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## CURRENT STATUS OF SUSU (*PLATANISTA GANGETICA GANGETICA*, ROXBURGH, 1801) IN RIVER HOOGHLY IN WEST BENGAL, INDIA

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### INTRODUCTION

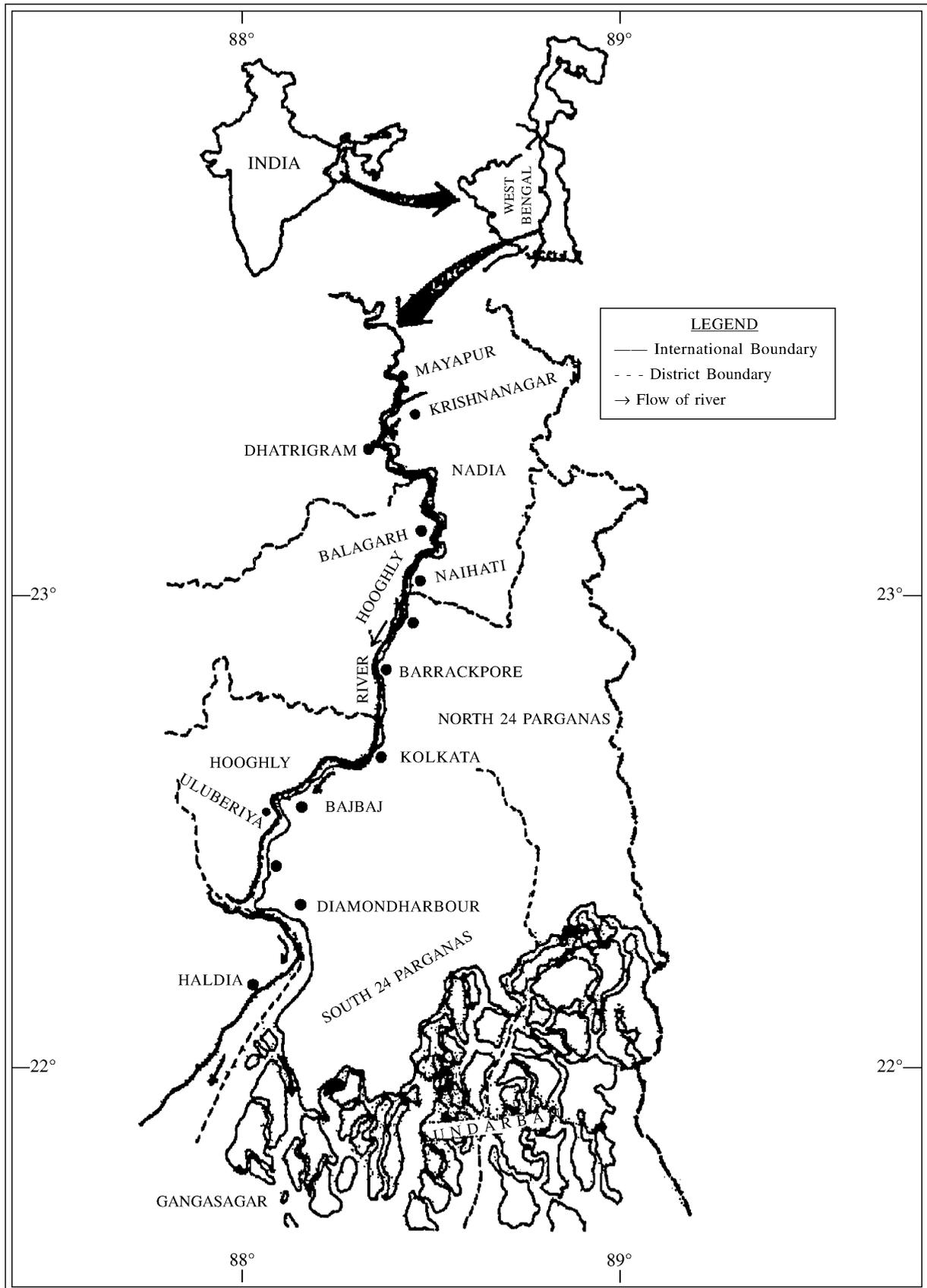
The Gangetic Dolphin, *Platanista gangetica gangetica* Roxburgh, 1801 is commonly known as Susu or 'soons' in local parlance in Bihar and shushuk in Bengal, belongs to Order Cetacea, suborder Odontoceti (Toothed whales). The Cetaceans are aquatic mammals and include whales, dolphins and porpoises. In India except one species, all of them are marine and inhabit oceans and seas, estuaries and tidal creeks. The only freshwater cetacean in India is the Ganges River Dolphin, which occurs in the River Ganga- Brahmaputra-Meghna and Sangu -Karnaphuli river systems in Nepal, India and Bangladesh. Cetaceans are having fusiform body, a pair of pectoral flipper and a horizontal compressed tail fluke with or without a notch in middle. They are lung breathers and their nostrils are placed much above the extremity of snout. These mammals come to water surface for breathing (Anderson, 1879; Kasuya and Haque, 1972; Sinha, 1997; Mohan *et al.* 1997; Smith *et al.*; 1998 and Sinha *et. al.* 2000 and Alfred *et. al.* 2006 ).

Susu is usually a solitary creature, has a stocky body with a long beak that thickens at the tip. The dorsal fin is very small and flippers are large. The skin colour is light gray-brown and pale at the belly, often with a tinge of pink. The eyes are very small and the forehead known as melon rises steeply. The eyes lack crystalline lens, as a result, the animal is unable to detect light and lacks vision. Echolocation helps in detection of food and navigation. Individuals tend to swim with one flipper trailing along the substrate and will root around with their beak to disturb and detect the shrimps, fishes sometimes snails upon which they feed.

The dolphin makes a sound while breathing, a reason to be called it 'soons'.

Due to solitary nature the animals is sighted frequently alone or in small groups of 2-3 (Jones 1982, Smith 1993). Sightings in pairs are generally mother and calf and male and female during mating (Kasuya and Haque 1972, Jones 1982). During the dry season *i.e.* from October to April many dolphins leave the tributaries of the Ganga and Brahmaputra river system and congregate in the main channel and return to the tributaries in rainy season-June to September (Reeves and Brownell 1989). This migration seems to be associated with the migration and dispersal of fishes, which are their main prey ( Kasuya and Haque 1972 )

Worldwide, four genus of dolphins (*Platanista*, *Inia*, *Pontoporia* and *Lepotes* ) live only in freshwater. The Yangtze River dolphin (*Lepotes vexillifer* ) in China has been declared extinct in its main habitat in December, 2006. The Indus River dolphin (*Platanista gangetica minor*) is found in Indus River system of India and Pakistan (Behra *et. al.*, 2008) while; the Amazon River dolphin (*Inia geoffrensis*) and La-Plata dolphin (*Pontoporia blainvillei*) are distributed in Latin America. The Ganges River dolphin was historically distributed throughout the Ganges, Meghna, Brahmaputra and Karnaphuli River systems of India, Nepal and Bangladesh (Ghosh, M. 1991, Gupta, P.D.1986, Jones 1982, Reeves and Brownell 1989, Shrestha 1989, Agrawal and Alfred, 1999, Alfred *et.al.*2006). But with the construction of dams and barrages and other water development projects, the dolphins are threatened by population fragmentation and isolation, pollution in their habitat, accidental or



Map of River Hooghly showing different locations during Dolphin Status Survey in 2005-2007

directed killings for trade, prey depletion, etc. As a result, the range and abundance of dolphin has reduced in many areas (Reeves and Leatherwood 1995, Alfred *et al.*, 2006).

#### SYSTEMATIC ACCOUNTS

Kingdom	ANIMALIA
Phylum	CHORDATA
Class	MAMMALIA
Subclass	EUTHERIA
Order	CETACEA
Suborder	ODONTOCETI
Superfamily	PLATANISTOIDEA
Family	PLATANISTIDAE

Genus *Platanista*

*P. gangetica gangetica*, Roxburgh, 1801

Subspecies *P. g. gangetica*

#### CONSERVATION STATUS

- Schedule-I of Indian Wild life (Protection) Act (1972)
- Endangered as per IUCN ( Hilton-Taylor, 2000).
- Appendix-I of CITES
- Appendix-II of Convention of Migratory Species (CMS)

#### OBJECTIVE OF THE PRESENT STUDY

Objective of the present study was to assess the current status of the Susu (*Platanista gangetica gangetica*) in the entire stretch of the River Hooghly from Mayapur to Ganga Sagar in the state of West Bengal-a stretch of approximately 250 kms.

The present study was undertaken by the Gangetic Plains Regional Station, as a part of the approved annual research plan of work 2005-2007 of the Zoological Survey of India, Ministry of Environment and Forests, Government of India.

#### STUDY AREA

**River Hooghly :** The lower Ganga stretch of about 560 km in India (River Bhagirathi and Hooghly) extends from Farakka to the Bay of Bengal. The lower half of this stretch is tidal. Farakka Barrage is constructed in 1975 to divert water into Hooghly River to reduce the silting problems at Kolkata and Haldia port. The slope of this segment is 1 : 24000. The total length of the main channel of the Ganga is 2750 km which includes, study area a stretch of 222 kms of river Hooghly.

The Farakka Barrage is diverts water from the Ganga to the Bhagirathi River through a Feeder canal. It parallels the Ganges, past Dhulian, until just above Jangipur where the canal ends and the river takes its own course. Just south of Jangipur it leaves the Ganges area and flows south past Jiaganj, Azimaganj, Murshidabad and Beharampur. South of Beharampur and north of Palashi it used to form the border between Bardhaman District and Nadia District, but while the border has remained the same the river is now often east or west of its former bed. The river then flows south past Katwa, Nawadwip and Kalna. At Kalna it originally formed the border between Nadia District and Hooghly District, and then further south between Hooghly District and North 24 Paragana District. It flows past Halisahar, Chunchura, Rishra, and Kamarhatti. Then just before entering the twin cities of Kolkata (Calcutta) and Howrah, it turns to the southeast. At Nurpur it enters an old channel of the Ganges and turns south to empty into the Bay of Bengal. Two of its well-known tributaries are Damodar and Rupnarayan which join downstream Kolkata.

The nexus formed by the Hooghly River (Ganga) and the Bay of Bengal, called *Ganga Sagar*. This is a sacred place for Hindus.

#### MATERIAL AND METHODS

**Reconnaissance Surveys :** A preliminary survey was also conducted in December 2004. The preliminary survey was followed by a rapid survey up stream and down stream along the entire River stretch of Hooghly during April 2005 to March 2007.

#### STATUS SURVEY METHODS

Surveys were conducted by a four-member team from GPRC, ZSI, Patna using a country boat with double motor engine (navigable in high and low tide) during daylight hours. A direct count survey method to estimate abundance was adopted following Perrin and Brownell (1989) and Smith and Reeves (2000). When the dolphins were sighted, the team remained in the area for approximately 25-30 minutes and counted the individuals with due care to avoid counting errors leading to underestimation or overestimation of dolphins. High and low estimate of the number of susus in the group were recorded. The low estimate was

considered to be an absolute minimum count and the high estimate as an absolute maximum count at specific location. We used identical best, high and low estimate to indicate a high level of confidence in our best count estimate. During continuous survey dolphins appeared to follow the motorized boat which added uncertainty to whether subsequent sighting were new or the same animal(s). In this case we used a low estimate of zero to reflect the possibility of making double counts. Sex and age class of the sighted dolphins were assessed based on morphological features (Fig. 2).

Global Position System (GPS) Receiver was used for navigation and recording the position of dolphin sighting. River depth was measured at every two km distance covered using SONAR (automatic depth finder).

## RESULTS AND DISCUSSION

Susus were usually seen in 7-8 groups near the confluence of River Jalangi at Krishnanagar (Mayapur) and 2-3 behind the sandbar near upstream of Bandel Railway Bridge. Mating pairs comprised of two males and one female was sighted during pre-monsoon survey (June 2006) near the Railway Bridge. Susus were usually noticed in between 100 to 200 meters range from the river bank, most probably due to availability of the pray species (fishes) near the bank.

In a stretch of 222 kms of River Hooghly 153 dolphins (best count) have been recorded (Fig.-1). After confluence with River Roopnarayan the River Hooghly fans out and flows through wider channel. If the wide channel of the River Hooghly would have been surveyed, an increase of 10% in the Susu population could be expected. And, the total population of Susu may be projected around 170-180 in 222 km stretch of main Channel of the River Hooghly. However, the distribution of dolphin in the wide channel is not uniform. The maximum depth 72.9 ft. of the River Hooghly was recorded near downstream Diamond Harbour. Due to clear visibility in the river from Krishna Nagar to Howrah Bridge at Kolkata both river banks were surveyed in same time. But in the downstream of Kolkata city Left and Right banks of the river were surveyed separately. The details of the river dolphin sightings have been depicted in Table-1.

### Dolphin status

- |   |                           |
|---|---------------------------|
| i. Mayapuri Temple to Howrah Bridge at Kolkata      | : 98 dolphins.            |
| ii. Howrah Bridge at Kolkata to Kakdwip : Left Bank | : 41 dolphins.            |
|   | <u>Total 139 dolphins</u> |
| iii. Kakdwip to Downstream Kolkata : Right bank     | : 31 Dolphins.            |

Total best individual count 139 dolphins and projected numbers of dolphins 170 in 222kms.

### Distance covered in River Hooghly during Census Survey

- Krishna Nagar to Howrah Bridge at Kolkata : 127.5 km
- Howrah Bridge at Kolkata to Kakdwip : 74.5 km
- Kakdwip to Ganga Sagar : 20.0 km Optimum

motorized boat speed was maintained at 6-8km/hr. in upstream survey and 10-12km/ hr in downstream survey.

Analysis of the dolphin records in different subsections between Krishna Nagar and Kakdwip are presented in Fig. 2 and Fig 3. Between Krishna Nagar to Mayapuri (a segment of 15.8 km river stretch) 24 dolphins were sighted (best estimate 24; min.1, max 8, mean group size 2.625, SD = 0.523). From Mayapuri to Babughat Garulia Mor (77.1 kms river stretch) 24 groups comprising of 42 dolphin (best estimate 42; min.1, max 5, mean group size 3.45, SD = 0.652) were sighted. Between Babughat Garulia Mor to Howrah Bridge at Kolkata, in 34.6 km river stretch, 32 dolphins were recorded in 16 groups (best estimate 32; min.1, max 6, mean group size 2.00, SD = 0.524). In the fourth segment, Howrah Bridge at Kolkata to Kakdwip (74.5 kms), 18 dolphin groups with 41 dolphins were sighted (best estimate 41; min.1, max. 6, mean group size 2.24, SD = 0.652).

During the study, a total of 81 adults, 36 sub-adult, 19 neonate/calves and 3 unclassified dolphins were recorded (Fig. 2). Highest dolphin encounter (1.5 dolphin/km.) was in the stretch of Krishna Nagar Temple to Mayapuri, whereas, lowest encounter (0.55 dolphin/km) was recorded in lower stretch between



*Platanista gangetica gangetica* Roxburgh

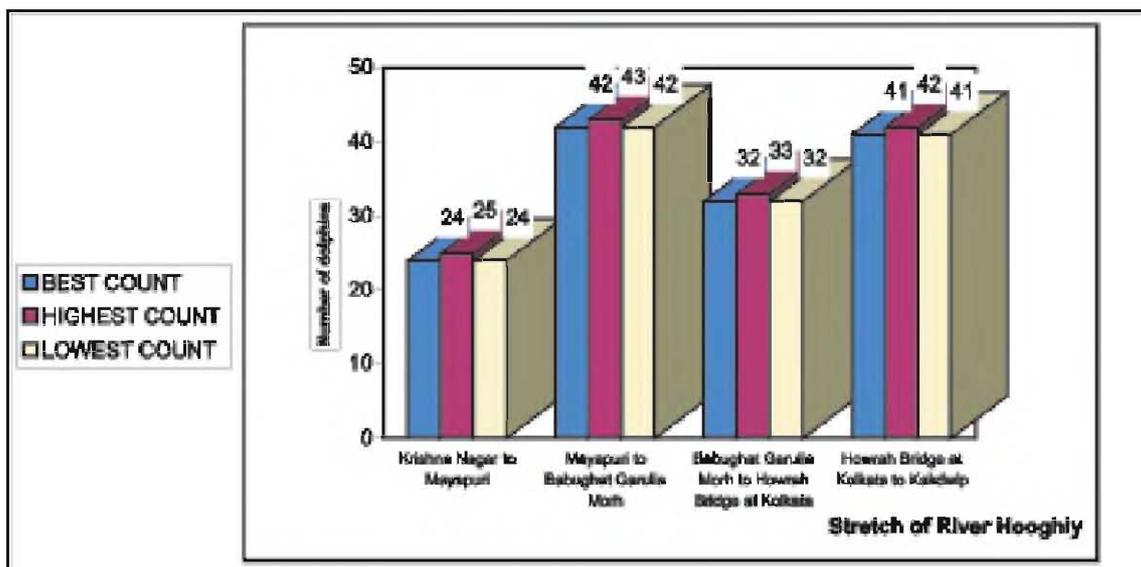


Fig. 1.: Best, Highest and Lowest count of Dolphin along River Hooghly in West Bengal.

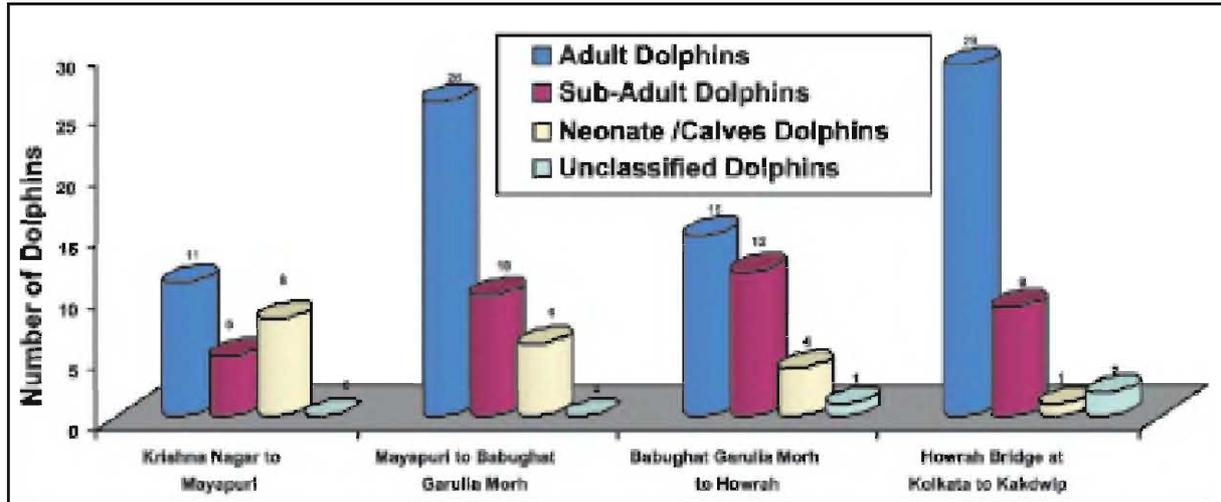


Fig. 2.: Population structure with age classes of dolphins along River Hooghly in West Bengal.

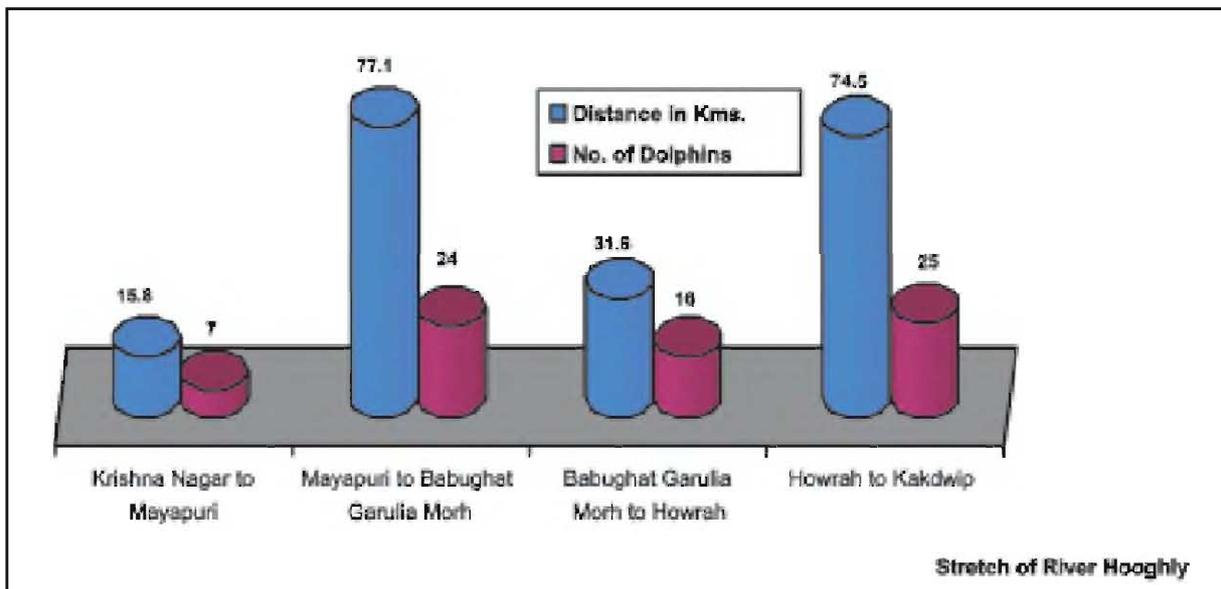


Fig. 3.: Graph showing the distribution of dolphins in the different Stretch of River Hooghly in West Bengal.

Howrah Bridge at Kolkata to Kakdwip might be due to movement of big ships (Fig. 3). However, good concentration of dolphins was recorded at the confluence of River Roopnarayan and River Hooghly.

During upstream survey between Krishnanagar to Howrah Bridge at Kolkata and habitat comprised of 78.7% wide single straight (WSS) and 21.3% of wide single meandering (WSM) channel while during downstream survey from Howrah Bridge at Kolkata to

Kakdwip 94.1% wide single straight (WSS) and 5.9% wide single meandering (WSM) channel, preferred by the dolphins were recorded. Highest gillnet fishing was observed between Sangraila and Noinan (between Howrah Bridge at Kolkata to Kakdwip) whereas, highest motorized ferry crossing was observed near Diamond Harbour.

**Heavy River Traffic is the Greatest Threat for Dolphin :** It has been observed that there are many

**Table-1 :** Summary of Dolphin (*Platanista gangetica gangetica*) sightings in the River Hooghly between Krishna Nagar to Kakdwip during rapid survey 2005-2007

	<b>Krishna Nagar to Mayapuri</b>	<b>Mayaapur to Babughat Garulia Mor</b>	<b>Babughat Garulia Mor to Howrah Bridge at Kolkata</b>	<b>Howrah to Kakdwip</b>
Total Survey Time (Hrs.)	2.54	11.52	4.35	11.12
Total Survey Distance (Km.)	15.8	77.1	31.6	74.5
Average Survey Speed (Km./hr.)	6.22	6.70	7.26	6.69
Number of sighting of Dolphin & groups seen by primary observers	7	24	16	25
Number of sighting of Dolphin & groups seen by the Rear Observer	1	2	1	0
Sum of best high and low estimate of Dolphin group size:				
Best (B)	24	42	32	41
High (H)	25	43	33	42
Low (L)	24	42	32	41
Mean group size based on best estimate				
Mean	3.45	2.625	2	2.24
S.D.	0.652	0.523	0.524	0.652
Range	1-8	1-5	1-6	1-6
Percentage Error based on groups sightings	14.3	8.33	6.25	0
Percentage Error based on best estimation	4.1	4.8	3.125	0
Dolphin encounter rate based on best estimate				
- (dolphin / Km.)	1.5	0.59	1.01	0.55
- (Dolphin / hr.)	9.5	3.75	7.35	3.69
Number of adult, sub adult, calf / Neonate and unclassified dolphin				
Adult	11	26	15	29
Sub adult	5	10	12	9
Neonate/Calf	8	6	4	1
Unclassified	0	0	1	2

boat and ship traffic in the Dolphin habitat in River Hooghly especially near and downstream Howrah Bridge at Kolkata. Due to this underwater noise may have harmful effects on the Dolphin (Sinha, 1997). Heavy river traffic in Hooghly is the greatest threat for the dolphin population. Author could not confirm any death of Dolphin by motorized boats in River Hooghly but it was observed that dolphins are confined to many small undisturbed areas in River Hooghly, where the motorized boats/ships either do not operate or operate occasionally. It appears that the dolphins were frightened.

**Effect of Hooghly tidal bore on Dolphin Movements :** The tide runs rapidly on the River Hooghly, and produces a remarkable example of the fluvial phenomenon known as a "tidal bore." This consists of the head-wave of the advancing tide, hemmed in where the estuary narrows suddenly into the river, and often exceeds 2 meter in height. Its effect is felt up to downstream Kolkata, and frequently destroys small boats. The difference from the lowest point of low-water in the dry season to the highest point of high-water in the rains is reported to be 20 ft 10 in. The greatest mean rise of tide, about 16 ft (4.9 m), takes place in March, April or May - with a declining range during the rainy season to a mean of 10 ft (3.0 m), and a minimum during freshets of 3 ft 6 inches.

During the continuous survey especially during high-tide, the adult dolphins movement were fast in different directions and the surfacing frequency were also observed very high. Relatively thin population of dolphin was recorded in this stretch in comparison to upper stretch of the river.

## RECOMMENDATIONS

Detrimental fishing gears viz. monofilament gillnets should be banned from the dolphin habitat to reduce the incidental deaths. River pollution due to oil spillage from ship traffic and industrial wastes must be taken into consideration effectively. The use of chemical fertilizers and pesticides should be reduced all along the river bank. The dolphin habitat must be declared as protected areas.

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