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Occurrence records of Ganges River Dolphin (*Platanista gangetica*) in Southern West Bengal and impact of anthropogenic interferences in its habitat

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Abstract: *The present study was conducted by WWF-India, West Bengal State Office on Ganges River dolphin (Platanista gangetica gangetica Roxburgh, 1801) during 2010-13 to assess its distribution pattern. Occurrence of this freshwater cetacean in River Hooghly and its tributaries of Southern West Bengal between 24 °30´-21 °51´N latitude and 88 °03´- 88 °10´ E longitude have been observed and recorded during the study period. The study was carried out in 6 districts of South Bengal by a small team of observers on channels of Hooghly River and its tributaries with direct observations following a systematic and standard survey method. Piscivorous dolphins still occur in several fragmented pockets of the river channels here, all of which have their specific characteristics with respect to geographic location, nature of water and land use, frequency of human settlements and water depth. It has been found out that an optimum range of hydrological parameters favoured the occurrence of dolphins in these locations. Besides that, the habitat of dolphin is subjected to various inferences of human origin, which made this legally protected species and its habitat vulnerable. Among the most commonly utilized 30 species of ichthyofauna recorded from this study area, 10 prey species of dolphins have been identified so far. Some of which are declining fast like Rhinomugil corsula. Hence decline in fish productivity adversely affect human livelihood and survival of dolphin. Future survival of dolphin would be imperfect if dolphin's habitat is not protected and prey variety declines.*

Keywords: *Anthropogenic, cetacean, congregation, confluence, Ganges, ichthyofauna*.

I. Introduction

Occurring in seven Indian states, namely, Assam, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, Jharkhand and West Bengal - Platanista gangetica (Ganges River dolphin) is one of the four freshwater dolphins of the world. Its population was estimated around 600 in Ganges and its tributaries in the states of Uttar Pradesh, Madhya Pradesh and Rajasthan (WWF, unpublished). There are 179 dolphins in Vikramshila Sanctuary (Kelkar, et. al 2010). However population status in other states is yet to be confirmed. The range of the subspecies has declined progressively since the nineteenth century when it was mapped by Anderson (1879) Ganges River dolphin was declared as **national aquatic animal** by Ministry of Environment & Forests, Govt. of India in 2010. With the IUCN status as **endangered** and only about 1700 of them left in the rivers of India, it needs immediate attention and candid synergized efforts to protect them in their natural habitats (WWF, 2009). The legal protection in India has been "completely ineffective" (Sinha, 2002), in spite of its inclusion in the highest category of Schedule I of Indian Wildlife (Protection) Act, 1972.

II. Study Area

Presence of this blind freshwater cetacean, Platanista gangetica in River Hooghly and its tributaries of Southern West Bengal between 24 °30´-21 °51´N latitude and 88 °03´- 88 °10´ E longitude have been observed seasonally during the study period. The study was carried out in 6 districts of South Bengal emphasizing the confluences of certain major freshwater channels having direct connectivity with River Hooghly.

Table: 1 Study area in Southern West Bengal

District	Study Undertaken
Hooghly	+
Howrah*	+
Nadia	+
South 24 Pgs	+
East Midnapur*	+
Murshidabad	+

***** Focal points of study

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A tentative working area was selected based on previous literatures and sighting records. The selected sites were later confirmed with field observation and secondary data collection. Following locations were chosen for field study. Sushuks were sighted in all the following locations in good numbers. However all the points have their specific characteristics with respect to geographic position, nature of land use, human settlements and navigability. Among all these points, occurrence of dolphin was followed regularly at 8 different sites where qualitative impact of anthropogenic activities was measured (Fig 1).

Table : 2 Dolphin congregation points in different water channels

ZONE (District)	RIVERS	PLACE CODE*
Kolaghat* (Purba Medinipur)	Rupnarayan	Klg
Gadiara* (Howrah)	At the confluence of Hooghly and Roopnarayan	Gdr
Garchumuk* (Howrah)	At the confluence of Damodar & Hooghly	Garchm
Tribeni (Hooghly)	Hooghly	Trb
Balagarh (Hooghly)	,,	Blg
Raichak, Diamond Harbor*, Beguakhali (South 24 Pgs)	,,	Dmd Harb
Bandar* (Hooghly)	Confluence of Dwarakeswar & Shilabati	Bnd
Purbasthali (Nadia)	Hooghly	Prtl
Nabadwip* (Nadia)	At the confluence of Bhagirathi and Jalangi	Nbd
Ranaghat* (Nadia)	At the confluence of Churni and Hooghly	Rng
Farakka*, Ahiron and adjacent region (Murshidabad)	Ganga and feeder canal of Farakka	Frkk
Barrackpur (North 24 pgs), Kolkata up to Bata Nagar (South 24 pgs)	Hooghly	Brk

Place code is used in Table: 3 ; *Places regularly monitored

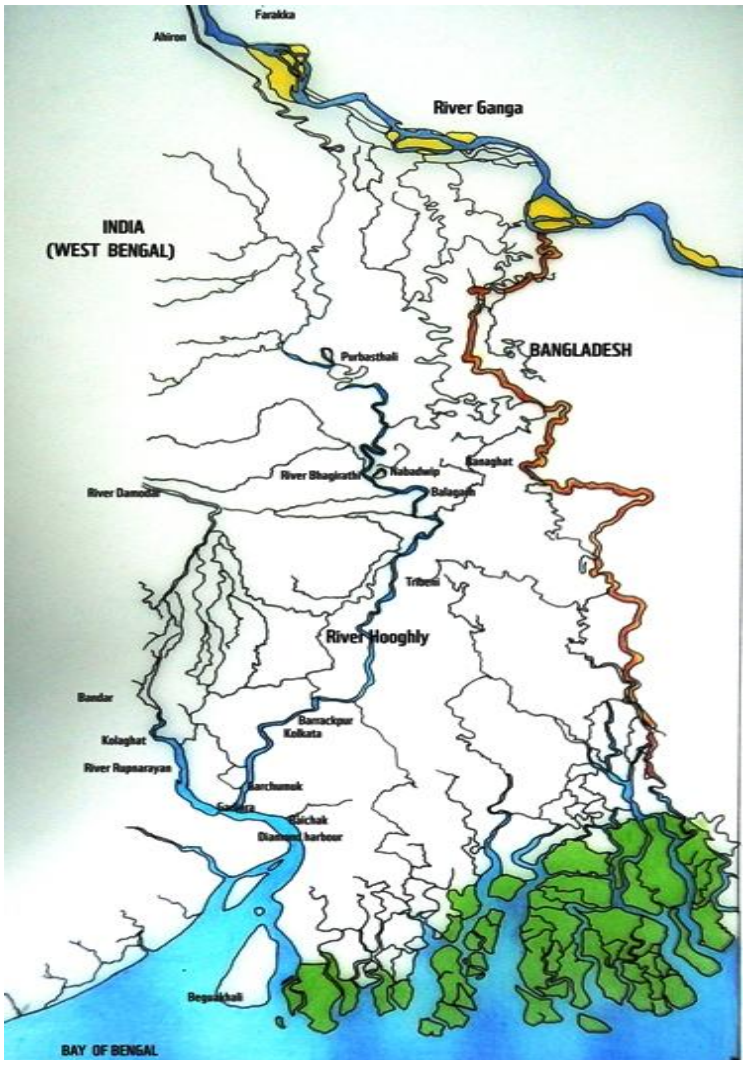


Fig 1 : Map of Study Area

III. Materials And Methods:

The first phase of study was completed during 2010-13 from Farrakka to Sagar. However certain congregation points (Table: 2) were prioritized as sampling sites based on present sightings and previous records. All the activities taken up under the present project was aimed at conserving P. gangetica in its natural habitat. Hence a pilot investigation was undertaken first to identify the potential zone of its occurrence along the course of River Hooghly and its tributaries. This was carried out in the initial phase of the project with the help of primary data collected from riverside population, fishermen and boatmen who have the best opportunity of observing dolphins during their regular course of activities. It was also validated with secondary data from the literature reviews and recent records of its occurrence. This involved field visits to all those spots where frequency of dolphin sighting is high, moderate and not rare.

Mapping of all the congregation points and sighting spots revealed the current distribution range of dolphins in the River Ganga and the tributaries in Southern West Bengal. This was further confirmed with secondary information recorded most recently from concerned stakeholders like Fisheries and Forest departments. Sighting of dolphins in any channel for two consecutive years in different seasons was considered as their regular place of occurrence.

From survey point of view, locating and tracing the current dolphin habitats and their past distribution tracks have been the focus of our work. However counting of their population was not the objective in this phase of study. Recording of hydrological parameters in different seasons at various points helped to understand the optimum aquatic environment of the rivers preferred by *P. gangetica*. Preparing a list if ichthyofauna preferred by Platanista in this stretch was also the aim of this study. Under this project nearly 250 fishermen and women were directly interacted and their feedbacks were incorporated while finding the local issues related with dolphin conservation. Boat owners, fish vendors, local community and non government groups were also consulted for authentication of field records.

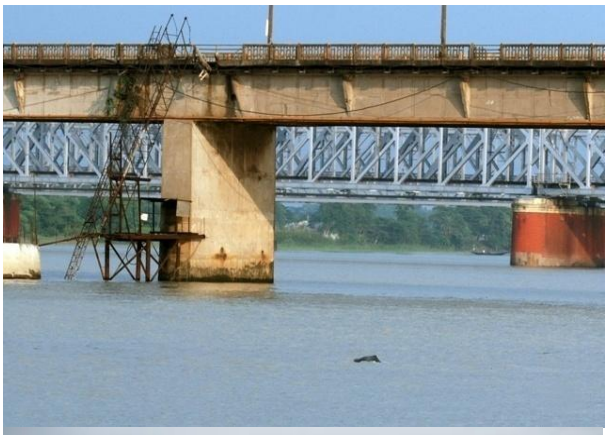
Certain physico-chemical parameters (Temperature, pH, salinity, conductivity and transparency) of water were also measured applying standard method and tools.

An overall status of dolphin's habitat was assessed considering the interferences all the study sites. Identifying the present threats and interferences in the rivers is based on a scale of 1 to 5 with varying degree of impact for each component (Table: 3).

© WWF-India, WBSO Ganges River dolphin in natural habitat

IV. Results

It has been noticed during this study that there are lot of interferences in dolphin habitat having adverse impact on its survival. It was confirmed by the observations and appraisal among community members that the waterways, which were full of resources are now showing signs of decline. The major interferences were WDP or water development projects (construction works, bridges, dams, riverfront damage or soil erosion, over-extraction of river water etc.), Pollutant load in rivers (POL), over fishing (OEF), mortality in fishing gears like nets, trawlers etc. (MOR) and deliberate killing (DK) of dolphins for flesh and oil. Among the major congregation points, 8 specific points were chosen on the basis of habitat use by dolphin. Kolaghat recorded a very high level of threat in dolphin habitat. Whereas sites like Bandar (Hugli) showing a much lower degree of threat because of limited availability of water and human interferences. Major impediments like Farakka barrage, bridges across the river, sluish gates, electric poles and many other structures hinder the free flow of water and obstruct natural behavior of this aquatic species.



Dolphin surfacing near Kolaghat Bridge on Rupnarayan R.

Interception at gate 58 on Damodar River

Ganges River dolphins have apparently been extirpated from the River Damodar, as sighting record is unavailable. The interceptions at different points and extremely low flow during lean period made it an unsuitable habitat for river dolphins. The confluence of Damodar and River Ganga is a favourable congregation point where dolphins are found throughout the year. However their entry into Damodar is obstructed by gate 58 which is hardly 1 km from this point.

Smith et al. 2000 mentioned adverse effects of at least ten dams and barrages constructed in its mainstem and tributaries is the probable reason for severe fragmentation of dolphin habitat. They could only locate a single dolphin rescued after becoming stranded in a deep pool after the flow was diverted during the dry season by an upstream barrage. However State Forest Department rescued Gangetic dolphin from River Damodar at Randiha in Burdwan and successfully translocated it to River Hooghly during February 2000.

Majority of the industries utilize river water and discharge their effluents into the river. There are thermal power plants close to river banks, series of brick kilns, outlets of municipal wastes, human sewage and agricultural runoffs in some points which are direct interferences effecting the water quality.

Effluents from Thermal Power plant

Over extraction of water for agriculture

Extraction of water for agricultural purposes 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 fresh water species of their home leading to fragmentation of habitat and confinement of the resources in separate pockets. The Ganges and other tributaries are highly subjected to tidal action over 175 miles length up to Nabadwip in South Bengal. There is change in river course at many points. Erosion of banks on River Ganga is very common at different places which engulfed vast areas including agricultural fields.

Brick kilns directly utilize soil from river banks and destabilizes river front making it vulnerable to erosion

Table: 3 Level of interferences in dolphin habitat

THREATS					**SITES**			
	Frkk	Nbd	Rng	Bnd	Klg	Gdr	Garchm	Dmd Harb
WDP	1	4	4	5	1	5	3	5
POL	4	2	2	4	1	3	3	3
OEF	2	3	4	4	1	2	2	1
MOR	4	4	5	5	3	3	4	3
DK	5	5	5	5	4	4	5	4

1= high level of threat; 3 = medium level of threat; 5 = almost no threat

The Dolphins are normally found in areas with high fish productivity and therefore also the primary fishing grounds. Hence they are vulnerable to accidental killing in gillnets. The over harvesting of fish and crustaceans also reduces the availability of the fish species both for humans and riverine fauna. Type of fishing nets used by the fishermen are often detrimental to small fishes, the fingerlings and even dolphins have the chances of entanglement. "Denan Village" in East Midnapur inhabited mostly by fishing community is located near Kolaghat. There is a net decline in the fishing activity in this area due to reduction of catch and fish variety, with consequent shift of employment from fishing to sand collection. Unfortunately the fishing regulations issued by government were unknown to 80% of the local community in project sites. Fishing gears used by the local fishermen do not adhere to the regulatory guidelines and unsustainable practices leads to loss of fish variety in the rivers and fodder species for dolphins. However there is no monitoring agency or authority functioning at any level to promote sustainable fishery and stop unsustainable fishing practices.

It is useful to analyse the gut content of a dolphin while finding out the prey variety or any toxic contamination of water. However in present study in wild there was hardly any opportunity to examine the dead dolphins in the field. So indirect evidences and secondary data from the fishermen community were the primary sources for recording ichthyofauna.

A list of around 30 fish fauna (Table: 4) were identified as fodder and associated species of Platanista gangetica from the focal study sites in Midnapore and Howrah districts.

Table : 4 Common Icthyofauna recorded from dolphin habitat

Sl no.	Vernacular Name	Scientific Name	Occurrence	Species
1.	Aar	*Aorichthys seenghala*	Rupnarayan, Ganga	P
2.	Baan	*Mastacembelus armatus armatus*	Rupnarayan	A
3.	Banshpata	*Salmostoma bacaila*	Rupnarayan	A
4.	Bata	*La beo bata*	Rupnarayan, Ganga	A
5.	Bele	*Glossogobius giuris giuris*	Rupnarayan, Ganga	A
6.	Belebhola	_	Rupnarayan	P
7.	Bhetki	*Lates calcarifer*	Rupnarayan	P
8.	Bhola	*Pama pama*	Rupnarayan Sikarpur, Uluberia	P
9.	Boal	*Wallago attu*	Damodar	P
10.	Chanda	*Chanda nama*	Ganga	A
11.	Chela	*Salmostoma bacaila*	Rupnarayan	A
12.	Chengo	*Channa gachua*	Rupnarayan	A
13.	Chital	*Notopterus chitala*	Rupnarayan	A
14.	Fesa	*Setipinna phasa*	Rupnarayan	A
15.	Gangdhara	*Xenentodon cancila*	Rupnarayan	P
16.	Ilish	*Tenualosa ilisha*	Ganga, Rupnarayan, Damodar	P
17.	Khaira	*Gudusia chapra*	Rupnarayan	A
18.	Kuche	*Monopterus cuchia*	Rupnarayan	A
19.	Lata	*Channa punctatus*	Rupnarayan	A
20.	lotia	*Harpadon nehereus*	Rupnarayan, Ganga, Damodar	A
21.	Maurala	*Amblypharyngodon mola*	Rupnarayan	A
22.	Pabda	*Ompok pabda*	Ganga	A
23.	Pangas	*Pagasius pangasius*	Gadiara, Rupnarayan	P
24.	Parse	*Liza parsia*	Rupnarayan	A
25.	Pekal	*Macrognathus aculeutus*	Rupnarayan	A
26.	Puti	*Puntius sophore*	Ganga	A
27.	Shaal	*Channa marulius*	Rupnarayan	A
28.	Tangra	*Mystus gulio*	Rupnarayan, Ganga, Damodar,	A
29.	Tarui	*Rhinomugil corsula*	Rupnarayan,	P
30.	Topse	*Polynemus paradiseus*	Ganga, Rupnarayan Damodar	P

P = Prey Species, A = Associate Species

A very popular fish like Hilsa (Tenualosa ilisha) is no more available in local markets during peak fishing season. Dolphin's favourite food like Rhinomugil corsula is also scarce. Many of the fishermen informed about dolphins behavoiur of snatching fishes from fish nets and damaging the nets. However the reason behind this behviour is yet to be confirmed. It could be due to loss of food variety.

Group of *Rhinomugil corsula* (dolphin's food) fish in river

Hydrology

Water parameters were recorded from all the waterways wherever Gangetic dolphins were regularly sighted in different seasons. The minimum-maximum range of all the parameters are provided in the following table (Table:5). The measurements were recorded annually from all the field sites. Following values are the optimum ranges when dolphins were frequently observed in different water channels of South Bengal.

Ganges River dolphins are not generally known to occur in salinities greater than 10 ppt, although they have been recorded in waters as saline as 23 ppt (Smith and Braulik, unpublished data). Variable water depths were recorded where dolphins were sighted during the study, however the exact range of water depth is yet to be studied.

Table: 5 Range of hydrological parameters in dolphin habitat

Hydrological parameters	Optimum Range
Surface water temperature	19-32˚C
pH	5.2- 8.8
Salinity	<1 – 1.014 ppt
Conductivity	48-183 s/cm
Transparency (Sechi disc)	3.5-12.25 inch

Wakid (2009) mentioned that dolphins prefer the water depth between 4.1 and 6 m. In this study dolphin was observed in variable water depths depending on the channel width , depth and season. It was observed at the confluence of Shilai and Dwarkeswar River at a depth of 3.5-4 m, which is the minimum depth, recorded where Platanista were sighted during this study. These narrow channels become water deficient in lean period when dolphins cannot access these waterways. In majority of observations points the dolphins were sighted at water depths between 6-10m. However a detail bathymetric study of these channels could only assess the exact water depths preferred by this cetacean in South Bengal.

V. Discussion

Although the total population is severely fragmented and the quality of habitat is continuing to deteriorate, a good number of pockets are there in Southern West Bengal where occurrence of dolphin has been recorded in this study. Sinha and Sharma (2003) made an indication regarding shrinkage of distribution range in Bihar. The subpopulation in Southern West Bengal from Farakka to Bay of Bengal spread in the River Hooghly and its tributaries is still surviving under the impacts of human activities. Deliberate killing of dolphins are rare, however some incidents of entanglement in fishing net go unreported and locals take this opportunity to utilize dolphin's body part. Extraction of oil is not rare in such cases. Other causes of elimination of dolphin from many tributaries are mostly due to reduced water depth and decline of prey base.

No information is available on the status of Ganges River dolphins in the Indian Sundarban, except for historical reports of occurrence (Anderson 1879, Jones 1982). In a Survey by ENDEV in 2002 (unpublished data) similar opinion was made. There were stray records of rescue from Matla River and release in Indian Sundarban. It also occurs at Diamond Harbour and sometimes in stretches like Muri Ganga and Hatania Doania, with close proximity to Hooghly estuary. In August 2010, a floating carcass of Gangetic dolphin was reported from River Vidya in Sundarban and earlier, a similar incident was recorded from Jhingakhali in June 2010. Unconfirmed report from Millennium Park, Kolkata recorded death of adult dolphin by river traffic on 3rd August 2010. However the species is common in Bangladesh Sundarban.

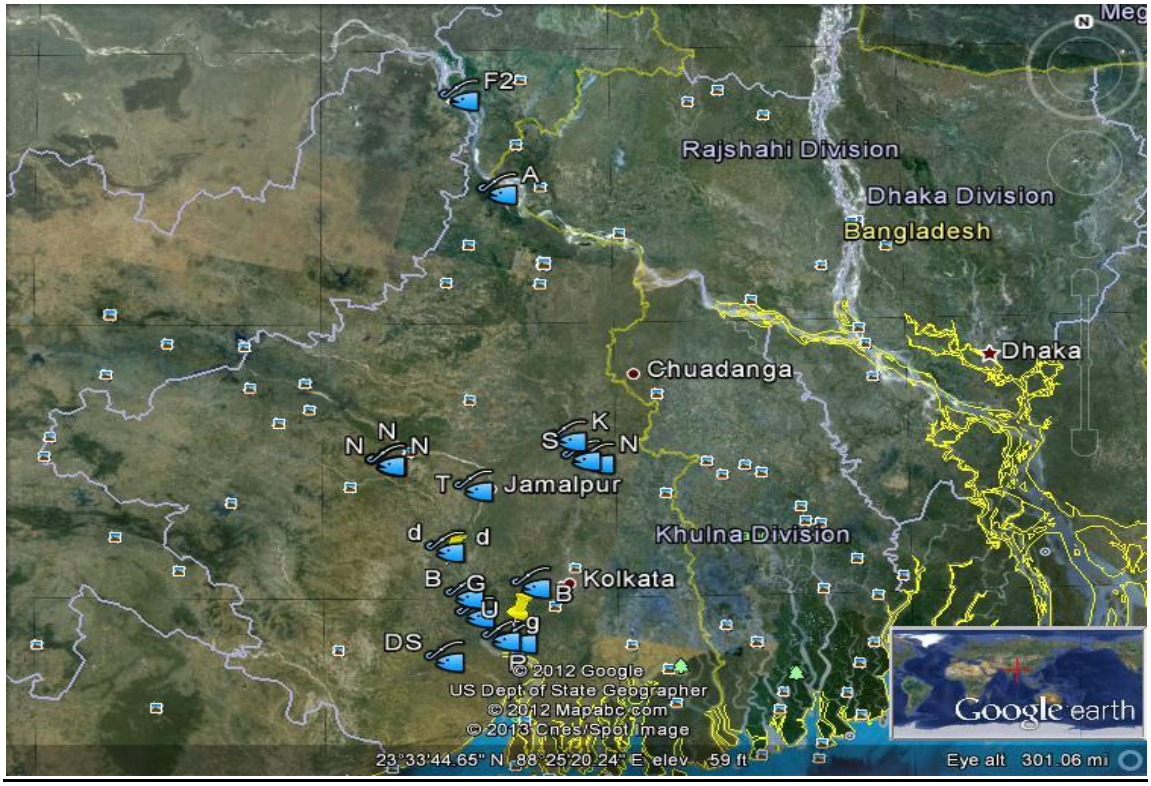


Fig: 2 Congregation points of *Platanista gangetica* in districts of southern West Bengal

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References

[1]. 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. Bernard Quaritch, London, UK.
[2]. Bashir, T., Behera,S.K., Khan, A., Gautam, P., 2012. An Inventory of mammals, birds and reptiles along a section of the river and banks of Upper Ganges, India. J. Threatened Taxa. 4(9), 2900–2910.
[3]. Behera, S. K. , Singh, H. and Sagar, V. 2013. Status of Ganges River Dolphin (Platanista gangetica gangetica) in the Ganga River Basin, India: A review, Aquatic Ecosystem Health & Management, 16:4, 425-432
[4]. Jones, S. 1982. The present status of the gangetic Susu, Platanista gangetica (Roxburgh), with comments on the Indus Susu, P. minor Owen.
[5]. Khatri, T. B., Shah, D. N. and Mishra, N. 2010 Post –flood status of the endangered Ganges River Dolphin Platanista gangetica gangetica (Cetartiodactyla: Platanistidae) in the Koshi River, Nepal. Jour. Of Threatened taxa 2 (13): 1365-71
[6]. Rao, R.J., 1995. Studies on Biological restoration of Ganga River in Uttar Pradesh; an indicator species approach. Final techni- cal report, Project No.J-11013/10/92 GPD.
[7]. Sharma, G. 2010. Current status of susu (Platanista gangetica gangetica Roxburgh, 1801) in River Hooghly in West Bengal, India. Rec. Zool. Surv. India: 110(part I): 61-69
[8]. Singha, T. P., Dutta, B. K. and Biswas, S. P. 2010 Endangered River dolphin Platanista gangetica gangetica Roxburgh, 1801 and their threatened habitat in the river Barak. Assam University Journal of Science & Technology. Biological & environmental sciences. 6(1): 75-81
[9]. Sinha, R. K. 2002. An alternative to dolphin oil as a fish attractant in the Ganges River system: conservation of the Ganges River Dolphin. Biological Conservation 107: 253–257.
[10]. Sinha, R. K. and Sharma, G. 2003 Current status of the Ganges River Dolphin Platanista gangetica in the Rivers Kosi and Son, Bihar, India. Jour. Bomb. Nat. Hist. Soc 100(1) : 27-36
[11]. Smith, B. D. and Reeves, R. R. 2000. Report of the Second Meeting of the Asian River Dolphin Committee, 22-24 February 1997, Rajendrapur, Bangladesh. In: R. R. Reeves, B. D. Smith and T. Kasuya (eds), Biology and conservation of freshwater cetaceans in Asia, pp. 1-14. Occasional Paper of the IUCN Species Survival Commission.
[12]. Smith, B. D., Sinha, R. K., Zhou, K., Chaudhry, A. A., Renjun, L., Wang, D., Ahmed, B., Haque, A. K. M. and Sapkota, K. 2000. Register of water development projects affecting Asian river cetaceans. In: R.R. Reeves, B. D. Smith, and T. Kasuya (eds), Biology and Conservation of Freshwater Cetaceans in Asia, pp. 22–39. IUCN/SSC Occasional Paper No. 23, Gland, Switzerland and Cambridge, UK
[13]. Wakid, A. & Braulik, G. (2009): Protection of endangered Gangetic dolphin in Brahmaputra
[14]. River, Assam, India. Final report to IUCN-Sir Peter Scott Fund. Pp 44.
WWF, 2009. Small cetaceans, the forgotten whales. (Elliott W, Sohl H, Bugener V). Whaling Report. India.