

## OPEN ACCESS



All articles published in the Journal of Threatened Taxa are registered under Creative Commons Attribution 4.0 International License unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.



## Journal of Threatened Taxa

The international journal of conservation and taxonomy

[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

### COMMUNICATION

**ON THE BEHAVIOUR, ABUNDANCE, HABITAT USE AND POTENTIAL THREATS OF THE GANGETIC DOLPHIN *PLATANISTA GANGETICA* IN SOUTHERN WEST BENGAL, INDIA**

Mahua Roy Chowdhury, Sangita Mitra & Saswati Sen

26 August 2016 | Vol. 8 | No. 9 | Pp. 9131–9137  
10.11609/jott.1752.8.9.9131-9137



For Focus, Scope, Aims, Policies and Guidelines visit [http://threatenedtaxa.org/About\\_JoTT.asp](http://threatenedtaxa.org/About_JoTT.asp)

For Article Submission Guidelines visit [http://threatenedtaxa.org/Submission\\_Guidelines.asp](http://threatenedtaxa.org/Submission_Guidelines.asp)

For Policies against Scientific Misconduct visit [http://threatenedtaxa.org/JoTT\\_Policy\\_against\\_Scientific\\_Misconduct.asp](http://threatenedtaxa.org/JoTT_Policy_against_Scientific_Misconduct.asp)

For reprints contact <[info@threatenedtaxa.org](mailto:info@threatenedtaxa.org)>

Partner



Publisher/Host







## ON THE BEHAVIOUR, ABUNDANCE, HABITAT USE AND POTENTIAL THREATS OF THE GANGETIC DOLPHIN *PLATANISTA GANGETICA* IN SOUTHERN WEST BENGAL, INDIA

Mahua Roy Chowdhury<sup>1</sup>, Sangita Mitra<sup>2</sup> & Saswati Sen<sup>3</sup>

<sup>1,3</sup>WWF-India, West Bengal State Office, Tata centre, 1st Floor 43 Jawaharlal Nehru Road, Kolkata, West Bengal 700071, India

<sup>2</sup>“Ananda Nilayam”, 2/21 6th Main Road, Kasturibai Nagar, Adyar, Chennai, Tamil Nadu 600020, India

<sup>2</sup>Present address: National Biodiversity Authority, TICEL Bio park, 5th floor, CSIR Road, Taramani, Chennai, Tamil Nadu 600113, India

<sup>1</sup>mahua.rishra@gmail.com (corresponding author), <sup>2</sup>mitras095@gmail.com, <sup>3</sup>ssen@wwfindia.net

OPEN ACCESS



**Abstract:** The Ganga River Dolphin *Platanista gangetica* Roxburgh, 1801 is a globally endangered cetacean found in the River system of Ganga, Brahmaputra and Meghna in Bangladesh and India. A survey and research were conducted from 2012–2014 to explore the behaviour, abundance, habitat use and potential threats of the Dolphin in the lower, middle and upper stretches of the river Ganga and its tributaries in southern West Bengal. The study recorded different types of surfacing patterns with respect to their age class as well as on diurnal activity pattern of the individual. The adults and sub-adults were found to have different types of surfacing during different hours of the day. The morning and afternoon were observed to be feeding hours of the Dolphin. Multiple potential threats were encountered during the present study such as destructive fishing gears, dumping of solid and municipal waste, industrial effluents, agricultural run-off, construction of water structures, water extraction and reduction of river depth attributed to siltation. These factors contributed to the present study of the river dolphins in the Ganga, which are localised at certain pockets in good number.

**Keywords:** Abundance, Ganges River Dolphin, population size, rivers, threats, tributaries, West Bengal.

DOI: <http://dx.doi.org/10.11609/jott.1752.8.9.9131-9137>

Editor: L.A.K. Singh, Bhubaneswar, Odisha, India.

Date of publication: 26 August 2016 (online & print)

Manuscript details: Ms # 1752 | Received 20 May 2016 | Final received 25 July 2016 | Finally accepted 04 August 2016

Citation: Chowdhury, M.R., S. Mitra & S. Sen (2016). On the Behaviour, abundance, habitat use and potential threats of the Gangetic Dolphin *Platanista gangetica* in southern West Bengal, India. *Journal of Threatened Taxa* 8(9): 9131–9137; <http://dx.doi.org/10.11609/jott.1752.8.9.9131-9137>

Copyright: © Chowdhury et al. 2016. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

Funding: The study was funded by HSBC Bank.

Conflict of Interest: The authors declare no competing interests.

Author Details: MAHUA ROY CHOWDHURY is a Marine Biologist, former Junior Research Fellow of University Calcutta and interested in marine ecology and wildlife biology related work, working as a project associate in WWF-India, West Bengal State Office. SANGITA MITRA is presently working as senior consultant with National Biodiversity Authority (GOI), Zoologist, specialization in wildlife ecology. Former Coordinator of WWF-India, West Bengal State Office. Saswati Sen, State Director of WWF-India, WBSO.

Author Contribution: All authors contributed equally in field work. MRC & SM designed and wrote the paper.

Acknowledgements: WWF-India, WBSO is sincerely thankful to HSBC for their generous support to this project and all other stakeholders whoever extended their cooperation in conducting this study so far. The authors are indebted to WWF-India secretariat and Mrs. Saswati Sen, Director WWF-India, WBSO for timely support and assistance.



## INTRODUCTION

River dolphins occurring in Asia and southern America are amongst the world's most threatened mammal species (Kreb & Budiono 2005). The Ganga River Dolphin *Platanista gangetica* Roxburgh, 1801 is a river dolphin out of about 36 species of dolphins found in the world. The Ganga River Dolphin (Dolphin) was historically distributed throughout the Ganga, Meghna, Brahmaputra and Karnaphuli River systems of India, Nepal and Bangladesh (Anderson 1879; Kasuya & Haque 1972; Jones 1982; Reeves et al. 1989; Shrestha 1993; Mohan et al. 1997; Wakid 2005). It is presently categorised as 'Endangered' (Smith & Braulik 2012). Its global population is declining. The current global population of the species is between 1,200 and 1,800 individuals (Smith & Braulik 2012). The study on the dolphin in southern West Bengal was the first such attempt to find out the present status of the species and its occurrence in the river system of the Ganga and its tributaries. The study further looked into the potential threats to the habitat of the Dolphin and its population.

## STUDY AREA

The Dolphins were observed in the Ganga River and its tributaries of southern West Bengal lying between 24°48'–22°10'N & 87°55'–88°11'E from Murshidabad to South 24 parganas. The lower and middle half of this riverine stretch up to 280km (at Nabadwip, S<sub>9</sub> in Table 1) from the mouth of the Bay of Bengal is influenced by tidal variations (Chugh 1961; Chatterjee et al. 2013). A barrage was commissioned at Farakka in 1975 to divert water into river Bhagirathi and to reduce the silting problem at Kolkata and Haldia port (Rudra 2008). Located 254km upstream from Nabadwip, this barrage diverts water from the Ganga to the Bhagirathi River through a 40km long feeder canal. It runs parallel to the flow direction of the Ganges for 38.3km. Two of its well known tributaries are the Damodar and the Rupnarayan which join downstream Kolkata. The sampling stations in Dolphin habitat on the river Ganga and its tributaries in southern West Bengal are described in Table 1 and Fig. 1. The study area all along the river course of the Ganga has been broadly categorised as:

1. Lower stretch: From the mouth of the Bay of Bengal to 160km upstream (including Diamond Harbour, Bakshihat, Gadiara and Garchumukh). The adjacent point of Kolaghat on river Rupnarayan is also included due to regular occurrence of Dolphin in recent times.

2. Middle stretch: A length of 92km on the river Ganga from the upper limit of the lower stretch up to Katwa (including Khamargachi, Sabujdwip, Pyaradanga and Nabadwip).

3. Upper stretch: A stretch of 45km adjoining Farakka Barrage (including CISF Ghat, Farakka feeder canal and Gandhighat near Farakka Barrage).

## MATERIALS AND METHODS

A total river survey effort of 297km was invested out of 534km (24°48'–22°10'N & 87°55'–88°11'E from Farakka Barrage to Diamond Harbour) of the River Ganga flowing in southern West Bengal from 2012–2014. The study area was selected on the basis of information collected from the literature, community interaction and by observing riverine character (emphasizing the confluence, meanderings, deep channels and area of high fishing activity and good assemblage of water birds) of the respective stations. Point observations were made during the day-light hours (0700 to 1600 hr) at 12 stations and their adjacent river stretches from the boat and along river banks during the study period. Global positioning system (GPS) was used during navigation for recording the locations of sightings around every station and adjacent water channels. The location of the boat was in proximity with individual dolphins and groups (5–40 m) while observations were made without using any optical device. Dolphins were identified as calves, sub-adults and adults based on their colour, size and diving pattern. At each point, observations on dolphins and potential anthropogenic threats were recorded. Hydrological parameters (temperature, pH, salinity, conductivity and dissolved oxygen) were measured from all the stations especially in the areas of regular occurrence of dolphins. The field team consisting of 2–4 observers was involved in the regular collection of field data on a pre-designed data sheet. The dolphins were considered to be of the same group if visibility of them was within a radius of 100m. The present study did not involve census survey to count dolphins because this was the first such attempt to record baseline data on the Dolphin in southern West Bengal in selected stretches where their occurrence has been monitored for two consecutive years.

Secondary data on anthropogenic threats and occurrence of dolphins were collected by conducting informal interactions especially with boatmen and fishermen who regularly spend considerable time (7-8 hours/day) on the river.

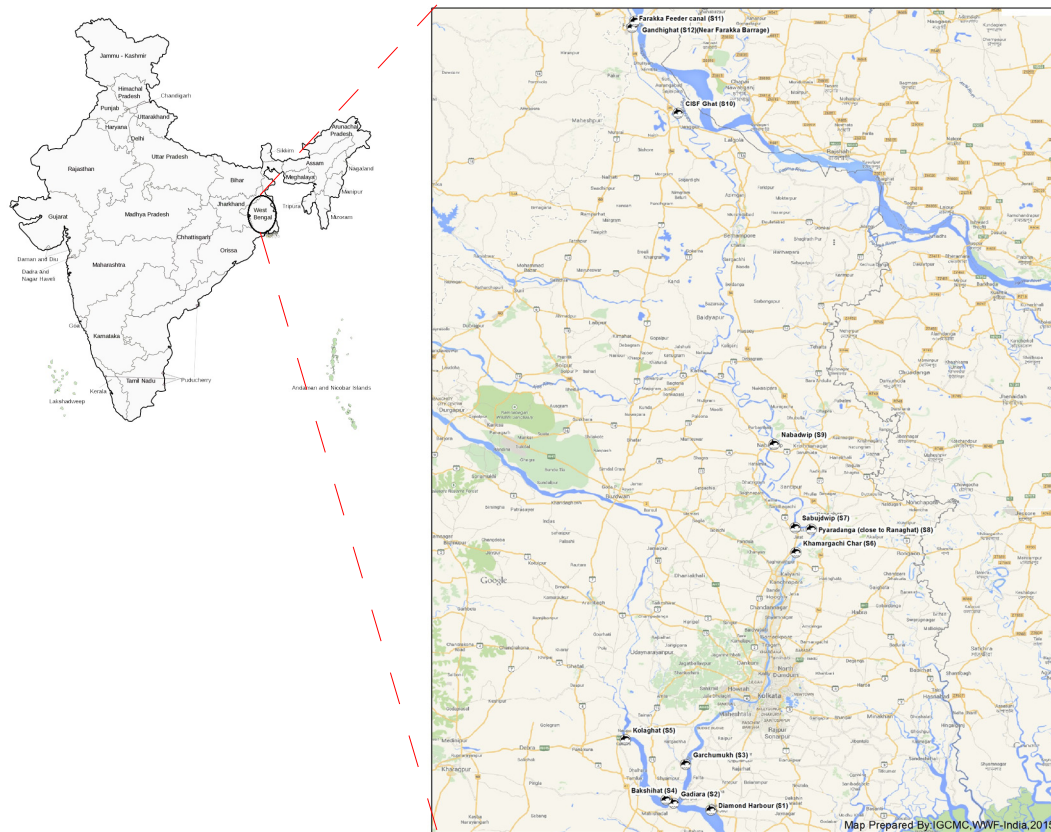


Figure 1. The sampling stations in dolphin habitat on the river Ganga and its tributaries

## RESULTS & DISCUSSION

A comprehensive Dolphin survey conducted from 2012–2014 confirmed the continued occurrence of *Platanista gangetica* in seven districts (East Midnapur, Hooghly, Howrah, Murshidabad, Nadia, North 24 Parganas, South 24 Parganas) of southern West Bengal where the Ganga and the other tributaries flow. They were usually seen in groups of 4–6 near the confluence of rivers and channels. Dolphins were sighted at the confluence of major tributaries, Rupnarayan, Behula, Damodar, Mundeshwari, Jalangi and Churni (Table 1; Images 1 & 2). This study confirmed that river confluences which are generally considered as high fish assemblage areas due to favourable hydro-biological conditions and proper depth (Smith et al. 1998; Bashir 2010; Choudhury 2013) were also identified as favourable dolphin microhabitats (Sinha 1997; Biswas et al. 2000; Wakid 2006). All the congregation points of Dolphin, however, have their specific characteristics with respect to channel width (88.39–4300 m), depth (5–37 m), nature of land use (crop lands, brick kiln and human settlement), fishing activity and frequency of river traffic (10–12 boats/hour). Among the observed dolphins most

were solitary or in small groups but as many as two to 12 individuals were spotted in the main channel of the river Hooghly like Khamargachi Char and at Sabujdwp in the confluence of rivers Hooghly and Behula.

### Habitat use

In the present study a congregation of more number of dolphins was noticed at locations with deep pools like Khamargachi Char ( $9 \pm 2$ ) and Sabujdwp ( $13 \pm 2$ ) with a depth between 20–25 m. Dolphins are known to prefer deeper pools, meandering channels and confluences that offer hydraulic refuge (Reeves & Leatherwood 1994; Smith et al. 2009, 2010; Kelkar et al. 2010). A similar observation was earlier supported by Smith et al. (1998) that in deeper pools with counter-currents, dolphins often aggregate for feeding in side-channels near deep pools, to maximize foraging efficiency. In the present study narrow channels like Bakshi Canal (Bakshihat) with lower water depth (4.8–5.1 m in dry season) houses a good number of dolphins during the monsoon. These narrow channels become water deficient in the lean period when dolphins are unable to access these waterways. In a study by Choudhary et al. (2012) the minimum mid-channel depth requirements were

Table 1. The sampling stations in dolphin habitat on the river Ganga and its tributaries in southern West Bengal

River stretch (Length)	Stations	District	Geographic location	Width	River	Number of dolphins sighted	Potential threats
Lower stretch (160km)	Diamond Harbour (S <sub>1</sub> )	South 24 Parganas	22°10'N & 88°11'E	4.3km	Hooghly	3±1	Movement of cargo ships, fishing trawlers, local ferry and brick kilns
	Gadiara (S <sub>2</sub> )	Howrah	22°13'N & 88°02'E	1.41km	Confluence of Rupnarayan and Hooghly	4±1	Dumping of solid waste including plastics, oil spill from ship, exploitative fishing
	Garchumukh (S <sub>3</sub> )	Howrah	22°20'N & 88°05'E	1.42km	Confluence of Damodar and Hooghly	3±1	Heavy river traffic, fishing activity, brick kilns and impediment at 58 lock gate near Garchumukh restricting movement of dolphins into Damodar canal
	Bakshihat (Bakshi canal)(S <sub>4</sub> )	Howrah	22°13'N & 88°01'E	444.33m	Confluence of Rupnarayan, Damodar and Mundeshwari	5±1	Mechanised boat, unsustainable fishing practices and brick kilns
	Kolaghat (S <sub>5</sub> )	East Midnapur	22°25'N & 87°53'E	604.22m	Rupnarayan	4±1	High anthropogenic activity, effluent from Kolaghat thermal power plant, water structure like rail and road bridge, electric tower, brick kiln and high fishing activity
Middle stretch (92 km)	Khamargachi Char (S <sub>6</sub> )	Hooghly	23°03'N & 88°27'E	220.27m	Hooghly	9±2	Fishing activity
	Sabujdwip (S <sub>7</sub> )	Hooghly	23°08'N & 88°26'E	330.45m	Hooghly and Behula	13±2	Water extraction and fishing activity
	Pyaradanga (close to Ranaghat) (S <sub>8</sub> )	Nadia	23°07'N & 88°30'E	245.49m	Confluence of Churni and Hooghly	3±1	Fishing activity, brick kiln, Contaminated river water in Churni, agricultural run-off
	Nabadwip (S <sub>9</sub> )	Nadia	23°24'N & 88°22'E	332.77m	Confluence of Jalangi and Hooghly	3±1	Municipal discharge and heavy river traffic
Upper stretch (45km)	CISF Ghat (S <sub>10</sub> )	Murshidabad	24°30'N & 88°03'E	171.17m	Feeder canal	2±1	Fishing activity and high river traffic
	Farakka Feeder canal (S <sub>11</sub> )	Murshidabad	24°48'N & 87°52'E	188.54m	Feeder canal	6±1	High fishing activity, barrage posing obstruction in movement route and hot water discharge from NTPC.
	Gandhighat (S <sub>12</sub> ) (Near Farakka Barrage)	Murshidabad	24°48'N & 87°55'E	183.16m	Bhagirathi	4±1	Moderate fishing activity and obstruction in movement route.

estimated at 5.2m for dolphin adults and between 2.2m and 2.4m for mother-calf pairs.

### Surfacing behaviour and abundance

Different surfacing patterns were observed with respect to their age class as well as on diurnal activity pattern. The adults and sub-adults were found to have different types of surfacing during different hours of the day. Exposure of the head and dorsal fin was dominant among adults throughout the day, while exposure of the

rostrum, head and dorsal fin among the sub-adults was common in the morning and afternoon. The morning and afternoon were observed to be feeding hours of the Dolphin (Sinha et al. 2010b). During this phase they are actively engaged in search of prey. Dive-time in the dolphins ranged from 10 to 411 sec in the present study. Dive-times of the adult and sub-adult were almost similar and it spans longer than juvenile individuals. Spotting of juvenile dolphins was higher during morning and afternoon whereas the dive-time observed was

Image 1. Ganges River Dolphin at Bakshihat (Bakshi Canal - S<sub>4</sub>)Image 2. Ganges River Dolphin at Kolaghat - S<sub>5</sub>

Table 2. Optimum range of hydrological parameters in the dolphin habitat of river Ganga and its tributaries

Stations	River	Temperature (°C)	pH	Salinity (ppm)	Conductivity (µs/cm)	Dissolve oxygen (mg/l)
Diamond Harbour (S <sub>1</sub> )	Hooghly	30.5	8.0	0	0186	7.8
Gadiara (S <sub>2</sub> )	Confluence of Rupnarayan and Hooghly	29	8.2	0	0232	7.5
Garchumukh (S <sub>3</sub> )	Confluence of Damodar and Hooghly	30	8.0	0	0371	7.7
Bakshihat (S <sub>4</sub> )	Confluence of Rupnarayan, Damodar and Mundeshwari	32.5	8.0	0	0257	7.6
Kolaghat (S <sub>5</sub> )	Rupnarayan	30	7.7	0	0159	7.8
Khamargachi Char (S <sub>6</sub> )	Hooghly	30	8.4	0	0198	7.8
Sabujdwip (S <sub>7</sub> )	Hooghly and Behula	31°C	7.9	0	0177	7.3
Pyaradanga (S <sub>8</sub> )	Confluence of Churni and Hooghly	32°C	7.1	0	0186	7.5
Nabadwip (S <sub>9</sub> )	Confluence of Jalangi and Hooghly	29.5°C	8.2	0	0224	8.0
CISF Ghat (S <sub>10</sub> )	Feeder canal	30.1	7.7	0	0164	7.8
Farakka Feeder canal (S <sub>11</sub> )	Feeder canal	30	7.8	0	0172	7.8
Gandhighat (S <sub>12</sub> )	Bhagirathi	30	7.8	0	0205	7.9

highest during the morning hours. Wakid & Braulik (2009) reported an average dive-time of 107sec in the Dolphin. The highest congregation of dolphins was recorded in Sabujdwip during the monsoon period followed by Khamargachi Char, Bakshihat, Feeder canal, Nabadwip, Gandhighat (Near Farakka Barrage), CISF Ghat, Kolaghat, Gadiara, Pyaradanga, Garchumukh and Diamond Harbour (Table 1). Stations like Sabujdwip and Khamargachi Char are important points of the river Ganga in terms of Dolphin congregation, particularly the abundance of calves (3±1) and sub-adults (5±1) observed were highest at Sabujdwip and Khamargachi

Char indicating calving areas. The adults appeared partially out of water during every leap whereas the calves frequently jumped out of the river making a complete U-turn in the air.

#### Hydrological parameters

Water parameters were recorded from all the stations where sighting of Dolphin was frequent throughout the seasons. The average surface water temperature recorded from the sites of point observations was 30.38±0.99 °C, pH 7.90±0.33, salinity 0 ppt, conductivity 210.92±58.28 µs/cm and dissolved

oxygen was  $7.70 \pm 0.19$  mg/l (Table 2). Dolphins are not generally known to occur in salinities greater than 10ppt, although they have been recorded in waters as saline as 23ppt (Smith & Braulik 2012). Hydrological parameters in stations like Sabujdwip, Khamargachi Char and Bakshihat were favourable compared to Nabadwip, Farakka, Kolaghat, Diamond Harbour, and Pyaradanga in terms of habitat preference of dolphins with respect to suitable depth (7–25 m) and non-occurrence of river traffic. Thus the above hydrological parameters of river Ganga and its tributaries were found to be optimum for the existence of dolphins.

#### Anthropogenic disturbances and potential threats

It was noticed during this study that potential threats in the Dolphin habitat have an adverse impact either directly on their prey species or confine the habitat into isolated pockets. It was confirmed by the observations and appraisal among the community members that the waterways, which were full of resources, are now showing signs of decline. Around 94–95 % of the Hilsa, an iconic fish (*Tenualosa ilisha*) in this subregion are captured by drift gill nets in the lower stretch of the study area at Hooghly estuarine system (De 2014). These nets have a direct or indirect impact on the availability of fish in the river. Unsustainable use of fishing gear in the Ganga and its tributaries contributes to the loss of many fish varieties, especially their breeding grounds and fish seeds (Chowdhury & Mitra 2014). Entanglement of dolphins in fishing nets causes direct damage to the local population. This was observed in Diamond Harbour, Garchumukh and near Farakka Barrage. Accidental killing is another concern for Dolphins throughout most of their range. The primary cause is believed to be entanglement in fishing gear such as nylon gill nets because their preferred habitat is often in the same location as primary fishing grounds. The practice of oil extraction from the specimen of such incidental killing is not rare in Nadia District. Such traditional habits have been recorded since ages by many observers (Anderson 1879; Sinha 2002). On a few occasions accidental killing due to collisions with river crafts has also been recorded in Kolkata. The present study had similar observations in all three stretches of the study area. Around 76% of the respondents in community appraisal comprised fishermen and boatmen depending on the river for their livelihood. Even 50–60 % of the fishing boats in lower and middle stretches are engaged in illegal sand mining on account of decline in fish catch.

The presence of dams and barrages in Ganga River is another potential threat to the Dolphin habitat which

prevents their migration and leads to the segregation of populations. Farakka Barrage on the Ganga is one major impediment in the movement of dolphins since its commissioning in 1975. Presently, there are five connecting bridges over river Rupnarayan at Kolaghat and a series of sluice gates over river Damodar near Garchumukh obstructing the movement of the dolphins. The mortality of dolphins has been recorded in the recent past (November 2014) near the Farakka Barrage gate. Migration of economically important species like the Hilsa and *Macrobrachium* prawns is severely affected by these impediments. The effects of dams and barrages on the Dolphins and their prey in the entire distribution range in India was studied by Smith et al. (2000).

Water quality is directly affected by the discharge of industrial effluents, hot water discharge from thermal power plants (like Kolaghat and Farakka), municipal waste, agricultural run-off, frequent river traffic and spillage of oil. Abundance of fish near Farakka and Kolaghat is affected by the discharge of hot water from thermal power plants and consequent impact on dolphin's prey.

Extraction of water for agriculture and industry leaves a major impact on the rivulets and tributaries especially in the lean seasons of summer and winter. This deprives the Dolphin and many other associated freshwater species of their home and confinement of resources in separate pockets. Brick kilns directly utilize soil from river banks in many locations (with 7–10 kilns/km on both banks of river) of the study area destabilizing the river front and making it vulnerable to erosion.

A predominantly fish eating community like that in West Bengal depends on large scale fishing activity in all the freshwater sources by direct wild harvesting. This is the major deterrent to replenish the fish variety. Fishing gear used by the local fisherman do not adhere to the regulatory guidelines of the government and unsustainable practices leads to loss of fish or prey species in the habitat (Braulik 2006). The above factors confine this species to isolated pockets and restrict their range in southern West Bengal.

#### CONCLUSIONS

This study demonstrates that this is one of the first few reports of the Ganga River Dolphin abundance in the river Ganga and other tributaries in southern West Bengal. It contributes to the baseline information about their status and distribution from a relatively less explored stretch of river. The habitat use by dolphins



and the impact of many possible potential threats on their distribution need to be further studied.

In general the aim is to increase awareness of the Dolphin and river ecosystem conservation among the general riverside communities and enhance the dolphin prey-base by awareness raising and monitoring of illegal fishing in association with local communities and management authorities.

## REFERENCES

- Anderson, J. (1879).** Anatomical and Zoological researches comprising an account of zoological results of the two expeditions to western Yunnan in 1868 and 1875; and a monograph of the two cetacean genera, *Platanista* and *Orcella*, B. Quatrach, London.
- Bashir, T. (2010).** Ganges River Dolphin (*Platanista gangetica*) seeks help. *Current Science* 98 (3): 287–288; <http://dx.doi.org/10.11609/jott.o2333.1087-91>
- Biswas, S.P. & S. Baruah (2000).** Ecology of river dolphin (*Platanista gangetica*) in the Upper Brahmaputra. *Hydrobiologia* 430: 97–111; <http://dx.doi.org/10.1023/A:1004077215276>
- Braulik, G.T. (2006).** Status assessment of the Indus River dolphin, *Platanista gangetica minor*, March–April 2001. *Biological Conservation* 129: 579–590; <http://dx.doi.org/10.1016/j.biocon.2005.11.026>
- Chatterjee, M., D. Shankar, G.K. Sen, P. Sanyal, D. Sundar, G.S. Michael, A. Chatterjee, P. Amol, D. Mukherjee, K. Suprit, A. Mukherjee, V. Vijith, S. Chatterjee, A. Basu, M. Das, S. Chakraborti, A. Kalla, S.K. Mishra, S. Mukhopadhyay, G. Mandal & K. Sarkar (2013).** Tidal variation in the Sundarbans estuarine system, India. *Journal of Earth System Science* 122(4): 899–933.
- Choudhary, S., S. Dey, S. Dey, V. Sagar, T. Naird & N. Kelkar (2012).** River dolphin distribution in regulated river systems: implications for dry-season flow regimes in the Gangetic basin. *Aquatic Conservation: Marine and Freshwater Ecosystems* 22: 11–25; <http://dx.doi.org/10.1002/aqc.1240>
- Choudhury, A.U. (2013).** *The Mammals of North East India*. Gibbon Books (Guwahati) and the Rhino Foundation for Nature in North East India (Guwahati), 221–222.
- Choudhury, A. & S. Mitra (2014).** Assessing sustainable livelihood strategies for fisheries communities during Hilsa fishing ban period in West Bengal, India. IUCN, 52pp.
- Chugh, R.S. (1961).** Tides in Hooghly River. *Hydrological Science Journal* 6(2): 10–26.
- De, D.K. (2014).** The Shad Hilsha, *Tenualosa ilisha* (Hamilton) - Its biology and fisheries. CIFRI, 166: 6–7.
- IUCN (2010).** IUCN Red List of Threatened Species. Version 2010.4. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 12 November 2010.
- Jones, S. (1982).** The present status of the Gangetic Susu, *Platanista gangetica* (Roxburgh) with comments on the Indus Susu *P. minor* (Owen). *FAO Fisheries Series* 5: 97–115.
- Kasuya, T. & A.K.M.A. Haque (1972).** Some information on the distribution and seasonal movement of the Ganges dolphin. *The Scientific Report of the Whales Research Institute* (Tokyo) 24: 109–115.
- Kelkar, N., J. Krishnaswamy, S. Choudhary & D. Samaria (2010).** Coexistence of fisheries with river dolphin conservation. *Conservation Biology* 24: 1130–1140; <http://dx.doi.org/10.1111/j.1523-1739.2010.01467.x>
- Kreb, D. & Budiono (2005).** Conservation management of small core areas: key to survival of a critically endangered population of Irrawaddy river dolphins *Orcaella brevirostris* in Indonesia. *Oryx* 39(2): 1–11.
- Mohan, R.S.L., S.C. Dey, S.P. Bairagi & S. Roy (1997).** On a survey of Ganges River dolphin *Platanista gangetica* of Brahmaputra River, Assam. *Journal of the Bombay Natural History Society* 94: 483–495.
- Reeves R.R. & S. Leatherwood (1994).** Dams and river dolphins: can they coexist? *Ambio* 23: 172–175.
- Reeves, R.R. & J.R.L. Brownell (1989).** Susu *Platanista gangetica* (Roxburgh, 1801) and *Platanista minor* (Owen, 1853), pp. 69–99. In: Ridgway, S.H. & R. Harrison (eds.). *Handbook of Marine Mammals*. Academic Press, London.
- Rudra, K. (2008).** The encroaching Ganga and social conflicts, The case of West Bengal. Publisher? Total number of pages?
- Shrestha, T.K. (1993).** Ecology, status appraisal, conservation and management of Gangetic Dolphin *Platanista gangetica* in the Koshi River of Nepal. *Journal of Freshwater Biology* 5(1): 93–105.
- Sinha, R.K. (1997).** Status and conservation of Ganges River dolphin in Bhagirathi-Hooghly River systems in India. *International Journal of Ecology and Environmental Sciences* 23: 343–355.
- Sinha, R.K. (2002).** An alternative to dolphin oil as a fish attractant in the Ganges River system: conservation of the Gangetic River Dolphin. *Biological Conservation* 107: 253–257.
- Sinha, R.K., S.K. Sinha, G. Sharma & D.K. Kedia (2010b).** Surfacing and diving behaviour of free-ranging Ganges River Dolphin, *Platanista gangetica gangetica*. *Current Science* 98(2): 230–236.
- Smith, B.D., M.A.A. Diyan, R.M. Mansur, E.F. Mansur & B. Ahmed (2010).** Identification and channel characteristics of cetacean hotspots in waterways of the eastern Sundarbans mangrove forest, Bangladesh. *Oryx* 44: 241–247.
- Smith, B.D. & G.T. Braulik (2012).** *Platanista gangetica*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. [www.iucnredlist.org](http://www.iucnredlist.org). Downloaded on 02 April 2014.
- Smith, B.D., A.K.M. Haque, M.S. Hussain & A. Khan (1998).** River dolphins in Bangladesh: conservation and the effects of water development. *Environmental Management* 22: 323–335.
- Smith, B.D., G. Braulik, S. Strindberg, R. Mansur, M. Diyan & B. Ahmed (2009).** Habitat selection of freshwater-dependent cetaceans and the potential effects of declining freshwater flows and sea-level rise in waterways of the Sundarbans mangrove forest, Bangladesh. *Aquatic Conservation: Marine and Freshwater Ecosystems* 19: 209–225; <http://dx.doi.org/10.1002/aqc.987>
- Smith, B.D., R.K. Sinha & K. Zhou (2000).** Register of water development projects affecting Asian river cetaceans, pp. 22–39. In: Reeves, R.R., B.D. Smith & T. Kasuya (eds.). *Biology and Conservation of Freshwater Cetaceans in Asia*. Occasional Papers of the IUCN Species Survival Commission. IUCN, Gland, Switzerland.
- Wakid, A. (2005).** Conservation of Gangetic Dolphin in Brahmaputra River System, India. Final Technical Report submitted to the BP Conservation Programme and Rufford Small Grant, 80pp.
- Wakid, A. (2006).** Status and distribution of a newly documented residential Gangetic Dolphin (*Platanista gangetica* Roxburgh 1801) population in eastern Assam. *Journal of the Bombay Natural History Society* 102: 158–161.
- Wakid, K. & G. Braulik (2009).** Protection of endangered Gangetic Dolphin in Brahmaputra River, Assam, India. Final report to IUCN-Sir Peter Scott Fund, 44pp.

## Bengali abstract:

ভারত ও বাংলাদেশের গঙ্গা, ব্রহ্মপুত্র ও মেঘনা নদীতলে সিটেশিয়ান বর্গের বিলাস গাঙ্গেয় শুভকরের দেখা মেলে। দক্ষিণবঙ্গে গঙ্গা ও তার শাখানদীসমূহে এই শুভকরের চলাচল, প্রচুর্য, বাসস্থানের ব্যবহার ও বিপন্নতা নিয়ে ২০১২-১৪ সালে এক সমীক্ষা ও গবেষণা চালানো হয়। এই অনুসন্ধানের মাধ্যমে শুভকরের জলের উপরিভাগে দুশ্যমান হওয়া ও উদনিন্দন কর্মপ্রণালীর বিচ্ছিন্নতা নথিভুক্ত করা হয়। পরিণত ও অপরিণত শুভকরা কিতাবে দিনের ভিন্ন সময়ে ভিন্ন প্রকারের আচরণ করে তা পর্যবেক্ষণ করা হয়। সকালে ও বিকেলেই এদের খাব্যগ্রহণের প্রণয় সময়। এই সমীক্ষায় শুভকরের বিভিন্ন সেক্টরের কারণ হিসাবে মালের জালে আটকে পড়া, নদীতে বিভিন্ন প্রকার বর্জ্য নিষ্ক্ষেপ করা, উন্নয়নের পরিকাঠামো নির্মাণ এবং নদীর গভীরতা হ্রাস ইত্যাদিকে কারণ হিসাবে তুলে ধরা হয়েছে। এই কারণগুলির অন্য গঙ্গায় শুভকরা কিছু নির্দিষ্ট অংশের মধ্যেই সীমাবদ্ধ হয়ে পড়েছে।





OPEN ACCESS



All articles published in the Journal of Threatened Taxa are registered under Creative Commons Attribution 4.0 International License unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

August 2016 | Vol. 8 | No. 9 | Pages: 9125–9220  
Date of Publication: 26 August 2016 (Online & Print)

DOI: 10.11609/jott.2016.8.9.9125-9220

[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

#### Communications

**People's attitudes toward Striped Hyaena (*Hyaena hyaena* Linnaeus, 1758) (Mammalia: Carnivora: Hyaenidae) conservation in lowland Nepal**

-- Shivish Bhandari & Mukesh Kumar Chalise, Pp. 9125–9130

**On the Behaviour, abundance, habitat use and potential threats of the Gangetic Dolphin *Platanista gangetica* in southern West Bengal, India**

-- Mahua Roy Chowdhury, Sangita Mitra & Saswati Sen, Pp. 9131–9137

**Habitat preference and roosting behaviour of the Red Junglefowl *Gallus gallus* (Aves: Galliformes: Phasianidae) in Deva Vatala National Park, Azad Jammu & Kashmir, Pakistan**

-- Faraz Akrim, Tariq Mahmood, Muhammad Siddique Awan, Siddiq Qasim Butt, Durr-e-Shawar, Muhammad Arslan Asadi & Imad-ul-din Zangi, Pp. 9138–9143

**Indigenous ornamental freshwater ichthyofauna of the Sundarban Biosphere Reserve, India: status and prospects**

-- Sandipan Gupta, Sourabh Kumar Dubey, Raman Kumar Trivedi, Bimal Kinkar Chand & Samir Banerjee, Pp. 9144–9154

**Pollination ecology and fruiting behavior of *Pavetta indica* L. (Rubiaceae), a keystone shrub species in the southern Eastern Ghats forest, Andhra Pradesh, India**

-- A.J. Solomon Raju, M. Mallikarjuna Rao, K. Venkata Ramana, C. Prasada Rao & M. Sulakshana, Pp. 9155–9170

#### Short Communications

**On the status of the Long-tailed Marmot *Marmota caudata* (Mammalia: Rodentia: Sciuridae) in Kargil, Ladakh (Indian Trans-Himalaya)**

-- Tanveer Ahmed, Mohammad Shoeb, Pankaj Chandan & Afifullah Khan, Pp. 9171–9176

**The decline of the interspecific agonistic displays in an adult female Indian Eagle Owl *Bubo bengalensis* (Aves: Strigiformes: Strigidae): a case of habituation to human approach**

-- M. Eric Ramanujam, Pp. 9177–9181

**Effect of vehicular traffic on wild animals in Sigur Plateau, Tamil Nadu, India**

-- A. Samson, B. Ramakrishnan, A. Veeramani, P. Santhoshkumar, S. Karthick, G. Sivasubramanian, M. Ilakkia, A. Chitheena, J. Leona Princy & P. Ravi, Pp. 9182–9189

**Range extension of *Heliogomphus lyratus* Fraser, 1933 (Anisoptera: Gomphidae) with notes on its identification, habits and habitat**

-- Amila P. Sumanapala & Himesh D. Jayasinghe, Pp. 9190–9194

**A second record of *Knipowitschia byblisia* Ahnelt, 2011 (Teleostei: Perciformes: Gobiidae) from southwestern Anatolia, Turkey**

-- H. Ahnelt, Pp. 9195–9197

**New records of polypores (Basidiomycota: Aphyllorphales) from the southern Western Ghats with an identification key for polypores in Peechi-Vazhani Wildlife Sanctuary, Kerala, India**

-- A. Muhammed Iqbal, Kattany Vidyasagar & P. Narayan Ganesh, Pp. 9198–9207

#### Notes

**Notes on three species of Palaearctic satyrinae (Lepidoptera: Nymphalidae) from northwestern Himalaya, India**

-- Arun P. Singh, Pp. 9208–9215

**Two additions to the flora of the Palni Hills, southern India**

-- S. Soosairaj, P. Raja, B. Balaguru & T. Dons, Pp. 9216–9220