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Observation of fresh water Ganges dolphin (*Platanista gangetica*) in the Hamirpur and Ekdala stretches of Yamuna river, India

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Abstract

The survey was carried out in 2 stretches of Yamuna River, India in total 10 Km length in toward down streams where 2 Adult, 1 juvenile in Hamirpur and 6 adult and 3 juvenile sizes in Ekdala River stretches. Dolphins were reported in surveyed stretches after in long periods. Various threats in stretch; sand mining, fishing, ferries, cremations, water lifting for irrigation, agricultural cultivation on the river banks etc. were also recorded during the survey. The present paper deals resulted survey of two stretch of Yamuna River in presence of Ganges River dolphins and various threats.

Keywords: Grids, Yamuna, Dolphins, Nadi mitra mandali, habitats, Ganga

Introduction

The Ganges River Dolphin locally known as Susu is restricted to the Ganga, Brahmaputra, Karnaphuli-Sangu and Meghna river systems and their tributaries, from the foot hills of the Himalayas to the limits of tidal zone in India, Bangladesh, Nepal and Bhutan (Anderson, 1878; Jones, 1982; Reeves and Brownell, 1989; Reeves *et al.*, 1993; Sinha, 1997 a, b; Sinha, 2000 Taigor and Rao, 2012, 2014.) [1, 12, 24, 25, 32, 34, 38, 42].

Investigations on the ecology and distribution of dolphin have been steadily advancing since early 1970's (Pilleri, 1970; Kasuya, 1972; Kasuya and Haque, 1972; Haque, 1976) [19, 13, 11]. In the recent years focus has been given on studies related to the status of dolphin in various rivers and their tributaries (Jones, 1982; Pilleri and Tagliavini, 1982; Gupta, 1986; Shrestha, 1986; Singh and Sharma, 1985; Rao *et al.*, 1988; Choudhury and Hussain, 1992) [12, 10, 27, 9]. In spite of being a "Flagship" species, representing an ecosystem in need of conservation its status has become a matter of grave concern over the past few decades (Behera, 2002) [6]. Once believed to be in tens of thousands, their numbers have gradually reduced to 4000-5000 (Jones, 1982; Anon, 2006; Choudhary *et al.*, 2006; Behera *et al.*, 2008, Meena *et al.*, 2017) [12, 7] with further decline to a mere 1800 individuals in all the tributaries of its distribution (Behera *et al.*, 2008, Bashir *et al.*, 2010, Sinha, *et al.* 2010, Anon, 2010, Anon, 2012, Sulekha *et al.* 2014, Singh *et al.* 2014,) [7, 4, 3, 5].

The Yamuna is the largest tributary of the river Ganges (Ganga) in northern India. Originating from the Yamunotri Glacier at a height 6,387 metres, on the south western slopes of Banderpooch peaks, in the Lower Himalayas in Uttarakhand, it travels a total length of 1,376 kilometers (855 miles) and has a drainage area of 366,223 sq km (40.2% of the entire Ganges Basin), before merging with the Ganga at Triveni Sangam, Allahabad (Anon, 2006, Sharma, 2006, Rao *et al.* 2013, 2016) [26, 6]. Encounters of anthropogenic threats of grids also highlighted. There is no complete scientific estimate of dolphin note done in Yamuna River since last decay except few surveys. Recent survey was carried out in two stretches of Yamuna River for estimate the population and assesses various threats in Ganges river dolphin.

Materials and Methods

Study area

The Present surveys were carried out in Hamirpur and Fatehpur districts in Uttar Pradesh (Yamuna Bridge to Pathewara village near railway bridge, to down steam of Yamuna-Betwa Confluence, approximate 7 km) and Ekdala (Patian ghat to Chosath Devi temple, approximate 3 km) in which lie two of the GRIDS (from Yamunotri to Allahabad Yamuna River segmented 14 sites after 100 km long stretches that is known as grids) under consideration as part of the

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River Restoration Techniques Development project, which is a twinning project of PEACE Institute charitable Trust, Delhi and Thames Rivers Restoration Trust, UK. The survey at

Hamirpur and Ekdala were carried out on 29 January 2012 and 1 February 2012 respectively Map 1 Showing study grid of Yamuna River.

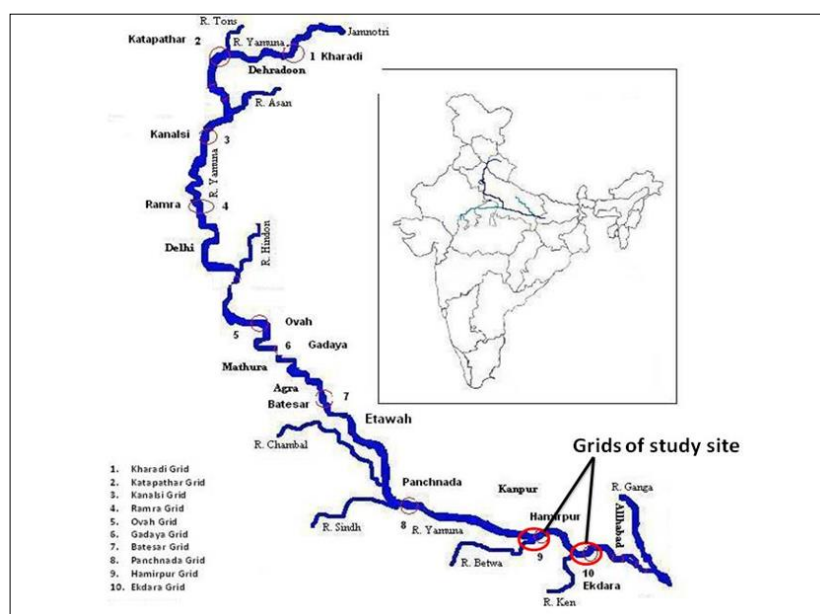


Fig 1: Showing grids of study at Yamuna river

Data Collection techniques and analysis

Observation of current dolphin population carried out based on the principle of direct sighting, numbering and recording animals. Animals were sighted by naked eye as well as using an Olympus binocular (10 X 50) to avoid any individual to be missed. Individuals sighted were recognized based on their sizes that were Direct-count method adopted by Perrin and Brownell (1989) [18], Singh and Sharma (1985) [29], Rao *et al.*, (1989) [21] and Mohan, *et al.*, (1993) [16]. Various means of habitat disturbance like fishing, dead bodies, sand mining, polluted nallas, agricultural practices, ferry boats, lift irrigation infrastructure etc. were observed and recorded. Interviews with local fishermen were held to know more about their understanding and knowledge regarding Sus (Dolphin) in the down and upstream of the River. Observations data were analysed through the Analytica software.

Results

Hamirpur Grid

Hamirpur is situated on the National Highway 86 (NH 86) which is also called Kanpur-Hamirpur-Sagar road. The city of Kanpur is located 67 km, Orai 85 km, Banda 95, Rath 76 km., Mahoba 85 km from Hamirpur but due to bad road conditions these distances cannot be covered in less than 3 hours if one is travelling by a government bus. The district lies between Latitude 25°7'N & 26° 7' N. and Longitude 79°17'E & 80°21'E including the Mahoba district. Hamirpur is bounded by districts Jalaun (Orai), Kanpur and Fatehpur in north, Banda in east, Mahoba in south and Districts of Jhansi and Jalaun on the West. The villages of Merapur, Bhilawa, Bhola ka dera, Churaman ka dera and Ramedi are part of the GRID and the local Nadi Mitra Mandali (NMM) namely the "Yamuna-Betwa River Mitra Samiti" has been in place for the last two years. Presently the NMM is participating in monitoring of river and village health and other activities under the River restoration techniques development project.

Ekdala grid

Ekdala village is situated 17 km from the Khaga town of Fatehpur district of Uttar Pradesh. "Panchdev Yamuna Nadi Mitra Society", Ekdala is the local Nadi Mitra Mandali (NMM). Local stretch (3 km) of the Yamuna River was surveyed from Patian ghat to Chosath Devi Temple. Geographical location of the surveyed stretch is Patian ghat (latitude N 25° 37' 43.4", longitude E 81° 02' 07.8' ') and Chosath devi temple (latitude N 25° 36' 41.3' ', longitude E 81° 02' 03.9' ').

Dolphin status in the grids

In the Hamirpur grid 2 adult and 1 juvenile were observed near Pathewara village which is down Stream of Railway Bridge after the Yamuna - Betwa River confluence. Geographic location of dolphin sighting is latitude N 25° 55' 12.40" and longitude is E 80° 13' 02.70''. In the Ekdala grid total 9 Dolphins were observed in 3 km stretch of the river surveyed stretch. 6 adults and 3 juvenile sizes of dolphins were observed. Number of surfacing sighting was 25 as observed in a 2-hour survey period Geographic location of dolphin sighting is latitude N 25° 37' 04.8' ' and longitude is E 81°02' 12.5' ' (Figure. 1).



Fig 2: Ganges Dolphin observed in the Yamuna River Habitat types

The characteristic feature of the River Yamuna is that it has perennial, rapidly flowing water during monsoon season and slowly flowing water in other seasons, which makes this river fit to accommodate flora and fauna of two different kinds of river flow systems. The Yamuna River in the survey area has different habitats characterized, particularly by the river depth, flow and nature of banks. Animals occupy various suitable habitats to their requirements. The crucial microhabitats of the River Yamuna at Hamirpur grids were classified as:

- River bank with sandy substratum
- River bank with clay/loamy soil substratum
- River bed with deep water
- River bed with rocky substratum
- Ravines with deep water

At Ekdala grid, the river forms a vast curve. Almost eight kilometers long deep stretch provides suitable habitat for Dolphins which are locally known as Suise. The eastern bank of River Yamuna is several feet higher from level of water. It provides opportunity to look over the river and behold movements of dolphins. In Ekdala grid above key microhabitats were points A, B, C, and D observed (Figure 2).



Fig 3: Key Habitats types of Yamuna River at grids

Anthropogenic threats

The anthropogenic threat to the mammal is largely due to the degradation of its river habitat and poaching. The Ganges river system is home to roughly one tenth of the world's human population and thus suffers from enormous pressure on its resource. A major threat to the Ganges River Dolphin has been due to extensive damming of rivers for irrigation and electricity generation, oil exploration, underwater noise which isolates its populations and prevents seasonal migration. Other threats include chemical pollution, boat traffics, hunting and human disturbances, accidental entanglement in fishing nets. The poaching happens mainly for oil, fishing baits and food by local people (Singh and Singh, 2006, Taigor and Rao, 2010) [30, 45].

In the grids Commercial fishing, Sand mining, dead bodies, cremation on river banks, and agricultural practices were observed. Migrant fishermen from Bihar indulge in commercial fishing in the river. They reportedly come every year in the month of January and stay till June. In Hamirpur grid Kanpur-Banda railway line and the lift irrigation infrastructure near Pathewara village which is utilizes heavy

duty power motor creating high sound close to the dolphin habitat were observed. During the survey the fishermen were also tried to be educated regarding the importance of the river Dolphin and why they (dolphin) needed their (fishermen) protection. Other threats such as agricultural practices close to the river bed, grazing by domestic animals, dumping of domestic waste water from the villages, construction of a pontoon bridge etc. were also observed. Anthropogenic threats in the both grids observation is listed in table no 1.

Table 1: Anthropogenic threats recorded in survey in both grids

S. N.	Factors affecting on dolphin habitats	Ekdala	Hamirpur
1	Fishing boat	13	9
2	Dead bodies in the river banks	0	5
3	Ferry	2	7
4	Crematoria site near River banks	3	5
6	Polluted drains	1	2
7	Water lifting irrigation canals	0	2
8	Sand mining	2	1
9	Railway bridge or Pontoon bridge	1	1
10	Agricultural practices close to the river bank	3	4

Discussion

Ganges River Dolphin comes into direct competition with people either for food (fish) or space or indirectly faces threats due to pollution (Taigor, 2009, Taigor and Rao, 2008, Bashir *et al.*, 2010, Taigor and Rao, 2010, Taigor *et al.* 2008) [44-48]. For this species, habitat fragmentation by barrages, excessive water abstraction, and River pollution are major threats (Smith and Smith, 1998; Smith *et al.*, 1998; Sinha, 2006) [39, 40, 36]. Illegal, intentional killing of River dolphins in India and Bangladesh to extract blubber oil for catfish fisheries and incidental mortality by entanglements in gill nets are examples (Smith and Smith, 1998; Sinha, 2006) [39, 40, 36] of negative interactions of dolphins with fishing practices. The main threats to dolphin survival are construction of barrages, heavy siltation, use of chemical fertilizers and organo-chlorines pesticides for farming in the River corridor, by catch in gill-nets, prey depletion and intentional killings for oil and meat (Nair, 2009; Sinha and Sharma, 2003) [17, 31]. River Yamuna is one of the major rivers in India and also a major tributary to river Ganges, the largest river in India. Both of these rivers cater to the vital human needs of the states in North India. River Yamuna originates from Yamunotri in Himalayas and traverses through Himachal Pradesh and Uttaranchal in the upper stretch of 200 Km drawing water from several major streams. In Yamuna River Dolphin is restricted in Pachanda to Allahabad (approximate 400 kms) stretch out of 1300 kms area of Yamuna River.

Conclusion

Hamirpur and Ekdala survey highlights the importance of these locations as key dolphin habitats but commercial fishing there has emerged as a threat to be addressed and mitigated. It is hoped that an extensive survey of the river Yamuna from Pachanda till Allahabad could be help identify more such dolphin habitat sites to make a good case for considering of a protected area for river Dolphin along this stretch. Periodic surveys and regular monitoring should be carried out of the entire dolphin habitat. Over exploitation and destructive methods of fishing in the dolphin habitat are to be controlled. There is a serious need of mass scale plantation in the catchments area of the rivers to reduce the silt load entering the river systems. A minimum flow of water in the river must

be allowed even during the lean season so that the dolphin population can survive and migrate. Education and awareness campaigns at potential dolphin habitats for fishing communities, civil officers, students and people at large need to be intensified. For the conservation of dolphin, Dolphin watch center has to be established in habitat stretch of Yamuna River like Ekdala grid had initiated this task.

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