Area assessment and Overview of the River Ganga within the State of Jharkhand for developing a Protected Area for the Gangetic River Dolphins by the State Government

Submission to the

Department of Environment and Forests, Sahibganj Division, Jharkhand

By

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River trip account

Dr. Sunil Kumar Choudhary, River dolphin expert & Principal Coordinator, Vikramshila Biodiversity Research & Education Center (VBREC), Bhagalpur was asked by Mr. Vikas Paliwal, Divisional Forest Officer, Sahibganj Forest Division to visit Sahibganj for assisting the forest officials in developing a proposal for creating a stretch of River Ganga within Jharkhand State as Protected Area for the endangered Gangetic dolphin. Dr. Choudhary deputed Mr. Subhasis Dey, Senior Research Person in VBREC, working for Gangetic dolphin (conservation & research) in rivers of Bihar for last more than twenty years to visit Sahibganj & assist forest officials in this regard. 10 October, 2020: Arrival of Mr. Subhasis Dey at Sahibganj DFO Office

11 October, 2020

Mr. Subhasis Dey had a meeting with Sri. Vikas Paliwal, DFO, Sahibganj Forest Division, Sri Raj Kumar, Range officer of Rajmahal, and Mr. Satwik, Officer on probation. Mr. Dey briefed about the stretch of the River Ganga within the boundary of the Jharkhand State with the help of satellite maps available online where state boundaries can be seen e.g. Google Earth and daftlogic.com. Mr. Dey also discussed about the potential stretch of the river which can be considered for creating a Protected Area for Gangetic dolphins within the boundary of Jharkhand State. Based upon the feedback from Mr, Dey, it was decided to make a river trip from Sahibganj to Farakka to have firsthand information/impression on the geomorphology, depth and aquatic fauna of the river in this stretch and to mark the stretch of the river which could be proposed for declaration as Protected Area for Gangetic dolphin.

12 October, 2020

The river survey team included Mr. Subhasis Dey, Mr. Satwik, Officer on probation, Mr. Haribansh Pandit, SDO of Rajmahal sub-division, Mr. Raj Kumar, Range Officer of Rajmahal Forest Range &

other forest persons. The survey team started the river trip in the morning hours of 12th October at Sahibganj Ferry Ghat. Sahibganj forest department speed boat was used for the survey. First the team went upstream to the point in the river from where the boundary of Jharkhand State starts. GPS (Garmin Montana 650)) waypoints on the Bihar – Jharkhand border were taken close to the river bank, so that the coordinates could be compared with the border shown on the online maps, by plotting the points on a GIS map. Like wise all points corresponding to the border of Bihar – Jharkhand and West Bengal near the river bank in all the stretches of the river within Jharkhand were marked through logging in waypoints in the GPS.

To assess the boundary and the area of the river within it, the team travelled a distance of 114km by boat from the starting point in Sahibganj to the end point at Farakka. This distance includes all to and fro movements of the boat in the river while conducting the preliminary boundary and area assessment survey. The team mainly surveyed four sections of the river within the state boundary –

1. Sakrigali section: –This section starts approximately four kilometres downstream of Manihari (Bihar) and has a length of approximately 16.5km within the state boundary,

2. Rajmahal section :– This section has an approximate length of 17km, the state boundary doesn't encompass the whole river channel within its boundary, and here the Jharkhand state shares its boundary with the state boundary of West Bengal, longitudinally within the river channel,

3. Paranpur section :- This section is a narrow meandering channel cutting north to south through a flood plain between Rajmahal section and the last section of the river within Jharkhand. This narrow channel has its entry point approximately 4km downstream of Rajmahal, meanders for approximately 18km and then opens within the last section of the river in Jharkhand, this section during its course criss-crosses the boundary of Jharkhand and West Bengal, with only 10km passing within Jharkhand and rest within Bengal, and

4. Begamganj section: – The last section encompassed within the state boundary, this is the smallest of the four sections, its maximum length in the middle of the river length wise is five kilometres.

The river section within Jharkhand isn't continuous, between the Sakrigali and Rajmahal section we have the state boundary of Bihar and West Bengal, between Rajmahal section and Begamganj section we have the state boundary of West Bengal.

Dolphins were seen in two sections only, the Sakrigali section and the narrow Paranpur section, in a very casual manner, as this survey was not meant for observing dolphins or collecting their presence data. No dolphins were observed in the Rajmahal section and Begamganj Section during the river trip, this doesn't mean that there are no dolphins there, it's only that they were not present during the time when the survey team was present there or theteam could have missed the sightings of dolphins because of their involvement in other activities.

River Ganga within Jharkhand

River Ganga traverses a distance of almost 2,700km through five north Indian states, from its origin upto the point of its entry in to the Bay of Bengal. The entire river can be broadly divided and categorised into three major segments, based mainly upon its geomorphology, flow and substrate: Uppar Ganga,Middle Ganga and Lower Ganga. The stretch of the river within the Jharkahand state boundry is part of the lower Ganga.Ganga in Jharkhand does not pass through the state in continuation as it does through the other states. it enters the state through Bihar and flows in the north-easterly direction for some distance and then flows in a west to east direction till the stretch again enters the state boundary of Bihar. After traversing for approximately 12km within Bihar, the main stem takes a sharp southward turn to again enter Jharkhand, but this time a portion of the river also enters the state of West Bengal, here the river flows in the north- south direction and maintains this directional course till the Farakka barrage in West Bengal, but before it's final entry into West Bengal, the river twice enters and exsits Jharkhand, once near Rajmahal and the other near Paranpur/Bagamganj. Near Rajmahal the state boundary lies within the river channel,with West Bengal on the other side of the boundary. In West Bengal the river flows for approximately another 40 km between Bihar, Jharkhand and West Bengal tri junction and Jharkhand border (the last section of Begamganj)and then again enters Jharkhand, now completely within its boundaries, here, in this section (Begamganj) of the state, the river flows for approximately 6km before once again entering the West Bengal. Ganga throughout its course, from origin to end, enters and exits three states (Jharkhand, Bihar and West Bengal) within a short distance of approximately 84 km.

Ganga flows through the state of Jharkhand as through all the other four states, between alluvial sand banks and flood plains. Usually extensive agriculture is practiced on the flood plains along the river. Natural grasslands and areas without agriculture field on the flood plains are also found along the river, though intermittently, extending up to some distance inwards before agriculture fields and human habitations (villages)start dominating the landscape.

The river stretch of Ganga starts getting wider as it enters Jharkhand from Bihar, and it continues to be so till it finally enters West Bengal.

Dolphin presence in the stretch of the river within Jharkhand

Gangetic River Dolphins are peresnt through out Ganga from Uttar Pradesh to West Bengal. Their presence and distribution in the river is not uniform, its presence depends upon dynamism of the channel, such as water depth, prey availability, habitat conditions and hydrological factors. All the mentioned condition are also not uniform in distribution throughout the Ganga. From the origin to the end, the river flows through different geomorphological conditions such as gradient, substratum, flow path (meanders and straight channels) different channel types (channel with sand bars, islands and confluences) all these different conditions govern the presence and distribution of biodiversity(microscopic and macroscopic plants and animals) which in turn influences presence of dolphins in the river.

Estimates of population sizes of Ganges river dolphin *Platanista gangetica gangetica* in the Ganga River within Jharkhand state boundaries are provided below, for December 2014 and November 2017. The Ganga River was surveyed for river dolphin population estimation by researchers from T.M. Bhagalpur University (TMBU) and Ashoka Trust for Ecology and the Environment (ATREE) in 2014, and by researchers from TMBU, ATREE, and the Wildlife Institute of India (WII) in 2017. Mr. Subhasis Dey and Mr. Nachiket Kelkar led both surveys. In both surveys, we used a double-observer survey methodology.

Ganges river dolphin population size in the stretch from Manihari to Farakka (approx. 90 km) ranged around 175 (range: 162-190; 2014) and 145 (range: 140-151; 2017). This 90 km stretch of the Ganga River flows along the state borders of Bihar-Jharkhand and Jharkhand-West Bengal. These population estimates can be regarded as the overall “super-population” or meta-population, from which 49-64 dolphins are estimated to be present within Jharkhand state boundaries, along a 32-38 km stretch (Table 1). Four calves were recorded in 2014 and none in 2017.

River channel dynamics

The Ganga river channels along Sahibganj district boundary (shared with Bihar and West Bengal) are highly dynamic, with intense flooding, large-scale meandering and braiding, and abrupt channel course changes. These river channels also form massive mid-channel alluvial islands and peninsulas called “chars” or “diaras”, where people also reside and carry out many livelihood activities, mostly related to seasonal farming, fishing, and livestock-rearing. The dynamic behaviour

of river courses has important implications for definition and settlement of boundaries of rights and ownership. In the notification of conservation areas, this is a crucial aspect that needs to be central to management. According to the channel movements of the Ganga, the river may be, at any given time, within or outside Jharkhand (see Figure 1). The Ganga can be considered to be fully within Jharkhand in sections 1, 4, and 6 only.Rajmahal, within section 4, is a geologically important location for the Ganga. The Ganga at Rajmahal is more stable than in adjacent sections, because of the rocky outcrops and rocky basements along the southern banks. But even here, the exact course of the river is subject to seasonal erosion and accretion.

Threats and prioritization of conservation measures

Water availability is not a threat or constraint to Ganges dolphin habitat in the Ganga River in Jharkhand. This is mainly because these sections are in the lower Gangetic plains, and are also strongly influenced by the backwater effects of the Farakka barrage in West Bengal downstream. The main threats to Ganges river dolphins are from on-going and proposed infrastructure projects and fairly intensive fishing activity along the river. Around Sahibganj, the river channel has undergone significant modifications recently, due to construction of large embankments, port and bridge construction (to develop Sahibganj as a terminal and hub for inland waterways), and associated activities such as dredging and flow diversions. Vessel traffic along National Waterways-1 is significantly high around Jharkhand. Recently, a major water diversion is proposed downstream of Sahibganj for water offtake to the Adani power plant at Godda (https://www.adaniwatch.org/adani_s_power_plans_threaten_pm_modi_s_promise_to_restore_the_ganges_river). This impact is likely to reduce flows in this section significantly, if not evaluated scientifically to prescribe minimum and ecologically tolerable diversion. Finally, fishing activity is rather significant, especially from Rajmahal downstream, and there is a possibility that river dolphin hunting for their oil is frequent in these areas.

Table 1.A summary table showing the number of dolphins counted in the five stretches (area numbers in Figure 1: Map) of the Ganga river channels within the state boundaries of Jharkhand. As the Ganga flows along the boundary of Jharkhand, Bihar, and West Bengal, the lengths of different channels may change in different years (in Dec 2014, 38 km was surveyed, while in 2017, only 32.75 km within Jharkhand could be surveyed).

Survey Year	**Area number**	**Stretch**	**River distance (km)**	**Ganga river channel**	**Total number of dolphins counted**	**Number of calves**
Dec 2014	1	Bihar border (Lal Bathani)-Sakrigali	14	Main channel	11	0
Nov 2017	1	Bihar border (Lal Bathani)-Sakrigali	14	Main channel	10	0
Dec 2014	2	Sakrigali-Saidpur	21	Side-channel	not surveyed	-
Nov 2017	2	Sakrigali-Saidpur	21	Side-channel	7 (in 5.3 km, Nurpur to Saidpur)	0
Dec 2014	3	Sakrigali-Maharajpur	3.3	Main channel	14	2
Nov 2017	3	Sakrigali-Maharajpur	3.3	Main channel	6	0
Dec 2014	4	Dergolna-Nayabazar	9.4	Main channel	29	1
Nov 2017	4	Dergolna-Nayabazar	9.4	Main channel	15	0
Dec 2014	5	Nayabazar-West Pranpur	15.25	Side-channel	not surveyed	0
Nov 2017	5	Nayabazar-West Pranpur	15.25	Side-channel	not surveyed	0
Dec 2014	6	Jitnagar-Dogachhi Char	11.35	Main channel	10	1
Nov 2017	6	Jitnagar-Dogachhi Char	11.35	Main channel	11	0
		Total: 74.3 km (surveyed lengths = 38.05, 32.75 km)			**64-49**	4-0

Figure 1. Map showing the six river segments of the Ganga river channels within Jharkhand state boundaries (see Table 1), within the Sahibganj and Rajmahal blocks of Sahibganj district, Jharkhand. The Ganga River flows along the boundary of Bihar-Jharkhand-West Bengal states. The base map of the river channels is adapted from the Global Surface Water Explorer, which shows water occurrence maps summarizing changes in river courses from 1984 to 2019.

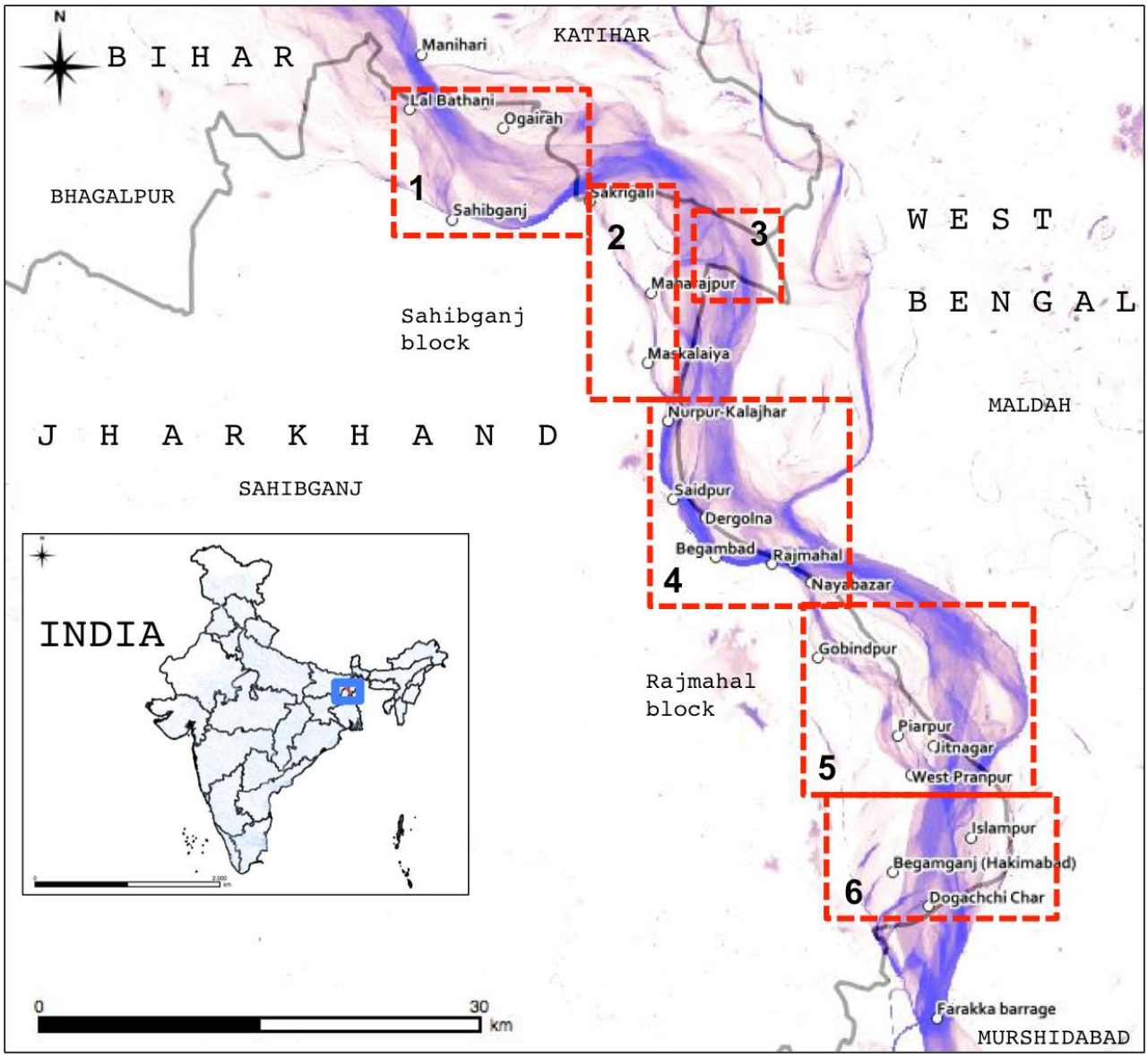


Figure 2. Distribution of Ganges river dolphins from Manihari to upstream of the Farakka barrage, with bubble sizes indicating local abundance. Distribution within the six stretches described in Table 1 is also indicated. The stretches with the highest dolphin abundance within Jharkhand are 1) Saidpur to Nayabazar (section 4), including Rajmahal, and 2) between Sakrigali and Maharjapur (section 3), 3) Jitnagar to Dogachhi Char (section 6), and 4) Sahibganj to Sakrigali (section 1).

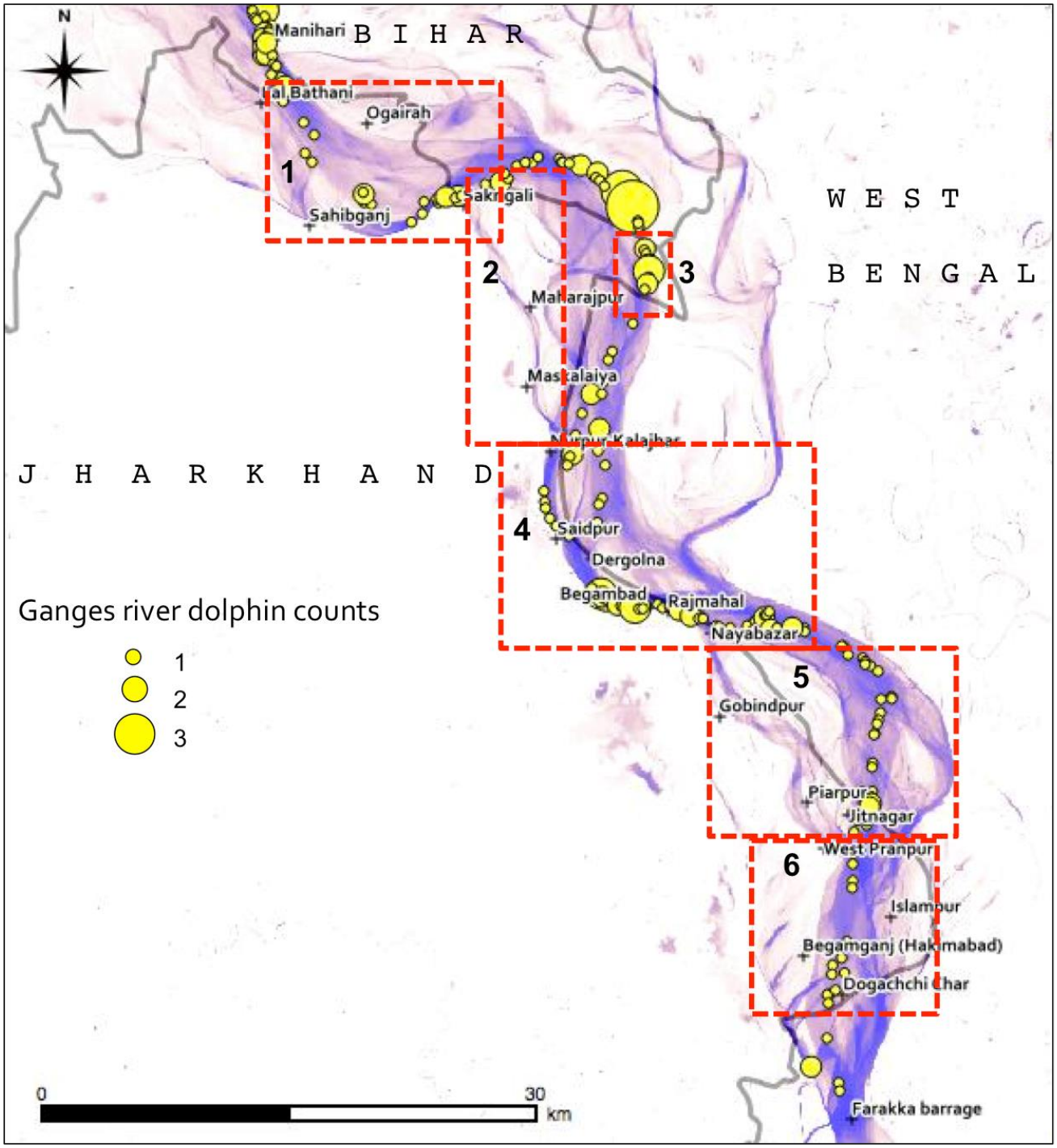


Table 2. An area-wise index of relative importance of different threats to Ganges river dolphins. Sections 1 and 4 had the highest number of threats, followed by section 6. The major threats to

river dolphins along the Ganga river channels in Jharkhand are related to 1) motorized vessel traffic and ship/barge traffic along inland waterways, 2) fishing impacts, mainly from bycatch in gillnets, but also likely from targeted hunting of dolphins for oil, and 3) local pollution impacts. An emerging threat specific to Sahibganj-Sakrigali stretch is the construction of a major port and terminal in the Inland Waterways projects of the Government of India. A water diversion is also being planned downstream of Sahibganj to supply Ganga water to Adani's power plant at Godda. These two threats are likely to make the Sahibganj-Sakrigali stretch a poor habitat for Ganges dolphins in the future.

Area number	**Stretch**	**Threat category 1**	**Threat category 2**	**Threat category 3**	**Threat Index**
1	Bihar border (Lal Bathani)-Sakrigali	Waterways terminal and port, bridge construction, pollution	Proposed diversion of water for Adani power plant at Godda	Fishing impacts	High
2	Sakrigali-Saidpur	Fishing impacts, bycatch likely in flood season	Pollution	-	Low
3	Sakrigali-Maharajpur	Vessel traffic	Fishing impacts	-	Low
4	Dergolna-Nayabazar	Motorized vessel traffic around Rajmahal	Fishing impacts, bycatch, and possible hunting	Pollution	High
5	Nayabazar-West Pranpur	Bycatch likely in flood season	Pollution	-	Low
6	Jitnagar-Dogachhi Char	Fishing impacts, bycatch, and possible hunting	Vessel traffic	Pollution	Moderate

Figure 3. Map showing the points (Yellow dots) that were marked through GPS waypoints on the day of the field visit on 12-10-2020. The points show the start point and end point of the state boundary on the river. One yellow dot is showing the location of the Adani intake well.

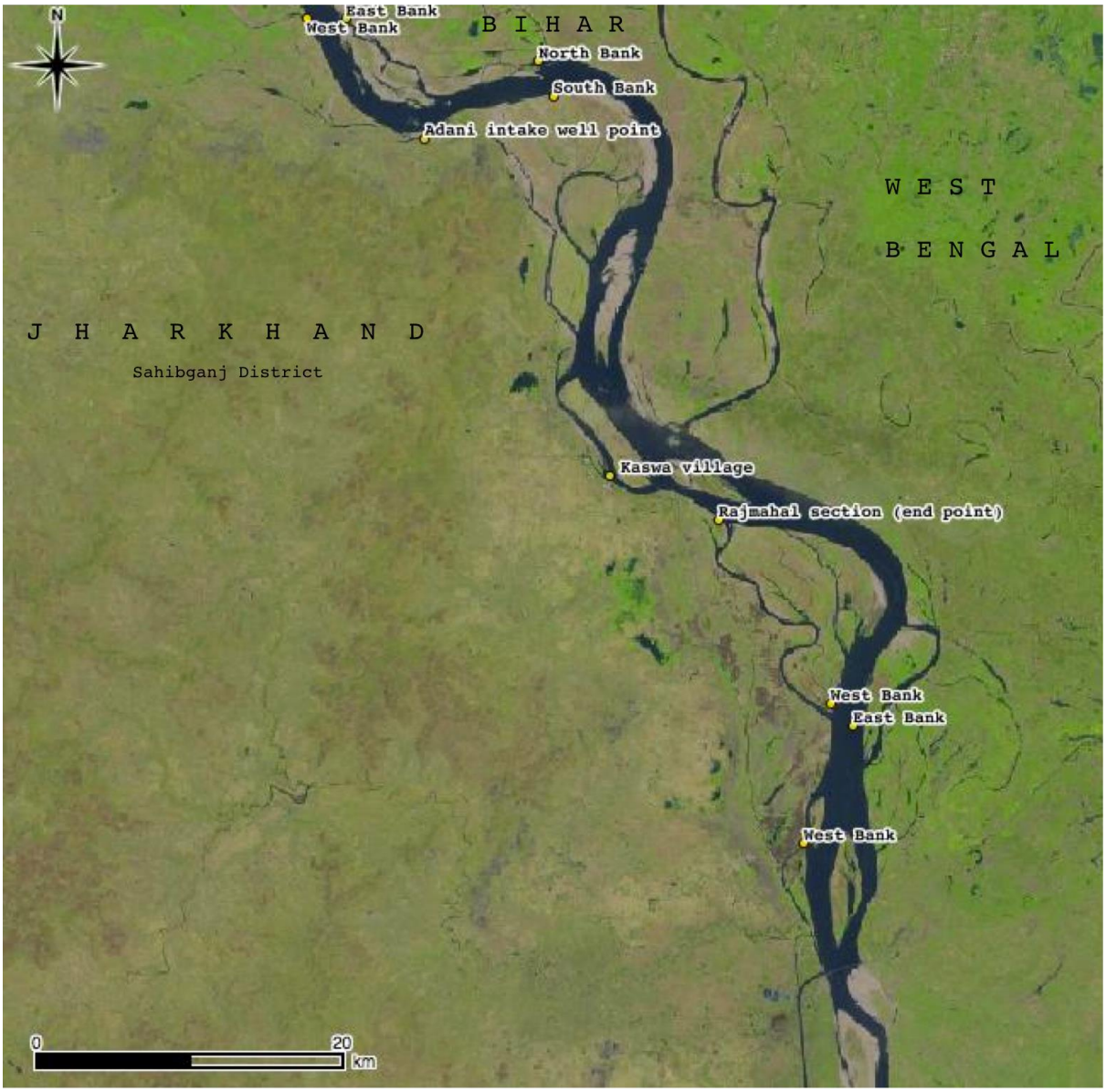


Figure 4. Map showing villages along and within the state border.

Figure 5. The white dots on the map are the locations in the narrow Paranpur anabranch within the Jharkhand state boundary where dolphins were sighted. Dolphins in this channel were documented for the first time on 12-10-2020.

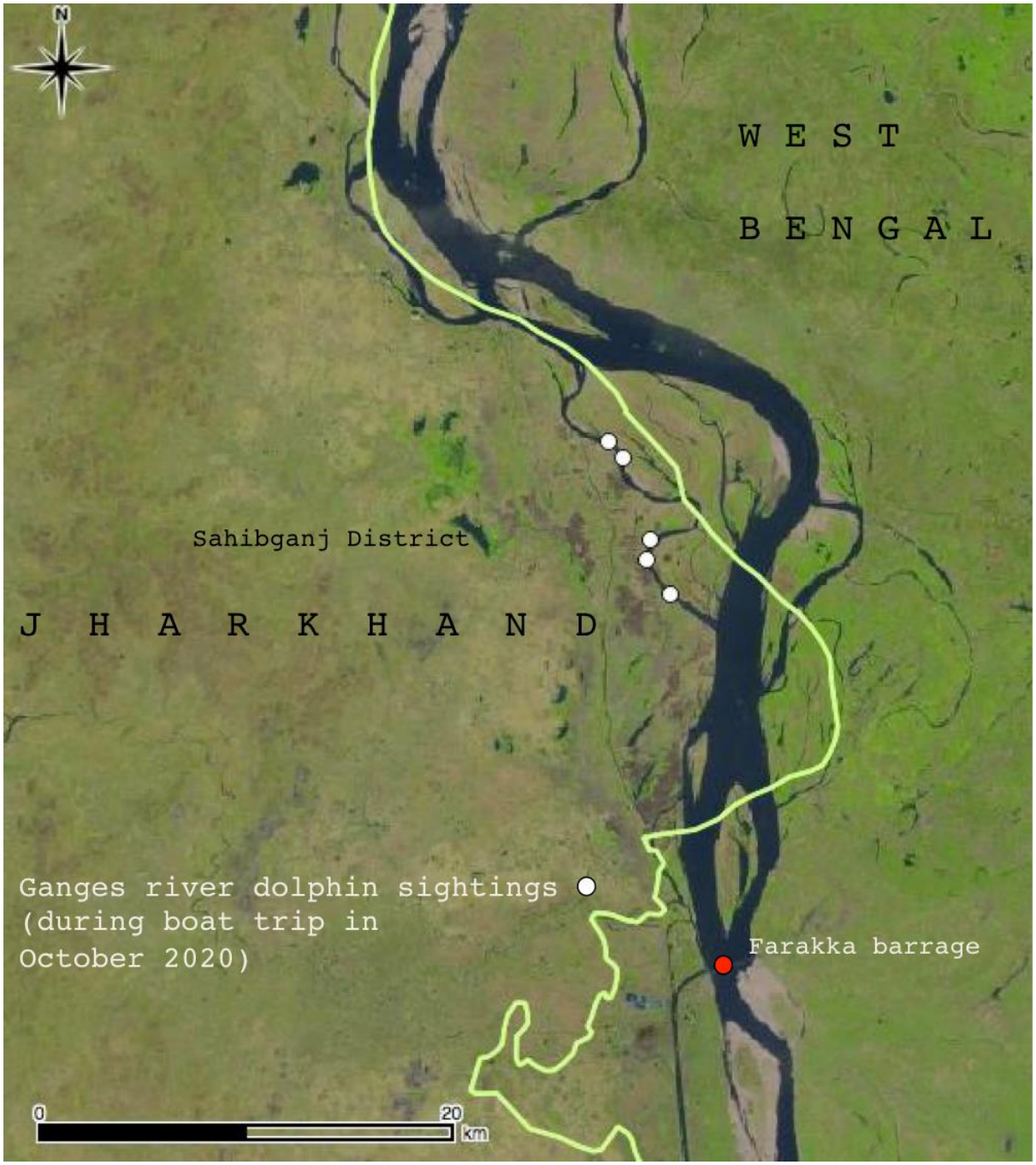


Figure 6. Distribution of Ganges river dolphins from Manihari to upstream of the Farakka barrage, with bubble sizes indicating abundance. Map without state boundaries.

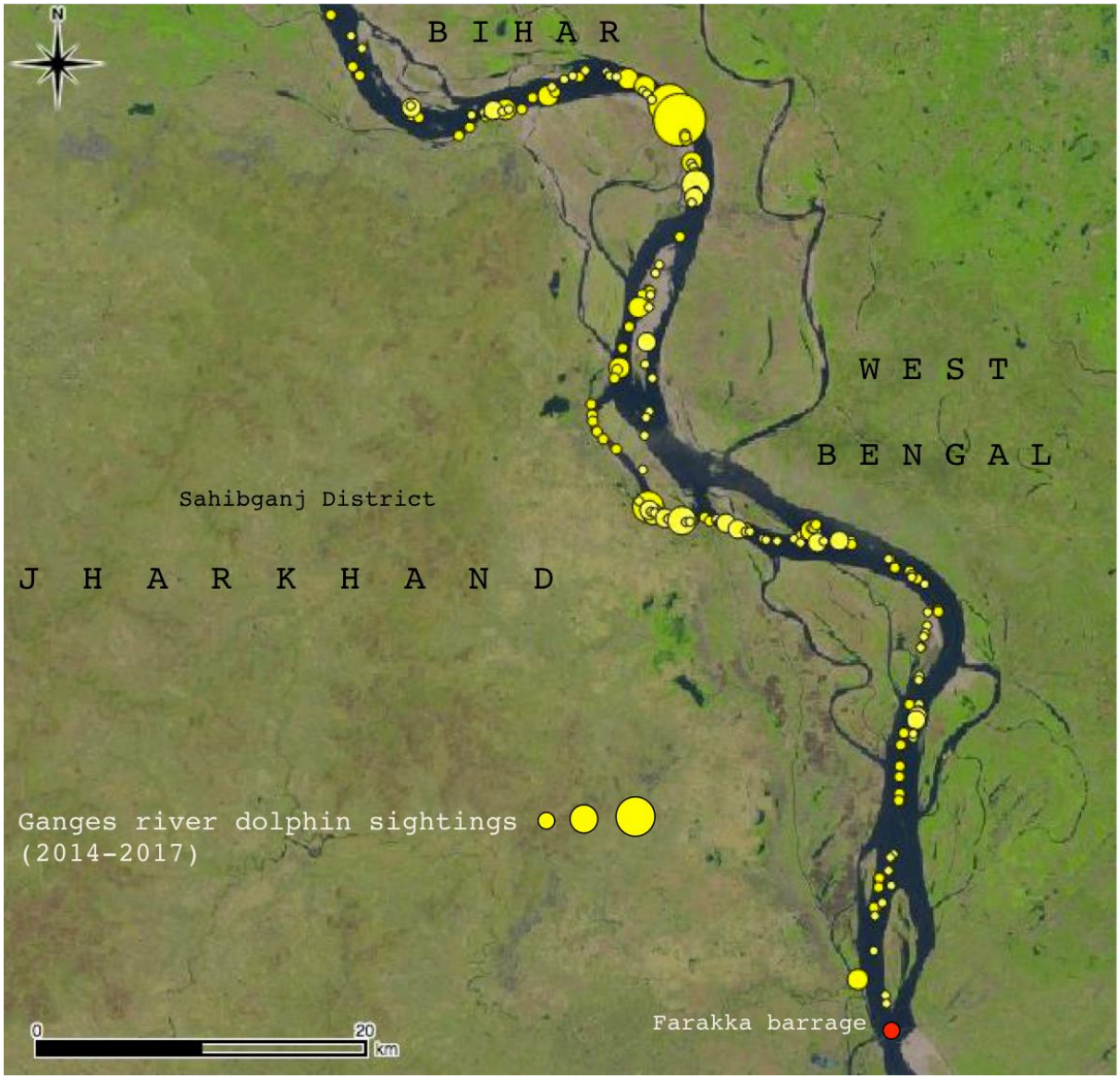
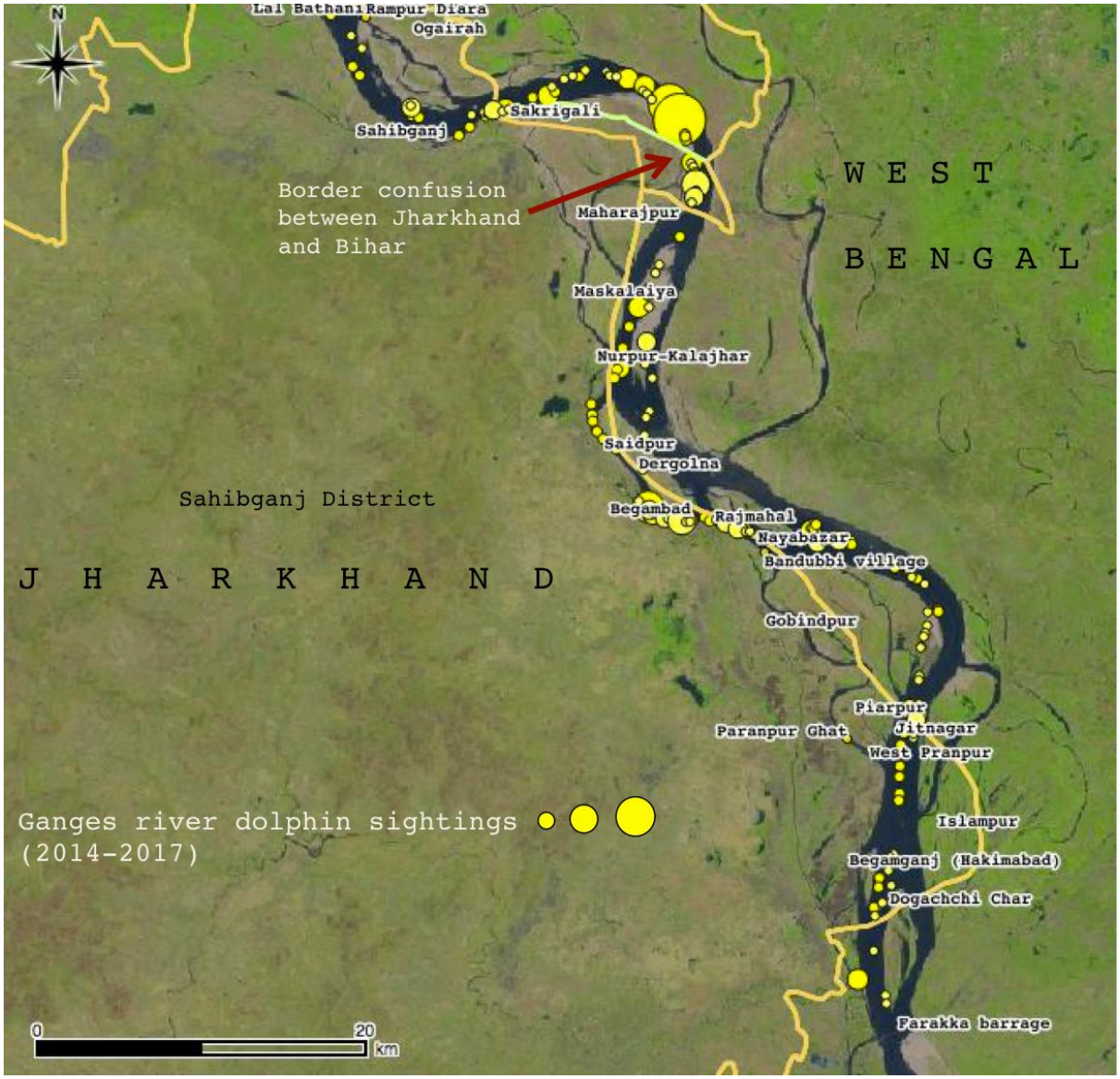


Figure 7. Distribution of Ganges river dolphins from Manihari to upstream of the Farakka barrage, with bubble sizes indicating abundance. Map with state boundaries.Red arrow is pointing to a section of the boundary that is shown as the Jharkahand state boundary in some maps and Bihar state boundary in some maps.



Conclusions and recommendations

1. The Ganges river dolphin population in the Ganga River within Jharkhand state boundaries is estimated to be between 50 and 60 individuals.
2. The river-floodplains and channels along the Bihar-Jharkhand-West Bengal boundaries are highly dynamic and their land-water boundaries are impossible to define in a fixed way. This has implications for settlement of land ownership and fishing rights, and the status of residence of people living in “chars”. These issues must be considered in the notification conservation areas and their adaptive management in the future.
3. The major threats pertaining to the Ganga river within Jharkhand are related to 1) vessel traffic, port and bridge construction, and proposed water diversion at Sahibganj, 2) fishing impacts being relatively high in the area, with possible occurrence of targeted hunting, and 3) pollution from towns along the river.
4. Attempts to notify or declare a conservation area along the Ganga River must involve fisher folk and incentivize them avoid hunting and prevent bycatch of river dolphins. Engaging with fisher folk will help in discovering socially relevant, equitable, and just approaches to biodiversity conservation.
5. We propose that the Ganga river stretch around Rajmahal (esp. Dergolna to Nayabazar) should be provided the highest priority for conservation planning, due to the combination of high threat level and high dolphin population densities co-occurring in this area.
6. Emerging threats from port construction and water diversion projects at Sahibganj are likely to have a severe impact on water availability in downstream regions. It is important to prioritize mitigation measures in this stretch for the protection of river dolphins, prevention of pollution, and reducing impacts of underwater noise and sediment disturbance from vessel traffic and dredging, respectively.
7. Before the proposal for a protected area is submitted, we recommend pre submission assessment surveys for dolphin population and abundance estimaiton, fish and fisheries, biodiversity (flora and fauna) and human activities in the section of the river chosen for the proposed protected area, so that a new base line data is available, based upon which future management strategies can be planned.
8. Disseminating information about the river and the animal among stakeholders through awareness programs.
9. We recommend a Conservation Reserve, under the Indian Wildlife Protection Act,1972 to be proposed in the selected stretches of Ganga as it is more inclusive of local communities in protection and management of the protected area and which in turn will save the

government in the future from the hassles of dealing with human issues and conflicts within the protected area.

10. Procurement of equipments specifically required for all future dolphin surveys (Appendix 1)

Appendix-1

Sl.No	Equipment	Numbers
1	GPS eTrex 30x	2
2	Garmin Map 585 Plus Chart plotter	2
3	Nikon Monarch M511 10X42 Binoculars	2
4	Hondex hand held digital depth sounder	1
5	DSLR Camera	1
6.	Laser Range finder	1