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A Study on the Threats to the Gangetic Dolphin

Sudhan Kumar Biswas*, Susanta Nath*, A.K. Panigrahi, Bibhas Guha*****

Abstract

Platanista gangetica gangetica, the obligatory freshwater dolphin of Ganga river in the world and is distributed in the Ganges–Brahmaputra–Meghna and Sangu–Karnaphuli River systems in India, Nepal, and Bangladesh. The diets include wide range of fish, turtles and birds, those are located around the Ganges river. Dolphins are considered as potential ecological indicator of ecosystem degradation of the river. Due to various anthropogenic interferences like poaching, water pollution etc this animal is at the face of extinction. There is no credible estimate of the range-wide numbers and this subspecies was listed as endangered in the IUCN Red List on 1996.

Keywords: Gangetic Dolphin; Endangered Species; Bioindicator; Threats.

Introduction

One of the most charismatic mega fauna of the Indian subcontinent is the Gangetic Dolphin *Platanista gangetica gangetica* . It is among the four obligate freshwater dolphins found in the world. This species has been included in Schedule I of the Indian Wildlife (Protection) Act 1972 Convention on International Trade in Endangered Species (CITES), in Appendix II of the Convention on Migratory Species(CMS) and categorized as Endangered on the International Union for the Conservation of Nature's (IUCN) Red List. During the Ganga Action Plan I and II efforts have been made to gather scientific information about this species and habitat degradation, through pollution and reduced water flow and poaching were considered as threats to this animal. In fact, one species once available in the rivers of China was functionally extinct in 2006 (Turvey *et al,* 2007, Hopkin, 2007). At present the Amazon River Dolphin, the Ganges River Dolphin and the Indus River Dolphin are available as endangered condition.

As an endemic animal, the Ganges River dolphin has a fairly extensive distribution range in the Indian sub-continent. This animal is found in the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of India and Bangladesh, while Karnali and the Sapta Kosi Rivers in Nepal are the sites where a few individuals may survive. Due to continuous decline in its population, the IUCN changed its status from 'Vulnerable' to 'Endangered' in 1996. Its population was recorded as 4000 to 5000 in the early 1980s to 3500 in 2014 in the distribution range (Sinha and Kannan, 2014). The average weight is 330-374 pounds, length 7 -8.9 feet and love to live in freshwater. As an oldest creatures in the world along with some species of turtles was officially discovered in 1801 (WWF, 2015).

Author's Affiliation: *UG & PG Department of Zoology, Bidhannagar College, EB-2, Sector – 1, Kolkata – 700064, West Bengal. **Professor of Zoology, University of Kalyani, Kalyani, West Bengal. ***Assistant Professor of Zoology, Netaji Subhas Open University, Salt Lake, Kolkata- 700 064.

Reprint's Request: Susanta Nath, UG & PG Department of Zoology, Bidhannagar College, EB-2, Sector – 1, Kolkata – 700 064, West Bengal.
E-mail: nathsusanta2012@gmail.com

Habitat Preference and Fragmentation

Ganges dolphin is fluvial in habit, but also be found in brackish water, though it never finds in the sea (Sinha, 1997). Salinity defines the downstream limit, while its distribution at upstream limit is maintained by physical barriers and low prey densities at high elevations. The long stretches of deep water in association with shallow water meanderings, confluences and mid channel sand bars are the places where dolphins are abundant.

Preferable habitats of the Ganges River dolphins are specially an eddy-counter current system which is very common in the main river flow. Such current system may be due to point bar formed from sediments and deposits, a convergent stream branch, or by an upstream meander. They are also found below sand bars and bridges if eddies are formed.

The Gangs River dolphin can tolerate a wide range of temperature fluctuations like as low as 5°C and as high as 35° C in the river Karnali in the winter in Nepal and in the plains of Uttar Pradesh and Bihar during summer respectively. More over turbidity does not determine the distribution of this beautiful animal. The construction of dams and barrages on the main stream of the Ganga and its tributaries is one of the cause of population fragmentation of this animal (Smith *et al*, 1994,1998,2000). Such construction includes gates to control the stream thus restrict the movement of this aquatic mega-fauna and two subpopulations appeared in 1975 with the commencement of Farakka Barrage in West Bengal . Another two subpopulations developed when the Lower Ganga Barrage at Narora (1966) and the Middle Ganga Barrage at Bijnor (1984) were constructed (Reeves *et al*, 1991).

Dolphin also reported to disappear above the Kaptai dam in the Karnaphuli river in Bangladesh over a period of around six years after the construction of the dam and also above the Middle Ganga barrage at Bijnor, about 100 kms downstream Haridwar after 12 years of its construction .

Reproduction and Life History

It is reported that breeding season of the Gangetic dolphin extends between January and June, though newly born calves can be seen even in other months. Mating takes place between March and June, sometime in July. After a gestation period of about nine months, a single baby is born which is about 70 cm in length and 4 to 5 kg in weight and stay with mother for about one year. At an age of 10 years, male attains sexual maturity with a body length of 1.7 m, while in females, 10 or less years is required to attain maturity when they attain 2 m length (Kasuya, 1972, Harison, 1972).

Feeding Behavior

A wide range of fish, turtles and birds are diet of Ganges River Dolphins those are located around the Ganges river. The diets include catfish, carp, clams, turtles and occasionally birds. As the deeper parts of the river are the preferable dwelling area of this animal, it also try to find most of it's food in a similar area. The period of active foraging is exhibited in the morning (0700 hrs- 1000 hrs) and after noon (1500 hrs - 1700 hrs). The dolphin prefers to chase and prey upon surface dwelling fish like *Rhinomugil corsula* as well as exhibited community feeding.

Ganges Dolphin as a Bioindicator Species

The relationships between measures of ecosystem degradation and river dolphins as potential ecological indicators was investigated by Gomez-Salazar *et al*, (2012). They tested three ecological indicators of freshwater ecosystem degradation using river dolphins: (i) density of river dolphins, (ii) mean group size of dolphins, and (iii) dolphin sighting rates. Study at selected locations of the Amazon and Orinoco Rivers indicated a strong negative relationship between measures of habitat degradation and river dolphin density estimates, and perfluorinated chemicals which are below detectable levels in the river water or in other. It was revealed that river dolphins are flagship and sentinel species for monitoring the conservation status of large tropical rivers in South America. The micro-pollutants such as organochlorines, organotin compounds which were measured below detectable level in other invertebrates and fishes, but the amount in Ganges dolphin tissues suggesting their sensitivity to toxic chemical pollution in the river (Kannan *et al*, 1994, 1997; Senthilkumar *et al*, 1999, Yeung *et al*, 2009). Low population of the Ganges dolphins in the regions of India–Nepal border indicated the environmental degradation in the Ganges basin.

Threats

The threats of Ganga river Dolphin are specially anthropogenic. Environmental degradation due to chemical changes in the river, noise pollution due to river transport, fisheries by catch etc. are the main causes for the decreasing population of this animal. Considering all these here is an discussion related to the threats to the Gangetic dolphin.

Construction of Dams and Barrages

So far fifty dams and barrages are constructed in the flow of Ganga which dramatically disrupted the dolphin population. The result is the appearance of subpopulation. A subpopulation may be defined as "geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less)" (IUCN 2001).

After the construction of the Farakka Barrage (24.7891°N, 87.8878°E; located on the Ganges River 400 km upstream of Kolkata near the India–Bangladesh the dolphin population have decreased rapidly as this barrage creates a number of physical barrier for movement of the dolphin (Sinha, 2000). Farakka Barrage creates peculiar physiographic and hydrologic complexity in the Bhagirathi Hooghly river which ultimately changes the population pattern of dolphin along with small tributary namely Ajay. Barrage changes the available distribution pattern of prey and also sediment transport at the same time reduce the extent of eddy-counter currents where dolphins are generally available (Reeves and Leatherwood 1994, Smith *et al*, 1998).

Chemical Pollution

Several studies revealed that the Ganga river basin is one of the most populated as well as heavily polluted area due to fertilizers, pesticides, industrial and domestic effluents. Through food chain, these pollutants enter the dolphin as biomagnified rate as this animal is the apex predator. Study revealed that rate of pollution is high but Ganges dolphins have a low capacity to metabolize such toxic pollutants. Which make the Ganges dolphins vulnerable to the effects of chemical pollution (Kannan *et al*, 1994).

Direct and Incidental Catches

One of the cause that make Dolphins vulnerable, because their preferred habitat is often in the same location as the fishing grounds. Dolphin oil is highly valued as fish attractant and fishermen intentionally prepare their net to capture the dolphin which is called "assisted incidental capture" (Sinha, 2002).

Extraction of River resource

Heavy river traffic in the Ganga and Brahmaputra increases noise pollution, deterioration of prey base alter the feeding behavior of this glorious animal. Moreover, regular removal of sand, stones and woody debris are degrading the ecological integrity of the river environment (Mohan *et al*, 1997).

Influence of Sedimentation

Continuous grazing, construction of road, landslides etc causing erosion of the soil at the high altitude from where the rivers are originated. Erosion also taking place in the catchment areas and flood plain due to lose of vegetations. Erosion produces huge amount of silt which are depositing in the river resulted in the rise of the river bed. As a result natural habitats of river dolphin are changing.

Mortality after Monsoon and Irrigation Canal

During monsoon, areas on two sides of the tributaries are flooded and dolphin enters those areas. When the water level comes down, this animal trapped in the bounded water and either capture by the local people or die due to decrease in the water level after monsoon. Small number of dolphin occasionally enter the large irrigation canals in Uttar Pradesh. Rarely they can return successfully to the main channel of the river. But in most cases either they are killed by the locals or trapped in the water-regulating gates causing death.

Conclusion

The Ganges river dolphin is an indicator as well as the flagship species for the river ecosystem. It is an endemic species of the Indian subcontinent and declared as National Aquatic Animal by the Government of India. Due to high population density in the Ganga basin especially in Bihar state (1102 person/km^2) recorded in the population census 2011, causing loss of freshwater biodiversity and inevitable uncertainty for the future of the dolphin.

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