TOPIC: CROCODILE(GHARIAL) CONSERVATION PROJECT

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INTRODUCTION

The **gharial** (*Gavialis gangeticus*), also known as the **gavial** or the **fish-eating crocodile**, is a *crocodilian* in the family *Gavialidae* and among the longest of all living crocodilians. Mature females are 2.6–4.5 m (8 ft 6 in–14 ft 9 in) long, and males 3–6 m (9 ft 10 in–19 ft 8 in). They have a distinct boss at the end of the snout, which resembles an earthenware pot known as a *ghara*, hence the name "gharial". The gharial is well adapted to catching fish because of its long, thin snout and 110 sharp, interlocking teeth.

DISTRIBUTION AND HABITAT

The gharial once thrived in all the major river systems of the northern Indian subcontinent, from the Indus River in Pakistan, the Ganges in India, the Brahmaputra River in northeastern India and Bangladesh to the Irrawaddy River in Myanmar.

In India, gharial populations are present in the:

- Ramganga River in Corbett National Park, where five gharials were recorded in 1974. Captive-bred gharials were released since the late 1970s. The population is breeding since 2008, and increased to about 42 adults by 2013. Most of them congregate along a 8 km (5.0 mi) long stretch of the Kalagarh Reservoir's shoreline. Surveys in 2015 revealed a population of 90 gharials including 59 breeding adults.
- Ganges, where 494 gharials were released between 2009 and 2012 in Hastinapur Wildlife Sanctuary.
- Girwa River in Katarniaghat Wildlife Sanctuary where the small breeding population was reinforced with captive reared gharials since 1979. A total of 909 gharials were released until 2006, but only 16 nesting females were recorded in the same year. In December 2008, 105 individuals were counted including 35 adults. In spring 2009, 27 nests were detected in seven sites.
- Gandaki River downstream the Triveni barrage west of Valmiki Tiger Reserve and adjacent to Sohagi Barwa Sanctuary. The population increased from 15 gharials in 2010 to 54 individuals recorded in March 2015 on a stretch of 320 km (200 mi). 35 of these gharials were wild-born.
- Chambal River in National Chambal Sanctuary where 107 gharials were recorded in 1974. Captive-bred gharials were released since 1979, and the population increased to 1,095 gharials in 1992. Between December 2007 and March 2008, 111 gharials were found dea. A total of 948 gharials were counted

during surveys in 2013 along the protected river stretch of 414 km (257 mi). In 2017, this population was estimated at 617–761 mature individuals and more than 1250 individuals by two different survey teams; 411 nests were found.

- Parbati River, a tributary of the Chambal River, where gharials started using a few sand banks since about 2015; 29 gharials were observed in 2016 and 251 hatchlings counted at two nesting sites in 2017.
- Yamuna River where eight young gharials were detected in autumn 2012 near the confluence of the Ken and Yamuna Rivers. They were probably offspring of the breeding population in the Chambal River and had drifted downriver during monsoon floods.
- Son River where 164 captive-reared gharials were released between 1981 and 2011.
- Koshi River in Bihar where two gharials were sighted basking in late January 2019 during a survey targeting South Asian River Dolphins (*Platanista gangetica*) on a stretch of about 175 km (109 mi). This is the first record of wild gharials in the river since the 1970s.
- Mahanadi River in Odisha's Satkosia Gorge Sanctuary where about 700 gharials were released between 1977 and the early 1990s. During a 1.5 year long survey in 2005–2006, only one male and one female gharial were detected moving together and sharing sand banks in the river.

Threats[edit]

The gharial population is estimated to have declined from 5,000–10,000 individuals in 1946 to fewer than 250 individuals in 2006, a decline of 96–98% within three generations. Gharials were killed by fishermen, hunted for skins, trophies and indigenous medicine, and their eggs collected for consumption. Today, the remaining individuals form several fragmented subpopulations. Hunting is no longer considered a significant threat. However, the wild population declined from an estimated 436 adult gharials in 1997 to fewer than 250 mature individuals in 2006. One reason for this decline is the increased use of gill nets for fishing in gharial habitat. The other major reason is the loss of riverine habitat as dams, barrages, irrigation canals and artificial embankments were built; siltation and sand-mining changed river courses; and land near rivers is used for agriculture and grazing by livestock.

When 111 dead gharials were found in the Chambal River between December 2007 and March 2008, it was initially suspected that they had died either because of toxicants or the illegal use of fish nets, in which they became entrapped in and subsequently drowned. Later post mortem pathological testing of tissue samples revealed high levels of heavy metals such as lead and cadmium, which, together with stomach ulcers and protozoan parasites reported in most necropsies, were thought to have caused their deaths.

Conservation

The gharial is listed on CITES Appendix I. In India, it is protected under the Wildlife Protection Act of 1972. In Nepal, it is fully protected under the National Parks and Wildlife Conservation Act of 1973.

Reintroduction programmes

- Since the late 1970s, the gharial conservation approach was focused on reintroduction. Rivers in protected areas in India and Nepal used to be restocked with captive bred juvenile gharials. Gharial eggs were incubated, hatched and juvenile gharials raised for two to three years and released when about one metre in length.
- In 1975, the Indian Crocodile Conservation Project was set up under the auspices of the Government of India, initially in Odisha's Satkosia Gorge Sanctuary. It was implemented with financial aid of the United Nations Development Fund and the Food and Agriculture Organization. The country's first gharial breeding center was built in Nandankanan Zoological Park. A male gharial was flown in from Frankfurt Zoological Garden to become one of the founding animals of the breeding program. In subsequent years, several protected areas were established. In 1976, two breeding centres were established in Uttar Pradesh, one in Kukrail Reserve Forest and one in Katarniaghat Wildlife Sanctuary, with facilities to

hatch and raise up to 800 gharials each year for release in rivers. Between 1975 and 1982, sixteen crocodile rehabilitation centers and five crocodile sanctuaries were established in the country. Gharial eggs were initially purchased from Nepal. In 1991, the Ministry of Environment and Forests withdrew funds for the captive-breeding and egg-collection programs, arguing that the project had served its purpose. In 1997–1998, over 1,200 gharials and over 75 nests were located in the National Chambal Sanctuary, but no surveys were carried out between 1999 and 2003. Gharial eggs collected from wild and captive-breeding nests amounted to 12,000 until 2004. Eggs were incubated, and hatchlings were reared to a length of about one meter or more. More than 5,000 gharials were released into Indian rivers between the early 1980s and 2006. Despite the release of 142 gharials between 1982 and 2007 into the Ken River, only one adult female gharial was observed in the river in spring 2013, indicating that most of the released gharials had not reproduced.

- In Nepal, wild eggs collected along rivers have been incubated in the Gharial Conservation and Breeding Center in Chitwan National Park since 1978. The first batch of 50 gharials was released in spring 1981 into the Narayani River. In subsequent years, gharials were also released into five other rivers in the country. In 2016, this center was overcrowded with more than 600 gharials aged between 5 and 12 years, and many were too old to be released. Between 1981 and 2018, a total of 1,365 gharials were released in

the Rapti–Narayani river system. Reintroducing gharials helped to maintain this population, but the survival rate of released gharials was rather low. Of 36 marked gharials released in the spring seasons of 2002 and 2003 into the Rapti–Narayani rivers, only 14 were found alive in spring 2004. This reintroduction programme has been criticised in 2017 as not being comprehensive and coordinated, as often too old and unsexed gharials were released at disturbed localities during unfavourable cold months and without assessing the efficiency of these releases. It has been suggested to instead leave wild nests in place, increase protection of nesting and basking sites and monitor the movement of gharials.

- Releasing captive-reared gharials did not contribute significantly to re-establishing viable populations.[2] Monitoring of released gharials revealed that the reintroduction programmes did not address multiple factors affecting their survival. These factors include disturbances from diversions of river courses, sand mining, cultivation of riversides, fishing by local people and mortality related to fishing methods like the use of gill nets and dynamite. In 2017, members of the Crocodile Specialist Group therefore recommended to foster engagement of local communities in gharial conservation programs.

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