591				Andhra Pradesh
Lanjumadugu	20				Andhra Pradesh
Manjira	20				Andhra Pradesh
Pakhhal	860			15	Andhra Pradesh
Nagarjunasagar-Srisaïlam (Krishna)	3 568			136	Andhra Pradesh
Hoggenakal ^a	?			48	Tamil Nadu
Mundanthorai ^a	?			25	Tamil Nadu
Shivpuri National Park ^a	156			25	Madhya Pradesh
Gir National Park ^a	1 412-12				Gujurat
Similipal Tiger Reserve ^a	303				Oriss ^a
Sunderbans Tiger Reserve ^a	2 585		65		West Bengal
Totals		879	190	475	

^a Not created specifically for crocodiles.

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DISCUSSION

Although the results obtained so far are a clear indication of the fact that the Government of India and State Governments have made good progress in establishing an effective programme of crocodile conservation, considerable work remains to be done, as is evidenced by the following information:

(1) The management of crocodile sanctuaries leaves much to be desired. Although some management plans have been drafted, none of them has been executed so far. Sanctuaries are either being encroached upon or are inhabited by man and his beasts; cutting of firewood is a common occurrence; overgrazing takes place frequently and harassment of wildlife by dogs often occurs; river banks are sometimes cultivated and/or overgrazed; and, because of the presence of people, poaching is often difficult to control.

(2) Inadequate information is available about the fate of crocodiles which have been released, and there are indications that a certain percentage of released gharials and estuarine crocodiles move out of protected areas and become threatened by the rural populations. Limited available data on mugger, however, indicate good survival rates of liberated stock (B. C. Choudhury, pers. comm.). It will be essential to step up monitoring of released crocodiles in order to determine how effective released programmes have been so far.

(3) There are general complaints by commercial fishermen that crocodiles cause a decrease in their catches of commercial fish and that for this reason no further release of crocodiles should be permitted. This is contrary to the findings of Cott (1961) in Uganda and other studies, that, rather than depleting commercial fish catches, crocodiles have instead increased them by controlling the populations of fish predators (fishes and birds), and fertilising the water with their excreta. In addition, young crocodiles prey extensively on many invertebrate predators of fish fry. As the results obtained in these studies may not necessarily apply in India, an experiment should be started to study the relationship between crocodile populations and economically valuable fishes.

(4) Much crocodile habitat continues to deteriorate, largely because of man's continuing interference. Mangrove forests, the best habitat for estuarine crocodiles in India, are either invaded by firewood gatherers or destroyed altogether in various places. Gharial habitat is affected by

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increasing erosion of river banks and siltation of river bottoms. It will be difficult to reverse this trend because of increasing population pressures on the land. The rate of habitat deterioration should be monitored.

(5) Although India has adopted suitable legislation through the Wild Life (Protection) Act, 1972, protection of crocodile populations against poaching still leaves much to be desired. For example, Choudhury & Bustard (1980) have indicated a very high level of predation of estuarine crocodile nests on North Andaman Island. There is a need for better staffing of crocodile sanctuaries by a cadre of motivated and specially trained protection staff.

In addition to what has already been stated, one major problem in crocodile conservation in India is the ignorance of the people, who consider that crocodiles are either man-eaters or competitors which should be eliminated. There is therefore a need to enlighten people about why crocodile conservation should be undertaken. The best places for doing this are, in fact, the various Crocodile Rehabilitation Centres now established by State Governments. Already large numbers of curious tourists are visiting some of these centres. This should be encouraged further and efforts should be made to have somebody on hand to explain the objectives of crocodile rehabilitation. In addition, films and slides about crocodile ecology and pamphlets should be used wherever possible.

It is hoped that the Crocodile Breeding and Management Training Institute, situated at Hyderabad, will in the future play a pivotal role in crocodile conservation in India by effectively advising State personnel about improved management procedures for captive crocodiles and crocodile sanctuaries and by creating a more favourable attitude among the public at large for crocodile conservation.

ACKNOWLEDGEMENTS

The author acknowledges the assistance of Drs B. C. Choudhury and L. A. K. Singh for providing the necessary background data for this paper. Dr J. B. Sale, commented on a draft of the manuscript.

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