



A Field Observation of the Critically Endangered Indian Gharial, *Gavialis gangeticus* (Gemlin 1789), in the Lower Ganga Canal, Narora, Uttar Pradesh, India

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Of the 24 extant species of crocodylians (Martin 2008), three occur in India: the Gharial, *Gavialis gangeticus* (Gemlin 1789); the Mugger, *Crocodylus palustris* (Lesson 1831); and the Estuarine Crocodile, *Crocodylus porosus* Schneider 1801. The Gharial (Gavialidae) is one of an ancient group of crocodylians most of which are extinct, hence this species is considered a living fossil (Vasudevan and Sondhi 2010). The Gharial is a river-dwelling species distinguished by its enormously long, thin jaws, which are considered an adaptation for its dependence on a diet of fish (Stevenson and Whitaker 2010). The name is derived from the bulbous cartilaginous growth on the end of the snout of adult males that resembles an earthenware pot called a *ghara* (Smith 1931).

This species is listed as Critically Endangered on the IUCN Red List (Choudhury et al. 2007) and is considered the most endangered large animal on the Indian Subcontinent and one of the most endangered of all crocodylians (GCA 2008). It is a keystone species of running freshwater ecosystem and plays an important role in aquatic systems by distributing nutrients from the bottom of the riverbed to the surface, escalation of primary production and fish populations, and sustaining aquatic ecosystem (CSG 2018).

The Gharial is endemic to the Indian Subcontinent, where it occurred historically in the Ganges, Brahmaputra, Indus, and Mahanadi River Systems (Groombridge 1987; Hussain 1999; Singh 1978; Smith 1931; Whitaker 1987);



Fig. 1. Basking Indian Gharial (*Gavialis gangeticus*) on the bank of the Lower Ganga Canal, Narora, Uttar Pradesh, India. Photograph by Debanjan Sarkar.

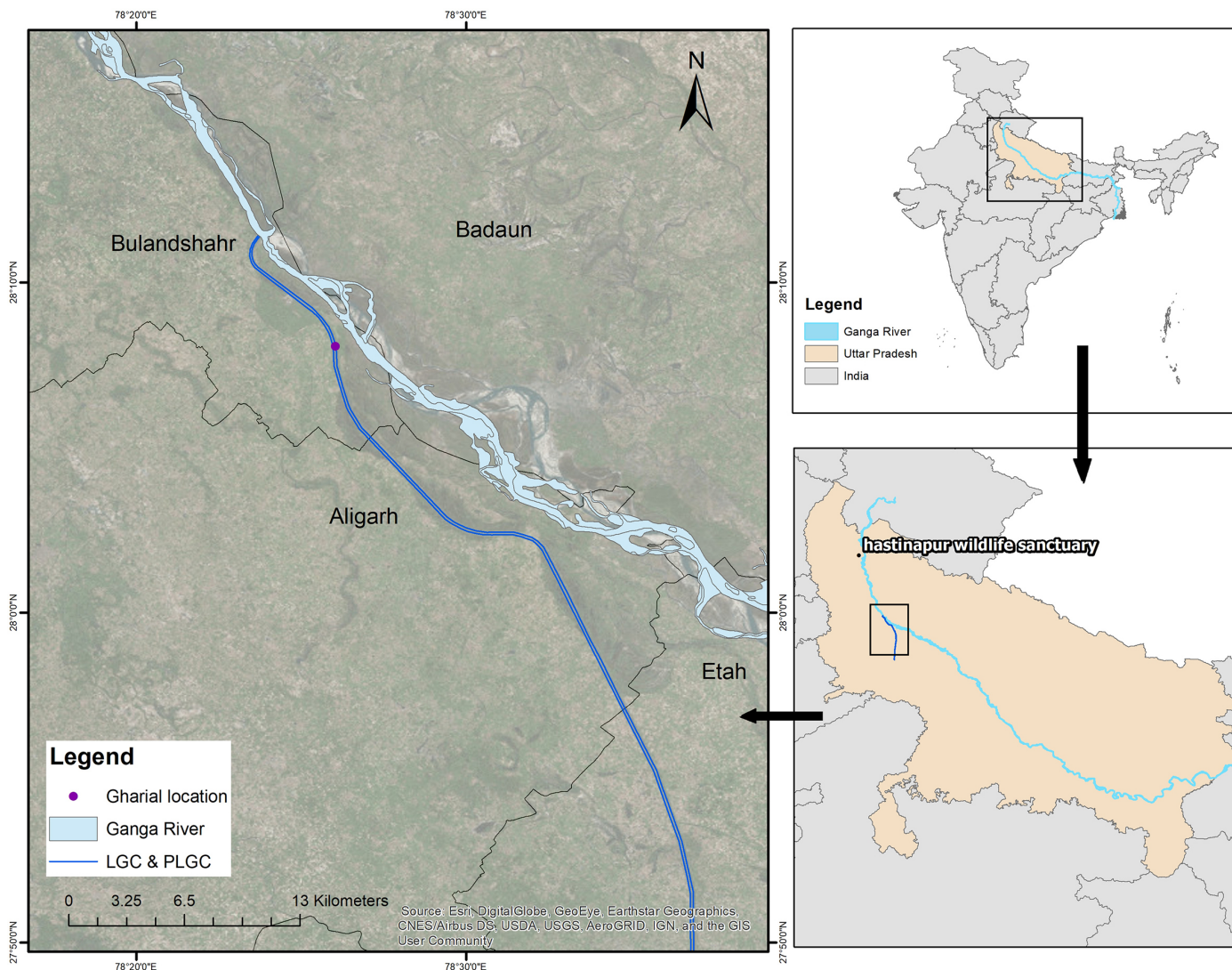


Fig. 2. The study area and the site where an Indian Gharial (*Gavialis gangeticus*) was sighted along the Lower Ganga Canal, Narora, Uttar Pradesh, India (LGC = Lower Ganga Canal; PLGC = Parallel Lower Ganga Canal).

Smith (1931) also reported its presence in the Irrawaddy River System. The species is now extirpated in Myanmar, Bhutan, and Pakistan (WII-GACMC 2018). During the mid-1970s, populations of Gharial were on the verge of extinction due to habitat loss and hunting (Choudhury and Bustard 1979; Choudhury and Chowdhury 1986; Daniel 1970; Honegger 1971). Other major threats to this species are incidental and intentional fishing activities (Stevenson and Whitaker 2010).

Gharials usually live in large rivers where they share habitat with Muggers (Vasudevan and Sondhi 2010). Surviving small wild populations are restricted to a few river systems in northern and eastern India, Bangladesh, and Nepal (Vasudevan and Sondhi 2010; Maskey and Percival 1994). The current distribution of Gharial in India is about 2% of the historical range, and numbers have declined about 96% since 1946 (Whitaker et al. 1974). According to Choudhury et al. (2007), as few as 182 adults remain in the wild in three broadly separated breeding subpopulations in India

(Chambal River, Girwa River, and Son River), one in Nepal (Rapti/Narayani River), and a few other non-breeding sites. Generally, Gharials prefer sandy banks with a water depth greater than 4 m (WII-GACMC 2018).

The Wildlife Institute of India carried out a biodiversity assessment survey from 24 January to 15 May 2017 along the Lower Ganga Canal in Uttar Pradesh, India. During the survey, we observed a basking Gharial (*Gavialis gangeticus*; Fig. 1) on the bank of the canal at 28.134515°N, 78.434047°E (Fig. 2) on 25 January at 1312 h. The individual was about 1.5 m in length and lacked a *ghara* on the tip of its snout. During our observation, the Gharial basked until 1401 h and then entered the water. This individual was sighted only once during the four-month survey. Information on the very few additional recent records of Gharial sighted at nearby locations are in Table 1.

In addition to the Gharial, we encountered 21 Muggers during the survey. Discussions with local inhabitants and fish-

Table 1. Records of Indian Gharial (*Gavialis gangeticus*) sightings at locations near the Lower Ganga Canal, Narora, Uttar Pradesh, India.

Location (coordinates and distance from present observation)	Source
Ganga River in Narora (28.383603°N, 78.280328°E; 25 km upstream of the canal)	NPCIL-NAPS (2015)
Rescued from the Parallel Lower Ganga Canal (28.19025°N, 78.39481°E; 7.27km upstream) and later released in the Hastinapur Wildlife Sanctuary, Uttar Pradesh (29.15438°N, 78.08388°E; 160 km upstream)	Yadav and Khan (2016)
Ganga River between Bhagalpur and Sultanganj (25.252544°N, 86.727777°E–25.321388°N, 86.993611°E; 1,040 km downstream)	Nawab et al. (2016)
Ganga River below the Bhimgoda Barrage (29.94697°N, 78.17339°E; 250 km upstream)	WII-GACMC (2018)
Ganga River between Brijghat and Bijnor (29.33879°N, 78.55199°E–28.7882°N, 78.75184°E; 85–160 km upstream)	WII-GACMC (2018)

ermen revealed that Muggers were sighted frequently in the canal, although they do not see them in the Ganga River. We also recorded nine species of freshwater turtles (Three-striped Roofed Turtle, *Batagur dhongoka*; Spotted Pond Turtle, *Geoclemys hamiltonii*; Indian Peacock Soft-shelled Turtle, *Nilssonia hurum*; Indian Roofed Turtle, *Pangshura tecta*; Brown Roofed Turtle, *Pangshura smithii*; Indian Tent Turtle, *Pangshura tentoria*; Indian Soft-shelled Turtle, *Nilssonia gangetica*; Crowned River Turtle, *Hardella thurjii*; Rock Terrapin, *Melanochelys trijuga*), the first three of which are considered threatened.

The Lower Ganga Canal (Fig. 3) was built in 1879 for the purpose of delivering water from the Ganga River to water-scarce areas of Uttar Pradesh. The canal is 90 km long and about 60 meters wide. However, because the canal was unlined, it has developed its own riparian ecosystem with

vegetation including cattails (*Typha* sp.), sedges (*Saccharum* sp.), buckthorns (*Ziziphus* sp.), dogbanes (*Calotropis* sp.), and mimosas (*Albizia* sp.). Consequently, many freshwater species enter the canal from the Ganga River. A recent proposal to line the Lower Ganga Canal would affect the riparian habitat. The feeder canal that parallels the Lower Ganga Canal already has been lined. We strongly recommended that proper mitigation measures be taken before lining the canal so that the flora and fauna of this freshwater ecosystem might persist.

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**Fig. 3.** View of the Lower Ganga Canal. Photograph by Debanjan Sarkar.

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