

## Two Incidents of Fishing Gear Entanglement of Ganges River Dolphins (*Platanista gangetica gangetica*) in Waterways of the Sundarbans Mangrove Forest, Bangladesh

Elisabeth Fahrni Mansur,<sup>1</sup> Brian D. Smith,<sup>2</sup> Rubaiyat Mansur Mowgli,<sup>1</sup> and M. Abdullah Abu Diyan<sup>1</sup>

<sup>1</sup>Bangladesh Cetacean Diversity Project, Shonadanga R/A, Khulna, Bangladesh; E-mail: mowgliz@gmail.com

<sup>2</sup>Wildlife Conservation Society, 2300 Southern Boulevard, Bronx, NY 10460, USA

### Abstract

Incidental mortality in fishing gear, especially gillnets, is considered among the most severe threats to the endangered Ganges River dolphin (*Platanista gangetica gangetica*). However, almost no information is available about actual interactions of the species with fisheries. An emaciated adult Ganges River dolphin was found stranded on Katka Beach where the eastern Sundarbans mangrove forest of Bangladesh meets the Bay of Bengal. The dolphin had a piece of fine-thread, mono-filament, 5-cm mesh-size gillnet, used to catch hilsa (*Tenualosa ilisha*) in large rivers and coastal areas, wrapped tightly around its rostrum. It also had a thicker strand, double-filament, 2.5- to 3.5-cm mesh-size gillnet, used to catch medium-size fin fishes in large rivers and small creeks, entangled in its teeth at the end of the rostrum. The dolphin was disentangled and released. In another incident, the carcass of a nonlactating female Ganges River dolphin was also retrieved from a local fishing boat in the northeast portion of the Sundarbans. The dolphin had become entangled in a long-line fishing gear very similar to the rolling hooks used in the Yangtze River that have been cited as among the primary factors contributing to the probable extinction of the baiji (*Lipotes vexillifer*). These incidents confirm that Ganges River dolphins are vulnerable to being accidentally killed by becoming entangled in gillnets and long-lines. These events also indicate the importance of monitoring mortality rates and establishing a protected area network in channel segments where the species occurs in relatively high numbers.

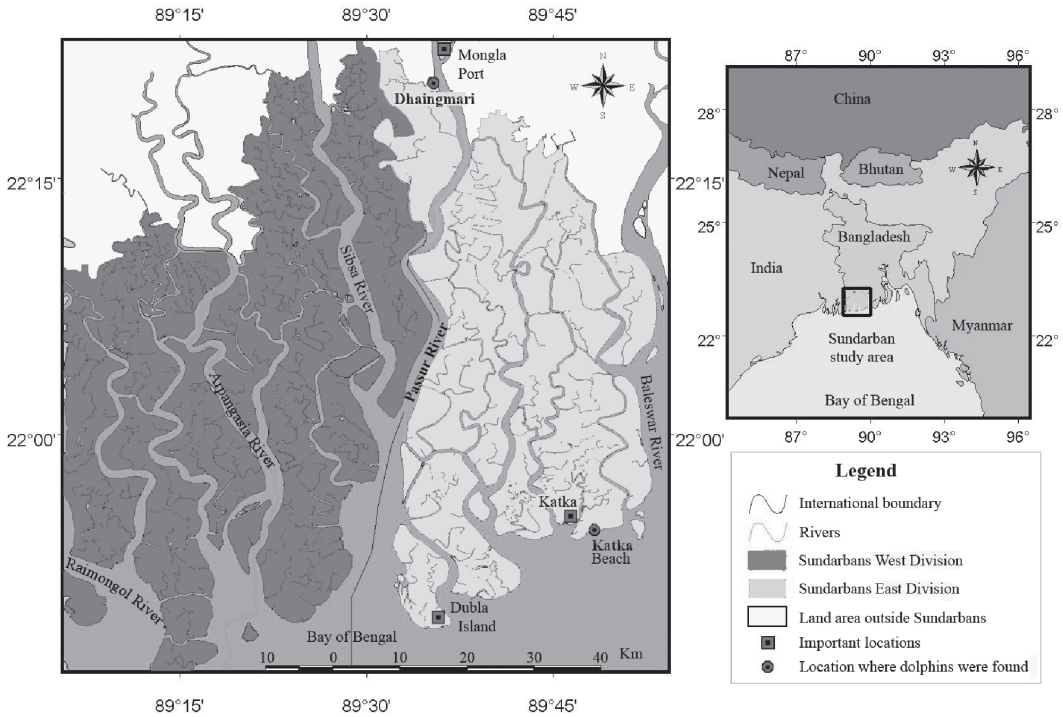
**Key Words:** Ganges River dolphin, *Platanista gangetica gangetica*, Irrawaddy dolphin, *Orcaella brevirostris*, gillnet, fishing gear entanglement, long-line, Sundarbans, Bangladesh

### Introduction

According to the IUCN Red List (Smith et al., 2004), mortality in fishing gear, especially gillnets, is considered among the most severe threats to the “endangered” Ganges River dolphin (*Platanista gangetica gangetica*) throughout its range in the Ganges-Brahmaputra-Meghna river system of Nepal, India, and Bangladesh (Mohan, 1995; Smith & Reeves, 2000; Smith et al., 2004; Choudhary et al., 2006), and in the comparatively much smaller Karnaphuli-Sangu river system of southern Bangladesh (Smith et al., 2001). However, information on actual interactions with fisheries is almost entirely lacking in the literature, and the perceived threat is based almost exclusively on anecdotal accounts and the observed preference of the species for inhabiting counter-current pools below confluences and meanders where gillnets are most densely deployed (see Smith, 1993; Smith et al., 1998).

This article describes two incidents of Ganges River dolphins becoming entangled with fishing gear in the waterways of the Sundarbans mangrove forest in Bangladesh (Figure 1), one involving gillnets and the other a long-line. Ganges River dolphins share the freshwater fringes of their mangrove channel habitat in the Sundarbans with Irrawaddy dolphins (*Orcaella brevirostris*) whose distribution extends farther southwest in the mangrove forest and offshore to the freshwater-affected coastal waters of the Bay of Bengal (Smith et al., 2006).

Drifting mono- and multifilament gillnets are commonly used to catch midwater fishes in the Sundarbans mangrove forest. Surveys for freshwater cetaceans conducted in almost all navigable channels of the mangrove forest during March and September/October 2002 recorded 501 (0.32/km) and 537 (0.72/km) of these type of gillnets, respectively (Smith, unpub. data). The gillnets were aggregately deployed along the northwest



**Figure 1.** Map of the Sundarbans mangrove forest showing the locations where two fishing gear entanglements of Ganges River dolphins were recorded (gillnet in Katka Beach and long-line near Dhangmari)

fringe of the Sundarbans Reserve Forest in the Passur River and in the southeast near Dubla Island where a large community of seasonal fishermen is located. Various different types of hook and line fishing gears targeting catfish, crabs, and freshwater lobsters are also commonly used (Bernacsek & Haque, 2001).

#### Description of Gillnet Entanglement

On 9 October 2003, a group of tourists from The Guide Tours Ltd. found an emaciated adult Ganges River dolphin stranded on Katka Beach where the eastern Sundarbans mangrove forest meets the Bay of Bengal (Figure 2). The dolphin had a piece of fine-thread, mono-filament, 5-cm mesh-size gillnet, known locally as a *sandi jahl*, wrapped tightly around its rostrum about a quarter of the length back from the tip. This type of gillnet is generally used to catch the commercially important andronomous shad hilsa (*Tenualosa ilisha*) in large rivers and in the coastal area between Dubla and Katka Islands. These gillnets are between 300 and 800 m long with a head rope fitted with plastic floats and a weighted foot rope that does not extend to the channel bottom (Bernacsek &

Haque, 2001). In addition, a portion of a thicker strand (0.5 mm diameter) double-filament, 2.5- to 3.5-cm mesh-size gillnet, known locally as *fash jal*, was found entangled in the teeth at the end of the dolphin's rostrum. This type of gillnet is used to catch medium-size fin fishes and juveniles of larger species, and it is generally set in large rivers and small creeks inside the mangrove forest. The gillnets are normally about 170 m long and, similar to the *sandi jahl*, have a head rope fitted with plastic floats and a weighted foot rope that does not extend to the bottom. These gillnets are reported to be pulled up frequently by the fishermen to prevent depredation by dolphins (Bernacsek & Haque, 2001).

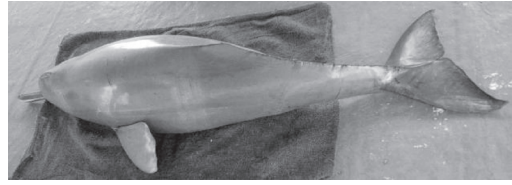
The first piece of gillnet prevented the dolphin from opening its jaws and feeding, while the second piece probably caused the lacerations observed close to the rostrum tip (Figure 2). Both gillnets were removed, and the animal was photographed before being carried to the water's edge and guided to deeper waters where it swam away. The fate of this animal is unknown, and no additional data are available.



**Figure 2.** A small-mesh, mono-filament gillnet was wrapped around the rostrum of a Ganges River dolphin, while a larger-mesh, braided-nylon thread gillnet was entangled in the teeth; the misalignment of front teeth is a fairly common characteristic among older individuals of the species and is not believed to have been caused by the gillnet (top). The emaciated Ganges River dolphin is shown here after the removal of both gillnets (bottom).

### Description of Long-Line Entanglement

On 19 February 2007, the carcass of a nonlactating adult female Ganges River dolphin was retrieved from a local fishing boat near the Dhangmari Forest Station (Figure 3). According to the fishermen, the dolphin had become entangled in their long-line fishing gear during the night. Line markings along the tail stock and junction of the flukes and incisions at the anterior insertion of the left pectoral fin supported the fishermen's account of the entanglement. This type of long-line fishing gear, known locally as *borshi*, is widely used in waterways of the Sundarbans mangrove forest. The gear consists of a heavy main line up to 150 m long with 300 to 800 short leader lines ending with small baited hooks (2 to 2.5 cm long or no. 12). One end of the line is tied to either a small nonmotorized fishing vessel or a tree, and the other end and a point just before the start of the leaders and hooks are anchored by heavy weights so that the line lies on the channel



**Figure 3.** Ganges River dolphin carcass recovered from long-line fishermen showing lacerations made by the line when it became wrapped around the tail stock

bottom (Bernacsek & Haque, 2001). This gear targets mainly long-whiskered catfish (*Mystus gulio*), fatty catfish (*Pangasius pangasius*), and mud crabs (*Scyllium serrata*).

The condition of the carcass was considered good (fresh), and it was examined about 12 h after its death. Due to moderate sun and heat, there was minor bloating and slight sloughing of the skin. All internal organs were intact. The dolphin had a full stomach, containing the remains of various unidentified small fish (< 15 cm) and crustaceans. The total length of the animal measured from the tip of the rostrum to the fluke notch was 148 cm, total fluke width was 35 cm, rostrum length was 35 cm, genital opening to anus distance was 27 cm, and height of dorsal fin was 4 cm. Skin samples were collected and stored in a saline and DMSO solution for later genetic analysis.

### Discussion

These incidents confirm that Ganges River dolphins are vulnerable to incidental killings from entanglement in gillnets and long-lines with hooks. The fact that the fishermen from the second incident were taking the carcass to sell in a local market indicates there is an economic demand for the species. Farther upstream in the Ganges and Brahmaputra Rivers, dolphin oil is highly valued as an attractant for the Schilbeid fish (*Clupisoma garua*) (Motwani & Srivastava, 1961; Smith et al., 1998; Bairagi, 1999). This gives fishermen a strong incentive to kill any animals found entangled but alive in their gillnets or long-lines, and to set their gear strategically in the hope of capturing dolphins (described in Sinha, 2002, as "assisted incidental capture"). The long-line fishing gear used in Bangladesh is very similar to the rolling hooks used in the Yangtze River of China. This gear is believed to be one of the primary factors that led to the rapid decline of the Yangtze River dolphin or baiji (*Lipotes vexillifer*) in the early 1980s (Chen & Hua, 1989; Zhou & Li, 1989) and its probable recent extinction (Turvey et al., 2007).

The current population size of Ganges River dolphins in the Sundarbans of Bangladesh appears

favorable with encounter rates recorded during a survey in February 2002 that are generally higher than other areas of the species' distribution (Smith et al., 2006). However, an increase in mortality from fisheries interactions could result in a rapid decline of the dolphin population.

Although we have no direct information on fisheries interactions with Irrawaddy dolphins in the Sundarbans, local fishermen report that this species also becomes entangled and dies in gillnets and long-lines. High mortality rates of Irrawaddy dolphins from gillnet entanglement in the Mekong River, Cambodia (Beasley et al., 2007) and Mahakam River, Kalimantan, Indonesia (Kreb et al., 2007), populations that are both considered "critically endangered" (Kreb & Smith, 2000; Smith & Beasley, 2004), suggest that rapid declines in abundance can occur as a result of incidental kills.

The authors recommend that a mortality monitoring network be established among nature tourism operators, the Forest Department, and the Fisheries Department to ensure that the rate of incidental killing does not threaten populations of both dolphin species inhabiting the Sundarbans, and that channel segments where the two species occur most frequently and in relatively high numbers be prioritized for focal protection from entanglement in gillnets and long-lines.

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