

Gharial conservation in Nepal: Results of a population reinforcement program

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Abstract

Two species of the family Crocodylidae are found in Nepal: The marsh Mugger, *Crocodylus palustris*, and the freshwater Gharial, *Gavialis gangeticus* Gmelin, 1789. The gharial has a large extremely slender-snout. Adult male has a conspicuous narial excrescence commonly called *ghara*. It is listed as endangered Protected animal in the National Parks and Wildlife Conservation Act 1973 of Nepal and on Appendix I of CITES. Gharials are specialised fish-eaters. At present, individuals are distributed in isolated remnant populations in the Karnali, Babai, Narayani and Sapta Kosi river systems. Just recently a new population of more than 20 animals is re-established in the Rapti River of Nepal. All of them are in or adjacent to protected areas. The population of Gharial in the Sapta Kosi River is very low.

Since 1981, the “Gharial Conservation Project” at Kasara in Royal Chitwan National Park began a program for crocodile conservation. More than 500 gharials have been released since then. However, captive breeding at the Gharial Conservation Project is successful but survival of the released animals is very low. The recent observation of the gharial in the Narayani and Rapti rivers indicated that the population of the adult gharial is declining but it is compensated by the regular release of the captive reared animals though the survival is very low. In order to manage this animal efficiently, a program was launched by the Department of National Parks and Wildlife Conservation, in collaboration with the La Ferme aux Crocodiles (Pierrelatte, France) and WWF Nepal Program. The programs include the construction of scientifically improved hatchling pools and regular monitoring of the released gharials in the Narayani River.

1. Introduction

Two species of the family Crocodylidae are found in Nepal: The Marsh Mugger, *Crocodylus palustris* belongs to the subfamily crocodylinae and the Gharial *Gavialis gangeticus* Gmelin 1789, belongs to the subfamily gavilianae is only survivor of the Gavialidae family (Maskey and Percival 1994). The gharial is the most aquatic of all the crocodiles, and its hydrodynamic body allows it to be an excellent swimmer. The peculiarity of the gharial morphology is striking. It has a large extremely slender snout and adult males grow around their nostrils a bulbous nasal appendages called “ghara”, which is absent among other crocodylians. It is listed as endangered Protected animals in the National Parks and Wildlife Conservation Act 1973 of Nepal and on Appendix I of CITES. Gharials are specialized fish-eaters.



In the past, the gharial was commonly found in all the major rivers of the Indian sub-continent, including rivers of Pakistan, Burma, North India, Nepal and Bhutan and in the south to the Mahanadi of India. But today this population has virtually disappeared. In spite of its wide distribution and abundance in the past, it is the least known of the 23 species in the world (Whitaker and Basu 1983). Gharial is one of the seven of the most threatened crocodiles in the world. The main cause of decline of the gharial population: human steal their eggs for food and medicine; killing the gharials for the skin and the superstitious value of the ghara of male gharial; overharvesting and poisoning of the fish in the rivers; caught in carelessly placed fishing nets which result death of the animal; industries pollution in the river; encroachment of the habitat by the extended agricultural practices and finally by the construction of reservoirs and dams in its suitable habitat.

2. Present Status

In the middle of the 1970's, its population was estimated at about 300 specimens in the world. Near from extinction, the species was saved from the brink of extinction, thanks to captive rearing and restocking programs led in India and Nepal. In India after re-introduction program, the population of gharial was counted more than three thousands animals but today it is again decline to a estimated wild population of about 585 individuals among which 450 in Chambal River, 50 in Girwa River, 25 in Son River, 10 in Ken River and less than 50 in other rivers (Poster Session, 18th CSG Meeting, Montelimar, 2006). In Nepal, the remnant population of gharial is found in Koshi, Narayani, Rapti, Babai and Karnali rivers. The estimated number of gharial in Nepal is given in Table 1. In Pakistan, Bangladesh, Bhutan and Myanmar, there is no record of wild gharial in the present situation. They are either rare or been wiped out from the river systems.

Table 1. Estimated gharial population in Nepal

	Rivers					
	Narayani	Rapti	Koshi	Karnali	Babai	
2004	31	30	10*	10*	12*	93
2005	27	23	10*	10*	12*	82
2006	22**	25**	10*	10*	12*	79

* Just estimation (Actual population is not known)

** Confirmed population in wild – not more than 47

3. Conservation Initiatives

In 1978, The Government of Nepal with the support of Frankfurt Zoological Society launched a Gharial Conservation Project in Royal Chitwan National Park, thanks to the Government of Nepal. It aims to protect the natural sites where gharials lay their eggs; to collect the wild eggs and hatch the eggs in artificial conditions; rear the young until they reach two meters (length at which they are not subjected to predation anymore) and to release them into the rivers in order to support the wild populations.



Since 1981, about 477 young gharials from the rearing centre at the Gharial Conservation Project have been released into the Rapti and Narayani rivers of Chitwan. Some were released into the Koshi, Babai and Karnali rivers (Table 2). These combined programs restored the population of gharial in the wild.

4. Collaboration in Gharial Conservation

Expanding the conservation measure led by the Nepalese Government for more than 20 years, a collaboration between the Department of National Parks and Wildlife Conservation, La Ferme aux Crocodiles and WWF Nepal Program was initiated in 2002, aiming to establish a gharial interpretation centre, initiate a monitor program of the released gharials in the Narayani and Rapti rivers and improve the rearing facilities established at the park headquarter (Cadi *et al.* 2002, Cadi *et al.* 2005).

4.1. Establishment of Gharial Interpretation Center

A gharial interpretation center was established in the premises of Gharial Conservation Project in Chitwan National Park. It includes the information on the historical background and conservation of gharial in Nepal, its distribution and nesting biology, food habits and threat to the survival of gharial in the wild. The interpretation center is very helpful to disseminate the information of gharial conservation to the local communities and the visitors to the park.

4.2. Monitoring of released gharial

From March 2002 to date, 76 gharials have been released at different location in the park. Before each released, each individual were attached with the numbered cattle tag for identification during monitoring. In addition, 20 individuals were equipped with radio transmitter, 10 in March 2002 release and 10 in November 2003 release. The monitoring result shows a homogenous distribution of gharial in Rapti and Narayani rivers (J.M. Ballouard *et al.*



2005) There is a higher concentration of gharial in the Bhawanipur – Kasara sector of Rapti River and Amaltari – Tribeni sector of Narayani River. In comparison with the 76 km of Narayani River, the Rapti River with only 36 km shows the highest concentration of gharial. This is probably because of the more human disturbances like heavy movement and fishing in the Narayani River and pollution created by dozens of industries established along the Narayani banks.

4.3. Reinforcement of Captive Breeding Facility



Despite the scrupulous care of the hatchlings in captivity, the growth of the hatchlings are recorded very slow and more than 50% of them died within the six month period of their hatching. In the current context of extinction of the species, it is essential to improve the existing condition of the hatchling pools that provide them more heat and a clean pool to reduce the early stage mortality. After discussion with many experts particularly with Dr. F. Huchzermeyer, Chairman of the Veterinarian Committee

of the CSG), Gharial Conservation Center and La Ferme aux Crocodiles has designed a improved type of hatchling pool and constructed in the premises of the Gharial Conservation Project, Chitwan National Park (A. Cadi 2005). This new facility will allow overall a suitable environment to reduce the mortality of hatchlings during its early stage contributing more anima survival in the captivity.

Recommendations

Participatory Conservation Program: The role of local community to the gharial conservation is very important. They help to collect wild eggs, supply fish for food and take care of the gharial conservation center.

Reintroduction: The re-introduction of the gharial into its suitable habitat is the only solution to built up the gharial population in the wild. In future re-introduce more gharials in the Karnali and Babai rivers of Bardia National Park and Koshi River of Koshitappu Wildlife Reserve.

Pollution Control: Rivers and wetlands are vulnerable to pollution from human activities and increasing industrialization. The water quality should be improved especially in the Narayani River where a high number of gharial is present. Effluents from industrial waste must be treated before it enters into natural water to preserve critical habitat of endangered aquatic species.

Strict enforcement of existing laws: Human activities like heavy movement and over fishing are directly or indirectly responsible for the disappearance of gharial from its habitat. The large scale fishing activities and human movement should be restricted in the Narayani River.

Community Development Initiatives: There is a provision of revenue sharing of Chitwan National Park in the existing National Parks and Wildlife Conservation Act 1973. Some portion of these revenue sharing resources should be canalized to support the local communities such as income generation activities, fish pond/ fishing farm construction for their livelihood and awareness program.

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