

## The Dilemma of Conservation

-by Gaurav Vashistha

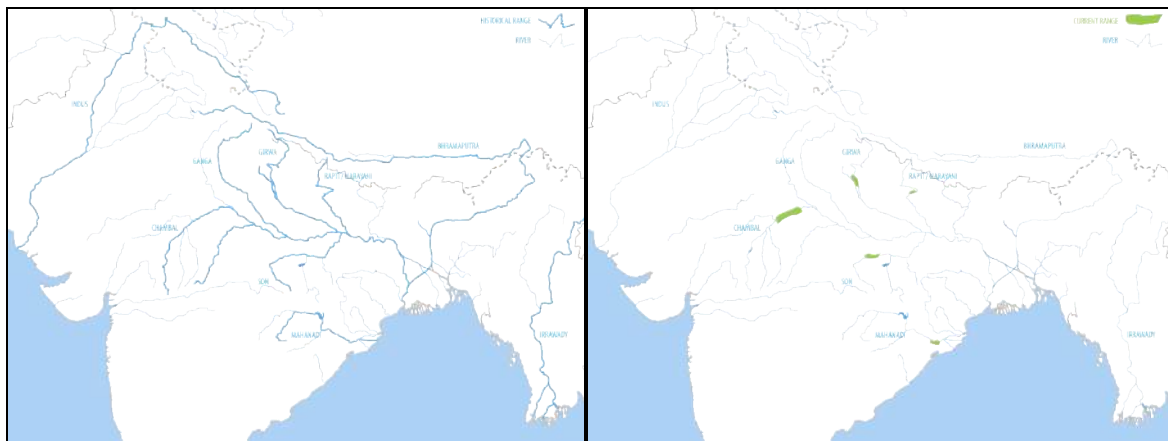
### Introduction



Pic 1: The magnificent *Gavialis gangeticus*

Gharials *Gavialis gangeticus* are crocodylian species which inhabit fresh water, flowing riverine ecosystems. It is a diet specialist, a piscivore, actively feeding on fish. Its snout is longirostrine type i.e. narrow and long and specialized for swift movement through water to catch active prey such as fish. Its body structure, especially vertebral column and skull, doesn't allow for active terrestrial movement as normally observed in other crocodylian species. It is a hole nesting species and uses sandy beaches and mid river sand bars for egg laying. Being the top predator in its ecosystem, the gharial maintains the food chain by feeding on larger predatory fish, which in turn, are a control for the smaller fish. It was widely distributed across Indian subcontinent, with its distribution in early 1900's ranging from the Indus river system in Pakistan to the Irrawaddy river system in

Myanmar, inhabiting major river systems across the Indian mainland. Fossil evidences show a wider range, including Kashmir in the north and few extinct species of genus *Gavialis* as far as Thailand and Java. Population surveys in 1976 resulted in an estimate of 129 gharials across India in the wild and a total of 774 in the world including captive animals from the zoo. This survey reported possible extinction of gharial from Bangladesh, Burma and Bhutan. Project crocodile was initiated in India under which crocodiles were captive bred under the 'grow and release' programme. Eggs were collected from the field, incubated artificially and released once they were of an appropriate length. Population surveys were conducted at regular intervals to monitor the population sizes and it was reported that the gharial number has been steadily increasing and the populations, stabilizing.



Distribution Map: Historical and Current Distribution of the Gharial in Indian Subcontinent. (Source: Gharial Conservation Alliance. Dark blue line in map represents the historical distribution while green line depicts the current distribution)

### Gharial population at the National Chambal Sanctuary

Gharial population at the National Chambal sanctuary suffered a massive die off during 2007-08 when nearly 110+ adult gharials were found dead within a very short time duration. Multiple investigations involving national and international experts were conducted, but no specific cause for the death was ascertained. Result from one of the investigation stated that the pollution from Yamuna could be one of the reasons behind the deaths, as post monsoon gharials move downstream to the region where the Yamuna joins Chambal near Etawah and pollutant from the Yamuna accumulated in the gharial's system due to its active feeding on fish. During winters, the gharial spends most of their time basking and the pollutants present in the animals' body couldn't be metabolized actively and got stored in the animal tissues.



Pic 2: Baby gharials swim near their hatching site in Katarniaghat wildlife sanctuary, Uttar Pradesh.

## Scientific analysis

The Government of India has initiated a long term monitoring project in collaboration with the Gharial Conservation alliance. As part of the project, radio telemetry was used to study the movement pattern of the gharials at different ages and seasons. This study showed remarkable patterns of animal movement based on the season as well as the age of the animal. According to the study, adults moved as far as 100+ Km upstream and downstream of the river for feeding and mating.

## Threats and distribution

Crocodylian species around the world faces imminent threat from anthropogenic activities. The key factors are habitat destruction and modification, illegal hunting and harvesting for meat, hide and illegal over exploitation of prey. The Gharial is a habitat and diet specialist. Construction of dams and barrages restricts its dispersal range and isolates various groups in a population, hence affecting the gene flow. Artificial construction affects the natural flow of river water and modifies the siltation rate, which plays a key role in formation of riverine sandy beaches and mid river sand bars. These sandy formations are prime locations for nesting and basking. Restricted flow of water also influences the prey base of the animal. Illegal sand mining results in direct destruction of gharial habitat as it

results in removal of sand from river during dry season which is the mating and nesting time for gharial as well as other fresh water reptilian species including many turtles. Increased use of sandy river beaches for cultivation is affecting the prime nesting sites and increasing human-animal conflicts. Fishing nets are found entangled around the snout of adult animals and may result in mortality.



Pic 3: Gharials basking on mid river sand bars

The habitat of gharial is shrinking at an alarming rate. Its wider distribution is now restricted to only a few patchy and isolated river ecosystems namely river Chambal in National Chambal sanctuary, river Girwa in Katarniaghat wildlife sanctuary and river Ram Ganga in Corbett tiger reserve. Another breeding population is found in Chitwan national park in Nepal. Gharial hatchlings have also been reported from the Hooghly river in West Bengal and river Gandak in Bihar in the recent years. However, Gharials are sometimes dispersed downstream during the flood season and these newly reported hatchlings from Hooghly and Gandak can be from Chambal and Nepal populations respectively. Investigations are being done to ascertain the origin of these new findings.



Gharials have been listed as Critically Endangered under the IUCN red list, considering the decline in its population and habitat size. Many studies focusing on habitat identification and characterization, behaviour and threat status, including anthropogenic interventions to gharials have been undertaken for gharials in India and Nepal. Grow and release program is still active at the Deori gharial centre in Morena, Madhya Pradesh. Recent population survey in 2017 gives a promising estimated count of 1500 + gharials across India. However, No studies are focussed on investigating the genetic diversity of these populations. Gharial populations have undergone severe population decline, population isolation and restocking in the last few decades. The habitat is constantly being destructed or modified with more and more construction, addition of pollutants, and withdrawal of river water for human and agricultural consumption. Telemetry results have already shown the great distances gharials move for feeding and mating.

### **Conservation requirements**

We are constantly working towards saving the species with multi dimensional studies and release programs but the most urgent requirement is availability of fresh water, running rivers and fishes to feed upon. We have been constantly restocking animals from one population to other but never tried to understand or investigate if it is actually assisting in making the population genetically viable and robust. Our conservation efforts should be towards conserving the habitat and the prey base, more than the anything else. Restoring a lost fresh water ecosystem is almost impossible in these times when fresh water is becoming a primary agenda on human conflicts. What if the gharial number rises to thousands again but there is no river to keep them? The perfect example is Nepal. They have hundreds of captive gharials which are beyond their release length and age but there is no place to release them. Locals actively kill the animals for meat and steal eggs for consumption. The impact of fishing is beyond control and is forcing captive gharials to be kept in their breeding centres only. Therefore we should take a lesson from these and focus our efforts on equally conserving the species and its habitat.

### **About the author:**

*Gaurav Vashistha, who is currently pursuing his Ph.D, has completed his Masters in Environmental studies from Department of Environmental studies, University of Delhi. His primary focus has been the population studies of critically endangered gharial *Gavialis gangeticus* in Katarniaghat wildlife sanctuary, Uttar Pradesh. He is passionate about reptiles and in his spare time, likes writing poems in Hindi.*

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