REPORT

ON

GANGETIC RIVER DOLPHIN STUDY

INTRODUCTION:

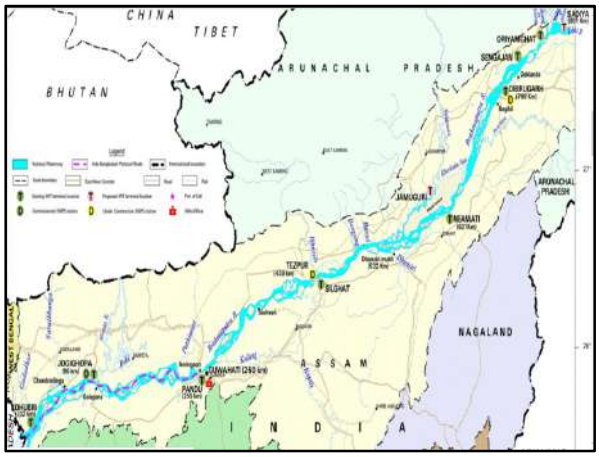
The Project's Development Objectives are to:(a) Improve passenger ferry infrastructure and services in Assam (b) To improve the institutional capacity and framework.

The project components in 1st phase are summarised in **Table 1**.

Table Error! No text of specified style in document.**: 1st Phase Project Components**

Project Component	Sub Component	Physical Investments planned
Component1: Institutional, regulatory and safety strengthening	a. Technical assistance: sector planning, design and roll-out of new Regulatory Authority, business planning for Assam Shipping Company and Assam Ports Company; training of staff to fulfill new roles in the restructured industry	Up-gradation of crew training centre
	b. Safety management: river navigation aids, night navigation technology on some routes, and emergency response system (policy, procedures, vessel and equipment)	
Component 2:Fleet safety improvements and modernization	a. GoA incentive scheme (known as Jibondinga) to assist for upgraded country boats	Vessel improvement works for private boat operator (engine, hull etc.)
	b. Procurement of new vessels for the Assam Shipping Company and retrofitting of existing public vessels	• Procurement of 20 new public vessels • Retrofitting of few govt. vessels
Component 3: Improvement in terminal infrastructure	a. Infrastructure Development of terminals at Guwahati and Majuli Island ferry routes	• 2 terminals at Guwahati (Lachit Ghat and North Guwahati) • 1 terminal at Majuli (Aphalamukh)
	b. Development of terminals on several other rural routes, to be selected	---

The South Asian River Dolphin is a freshwater river dolphin found in India, Bangladesh, Nepal and Pakistan which is split into two subspecies-The Ganges River dolphin and Indus River Dolphin (Platanistagangetica minor). The Ganges River Dolphin is found primarily in the Gangetic and Brahmaputra River and their tributaries in India, Bangladesh and Nepal. The Gangetic River dolphins are completely blind and do not have a crystalline eye lens. They used to echolocate for navigation and hunting.



Dolphins have been poached over for their oil. The habitat degradation due to declining flow, heavy siltation and construction of barrages causing physical barrier for this migratory species is also one of the reasons behind decline of their numbers.

UNIQUE FEATURES OF GANGES RIVER DOLPHIN:

Body: Sturdy but flexible body with large flippers and low a triangular dorsal fin. Weighs up to 150 kg.

Colour: Calves are chocolate brown at birth and adults are greyish brown.

Head: Head melon shaped with a long thin snout armed with as many as 130 sharp teeth. A slit like blowhole on the top of the head, acting as a nostril. From teeth long and sharp, lower law longer than the upper jaw.

Skin: Smooth and hairless.

Size: Female is larger than male. Maximum length of female- 2.67m and male – 2.12m.

Habitat: Prefers deep waters, in and around the confluence of two or more rivers. Dolphin shares its habitat with crocodiles, freshwater turtles and wetland birds.

Feeding habits: Normally chases surface dwelling fishes and grovels mud dwelling fishes in shallow water with the help of their long snout.

Breeding: Female attains sexual maturity at length 1.5m at the age of 10-12 years, male matures earlier. The gestation period is 9-11 months and a female gives birth to only calf, once in 2-3 year. Calves wean from mother at the age of 1 year.

Reproduction and Life History: Though the breeding season of the Gangetic dolphin extends from January to June, newly born calves can be seen even in other months. While mating usually takes place between March and June, it has been observed even in July. The male attains sexual maturity at an age of about 10 years when they reach a length of 1.7

meters while the females are known to attain sexual maturity at 10 or less years (Kasuya 1972) when they are around 2m long (Harison 1972). The gestation period is 9-11 months and a female gives birth to only calf, once in 2-3 year. Calves wean from mother at the age of 1 year. At the time of birth the neonate is about 70 cm and weighs about 4 kg - 5 kg. The mother and calf remain together for about one year.

Ganges River Dolphin

CONSERVATION STATUS:

The Indian Government has notified the Gangetic River Dolphin (Platanistagangeticagangetica Roxburgh 1801) as India's "National Aquatic Animal. Ganga River Dolphins (Platanistagangeticagangetica Roxburgh, 1801), is included in the Schedule I of the Indian Wildlife (Protection) Act 1972 banning their killing, transport and sale of products. The penalties for violation of the law are imprisonment for a term which shall be not be less than three years but which may extend up to seven years be less. India also bans the use of dolphins and other cetaceans for public entrainment and forbids them from being held captive.

Ganges River Dolphin is placed under "Endangered Category" in the IUCN Red List. Thus, the species requires increased conservation and management priorities. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) prohibits or Forbids any form of commercial International Trade by the listing of the Ganges River Dolphins on Appendix II.

Table-2 List of the Pre-Identified and Priority Terminals

Ferry Line From - to		Service
South Ghat	**North Ghat**	
Lachit Ghat	North Guwahati	Passenger
Sonaram Ghat	Rajaduar	Passenger
Uzan Bazar Ghat	Umananda Island	Passenger
Nagarbera (upstream)	Nagarbera (upstream)	Passenger

Nagarbera (downstream)	Nagarbera (downstream)	Passenger
Jaleshwar	Dhubri	Passengers
Medartary / South Salmara	Dhubri	Passengers
Fakirganj	Dhubri	Passengers
Neamati	Kamalabari	Passengers + RoRo service Majuli island
Neamati	Aphalamukh	Passengers + RoRo service Majuli island
Gandhighat	Dudhpatil	Passenger
Beranga	Gangapur/ Kanakpur	Passenger

METHODOLOGY FOR DOLPHIN SURVEY (Brahmaputra River System):

This methodology for Ganges River Dolphin census is adopted after detail review of various survey techniques used in wildlife census in general and in particular the cetacean survey techniques across the world. The methodology for Ganges River Dolphin population census follows the Line Transect Survey technique incorporated with few modifications for its suitability in Brahmaputra and its inherent geo-morphological characteristics. This widely excepted method has been adopted for Ganges River dolphin population census in the Brahmaputra River System.

STRAIGHT LINE TRANSECT SURVEYS:

The straight line transect survey provides a good baseline for data collection. There are 11 nos. of Transect for Census stretch over a length from Jorhat to Guwahati and also at the Silchar IWT division in the state of Assam. The Dolphin Census was carried out for dry season from 26th March to 29th- March 2019 for dry season and for the monsoon season from 2nd August to 6th August- 2019.

Internationally accepted methodology;

Most applied methodology is Line transects or distance sampling methodology. This Dolphin study has been completed using Line Transect Survey. Generally research group survey through all the transects in Brahmaputra river system to minimize the error by missing or duplication of counts. This method has been adopted from Chilika Lagoon and used also in Bangladesh in 2005 by Brian D. Smith (IUCN member Cetacean Specialist Group) & admired by Former ZSI, Director Dr. P. Dhandapani.

OBSERVATION & DISCUSSION:

There have been two teams formed to cover the stretch under Guwahati, Jorhat and Silchar IWT division. For recording the dolphin sighted spot, the GARMIN E-Trex GPS have been used.

Neamati Ghat-Kamalabari-Aphalamukh:

Monsoon: During the Monsoon survey in the month of August 2019 there were 7 nos. of Dolphin Sighted upstream of the Neamati Ghat near the confluence point of River Dhikho and also in front of the Aphalamukh jetty 10 nos. of Ganges River Dolphins during the survey which also includes sub-adult species

Dry Season: It was worth mentioned that near to the Neamati Ghat 07 nos. of Dolphins have been sighted and also near to the Aphalamukh 04 nos. of Ganges River Dolphins during the survey which also includes sub-adult species, which establish that the Ganges River Dolphin breed in the Brahamputra River

Nagarbera – Allupeti Ghat

Monsoon: During the survey during August 2019, 06 nos. Dolphins were found to be swimming/fishing in the main river. The water depth was found to be more than 20 feet. There both individual and school of dolphins were sighted in the main river. The dolphin schools comprise of adult & sub-adult. The basic activities of dolphins in the study site were milling, fishing and socializing. Compare to dry season in wet season the river was full of water and the river has turned into an ideal habitat for these aquatic mammals.

Dry Season: In Nagarbera the local people informed that during the monsoon season the dolphins have been sighted in this part of the river and during non-monsoon period as river became narrow and shallow, there is no dolphin sighting.

Dhubri-Jaleswar-Fakirganj-South Salmara

Monsoon: Total 34 nos. of Ganges dolphins were sighted during the survey period, in this stretch the Ganges Dolphins are quite abundant in this region. Primarily the dolphin schools were sighted on the confluence point of small rivers with the Brahmaputra river. Dolphin schools remained in the tributary river bed and were seen not to venture in to main stream of Brahmaputra. Apparently, it can be concluded that dolphins were avoiding the gusting force of mighty Brahmaputra. Seldom adult dolphins either single or in pair were seen in the main stream of Brahmaputra. The dolphin schools comprise of adult, sub-adult, juveniles. This indicates the population present in this region was breeding and the population is in a dynamic state. In dry season the dolphins were sighted in the main river in contrast to the wet season. The water gust in wet season was higher compare to dry season and hence these animals move up into the tributary rivers just above the confluence point and reside there.

Dry Season: Along the Fakirganj to South Salmara 12 nos of Dolphins were spotted, along Dhubri to Jaleswar 02 nos and also along the Dhubri to downstream & upstream 07 nos. of Dolphins spotted. Along Jaleswar to Fakirganj there was no sighting of Ganges Dolphins during the survey. In the Dhubri section there have dolphin spotted during the Survey.

Ujan Bajar/Umanada Ghat-North Guwahati-GG Ghat

Monsoon: Umanada Ghat and North Guwahati no Dolphin sighted, it may be due to strong current during the monsoon and they may be migrated to other safe places.

Dry Season: During the survey 04 nos. of Dolphins were sighted near Umanada Ghat.

Silchar:

Monsoon: All the project sites were studied but no dolphins were sighted. On discussion with local people it was found that in last several years there no dolphins were ever sighted. Earlier, six to seven years ago dolphins were available in the Barak River. It could be inferred that the Barak River was a habitat for dolphins but now it has been degraded and the habitat was lost.

Dry Season: There have been no sighting of dolphins in the Silchar section, as described by the local stakeholders that there was no Dolphin sighted for last four to five years.

Table: 3: Ganges Dolphins sighting location (Dry Season Season)

Sl. No.	Route Name	Longitude	Latitude	Nos. of Dolphin Sighted
1	Fakirganj to South Salmara	90.01815	25.93688	12
2	Dhubri to Jaleswar	90.16838	26.06830	2
3	Dhubri to Ghat up & Down	89.99935	26.01740	2
4	Dhubri to Ghat up & Down	89.98971	26.00464	2
5	Dhubri to Ghat up & Down	90.00199	26.01741	3
6	Neamati to Kamalabari Ghat (Near Neamati Ghat)	94.23043	26.86408	7
7	Neamati to Aphalamukh Ghat (Near Aphalamukh Ghat)	94.29839	26.91219	4
8	Lachit Ghat to Umananda (Near Umananda Ghat)	91.74617	26.19768	4
	Total			36

Table: 4: Ganges Dolphins sighting location (Monsoon Season)

Sl. No.	Site Name	Longitude	Latitude	Nos. of Dolphin Sighted
1	Fakirganj	90.07686	25.96971	1
2	South Salmara	90.01808	25.89251	5
		90.02340	25.89251	7

		90.01815	25.89267	2
		90.02880	25.92042	1
3	Dhubri to Jaleswar	90.16006	26.07070	2
		90.14781	26.04414	2
4	Allupeti Ghat	90.99269	26.11620	1
		90.98467	26.11170	3
		90.99163	26.11421	2
5	Dhubri	90.00294	26.02602	2
		89.98920	26.01104	1
		89.99660	26.02354	7
		90.00100	26.03273	4
6	Neamati Ghat	94.25379	26.85860	7
7	Aphalamukh Ghat	94.29542	26.89695	10
			Total	**57**

MITIGATION/RECOMMENDATION FOR CONSERVATION OF GANGES DOLPHIN IN PROJECT SITES DURING CONSTRUCTION & OPERATION PHASE:

- Any water base development work to be refrained from interfering with the natural flow regime and also to avoid constructing barriers to animals and sediment movement. The concerned should manage the water developmental activities in ways that will minimise the harm to dolphins and other aquatic species.
- The Ganges Dolphins mostly depend on eco-location to find their food and they are very sensitive to the impact of the sound as they are basically blind. Equilibrium between sediment erosion and deposition is necessary to maintain essential habitat features.
- Access to floodplains should be preserved to ensure natural spawning and rearing habitat for fishes which are prey base of the dolphin and there should have the provision for Fish Ways.
- To monitor the operational aspects of projects as well as the effects on upstream and downstream populations of cetaceans and their habitat, on a regular basis.
- Capacity-building of the local stakeholder including the Government Officials through a combination of education and infrastructure improvement.
- Awareness campaigns to conserve the Dolphin Habitat and its ecological importance.

SPECIAL RECOMMENDATIONS

The Brahmaputra River support high levels of biodiversity. Country's National Aquatic Animal, the Ganges river dolphin prosper in this mighty river's riverine aquatic ecosystem. This species is already threatened by population reductions. In many areas, their populations have been locally extirpated or persist only in very small numbers. Any kind of industrial/transport activity in the river will degrade the habitat and further fragment the populations of Ganges River dolphins.

A few critical aspects to be specially cared:

a. Vessel Traffic: Endangered riverine wildlife, including Ganges river dolphins, will be at increased risk of being struck by vessels and of being displaced from critical habitat by vessel-induced disturbances. Dolphin is completely blind and depend upon echolocation for its itinerary. Special efforts should be taken to minimise the noise pollution during vessel movement. Noisy mechanised water vessels should not be used.

b. Capacity building of boat crew: Guidelines should be prepared for boat crew for ferrying boats in Brahmaputra particularly for large sized mechanised boats. When a dolphin or school of dolphin will be sighted while ferrying on route or dolphins come near to the boat, the boat should be slowed down and even the engine should be stopped until the dolphins leave the area.

c. Construction in River bed: Pilling is one of the main objectives in construction in river bed. This is a very vibrating and noisy process. This vibration and noise may impact the echolocation of dolphins. Further, Bentonite clay used during pilling is toxic and harmful in nature for aquatic biodiversity. Therefore, use of Bentonite should be discouraged. Instead Bentonite, polymers should be used for pilling.

d. Pollution: Fuel leaks and oil spills appear unavoidable on account of the vessel traffic in the river system. Aquatic biodiversity is very much sensitive to oil pollution. The oil spill in the river system will bring menace to Ganges River dolphins' population. For mitigating the problem oil spill management plan should be formulated prior to starting of the project works.

e. Dredging: Dredging reduces the hydro-geo-morphological complexity and variability of the river habitat which supports productive fisheries and the prey of Ganges river dolphins. Dredging also destroys benthic (river bed) flora, fauna and their habitats full of organic detritus. Theses biota serve as food for fishes and dolphins. Further, high levels of noise caused by dredging will adversely affects the blind Ganges dolphins whose vital activities depend on echolocation.

NO CONSTRUCTION PERIOD

The breeding season of the Gangetic dolphin extends from January to June. However, newly born calves are seen even in other months. While mating usually takes place between March and June, it has been observed even in July. Only a single baby is born after a gestation period of about 9 months. During the dry time survey in March, neonates

were sighted in the Brahmaputra River. The breeding time of Gangetic dolphin was found to be February to May.

Further, the reduced river flow and depth in lean season cause severe problem for Gangetic river dolphins. The above-mentioned problem will be more critical for dolphins as the habitat of the species shrink naturally in dry period. The shrinkage of habitat due to reduced water flow and the breeding period coincide in the months of February to June.

It is recommended to stop the construction activities in water part (for example piling or dredging) in between mid of March to Mid of June especially in the ghats located at Aphalamukh, Guwahati ,North Guwahati, Dhubri, South Salmara, Fakirganj, Nagarbera & Alupetti. Dolphin habitat is not found on Barak River in Silchar IWT division.

Track Points & Dolphin sighting during Dolphin Survey in River Brahmaputra

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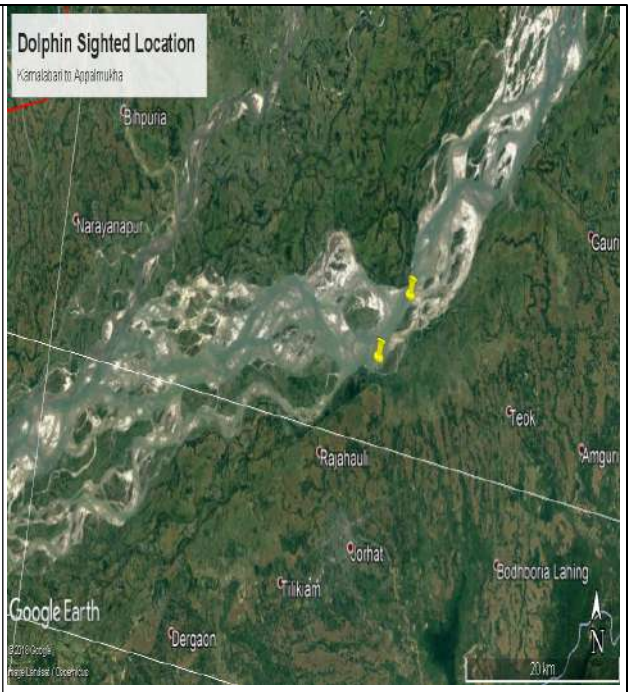
<td> 
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<td>Neamati-Kamalabari & Neamati –Aphlamukh Ghat</td>
<td>Dolphin sighted near Neamati and Aphlamukh Ghat</td>
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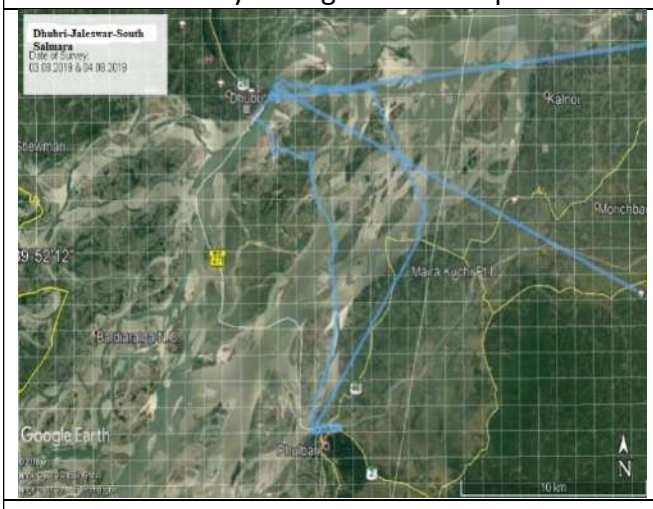
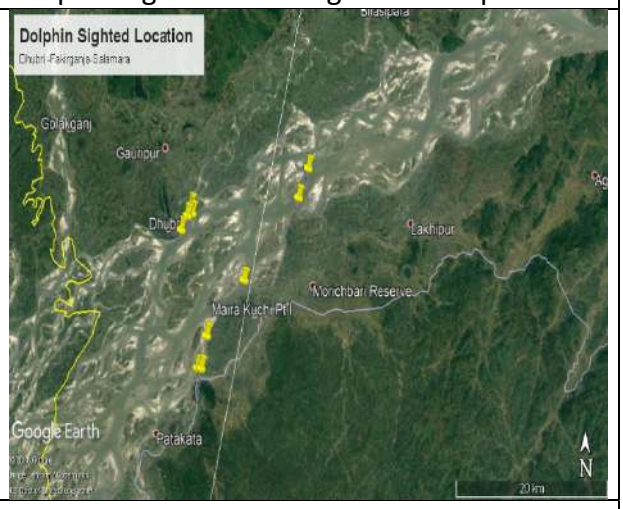
Track of survey in Nagarbera – Alupati Ghat

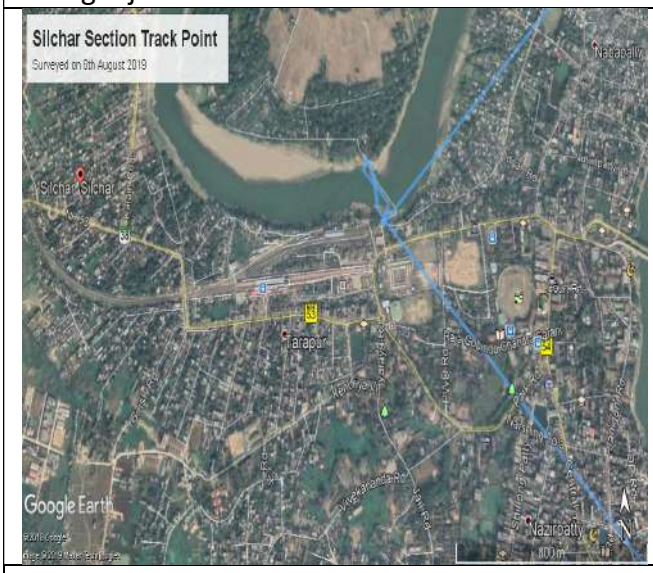
Dolphin sighted near Nagarbera-Alupati Ghat



Track of survey in Dhubri-South Salmara-Fakirganj-Jaleswar Ghat



Dolphin sighted near Dhubri-Salmara-Fakirganj-Jaleswar Ghat



Track of survey in Silchar section & No Dolphin Sighted

Track of survey in Guwahati section & No Dolphin Sighted

Public Interaction & Dolphin Survey

Survey for Dolphin @ Nagarbera

Public Interaction @ Annapurna Ghat

Interaction with local stakeholder @ South Salmara Ghat

Gandhi Ghat of Silchar

Interaction with local stakeholder @ Gandhi Ghat of Silchar

Interaction with local stakeholder @ Beranga Ghat of Silchar