Progress Report on
Community based River Dolphin and habitat monitoring in Brahmaputra river system

Report prepared and submitted by-

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Abstract

Community based Dolphin conservation network (DCN) members were engaged in a land based dolphin and their habitat monitoring in Brahmaputra river system in June-July, 2014. Independent double observer based mark-recapture method was applied for this monitoring. This phase of monitoring was conducted in total 25 DCN and covered a transect effort of 135km in total 5 monitoring days in Jun-July, 2014. In the month of June, the highest encounter rate of Gangetic dolphins (1.07 dolphins/km, SE=0.19) was estimated on 8th June and in the month of July, the highest encounter rate (1.16 dolphins/km, SE=0.21) was estimated on 13th of July. With Independent double observer based mark-recapture method, abundance of Gangetic dolphins was highest with 52 dolphins (SE=2) on 8th June with a total transect effort of 23.28 km, whereas in July 2014, the highest abundance estimate was 31 dolphins (SE=3) on 13th July with a transect effort of 12km. No significant difference was observed between the presence of dolphins in different habitat types (chi-square, $p>0.05$). We found significant relations with the anthropogenic pressure and dolphin absence with the data ($p<0.05$). It was the first scientific land-based dolphin and habitat monitoring process through the engagement of local communities, which seems quite effective in long term monitoring of Gangetic dolphins in Assam through local community participation.

Key words: DCN members, encounter rate, independent double observer, mark- recapture.

Introduction

There are about 635 Endangered Ganges River Dolphin / Gangetic dolphin (*Platanista gangetica gangatica*) in Brahmaputra river system within Assam of North East India. Before three decades, these dolphins were frequently seen in the Brahmaputra main channel and most of its tributaries. However, now they are confined only in certain pockets of Brahmaputra River as well as two of its tributaries (Kulsi and Subansiri River).

The major cause of population decline of the species in Brahmaputra river system are – poaching for oil, accidental killing through fishing net entanglement and habitat degradation. The main problem of preventing these threats is the remoteness of the dolphin inhabited areas and lack of adequate management infrastructure and attention. In that condition, we, the Gangetic Dolphin Research and Conservation Initiative (GDRCI) of Aaranyak, developed the concept of Dolphin Conservation Network. Dolphin Conservation Network (DCN) is a community based Gangetic dolphin conservation effort in Brahmaputra river system. This was set up in 2008 with an aim for long term protection of dolphins and their habitats in key identified habitats by trained local communities. Currently, 30 important dolphin habitats are categorised as DCN sites. Initially (2008-2013), from each site one interested community youth was recruited, trained and then engaged for land-based dolphin and habitat monitoring. During this phase, the simple Direct Sighting Method was applied, from where dolphin abundance was estimated as encounter rate (number of dolphins/km).

However, after some prolonged experiments, we came up with a new scientific method of low cost dolphin and habitat monitoring in 2014. This method was Double observer based Mark-Recapture method. The DCN members (total 54) were given extensive training on this new method in a training session on 21st – 27th May, 2014. Moreover, the DCN Members were also trained on equipments use (GPS, Binocular, guidebook), data collection protocols and then we gave them an equipment set (1 GPS, 1 Binocular, 1 camera, 2 guidebooks, 1 user manual and 1 set of data entry forms). With these equipment, these trained DCN Members started dolphin and habitat monitoring from 1st week of June, 2014. As the trial of this high quality scientific monitoring method by less skilled community youths, we are presenting here the initial two months progress of the work.

Study Area

Out of the 30 DCN sites 25 DCN sites participated in the Ganges dolphin monitoring program for the month of June and July, 2014 (Table 1). These DCN sites covered 20 sites along the Brahmaputra

river, 2 sites along Subhansiri river and 3 sites along Kulsi river which are the three major habitats of Ganges dolphin in the entire Brahmaputra valley (Fig. 1).

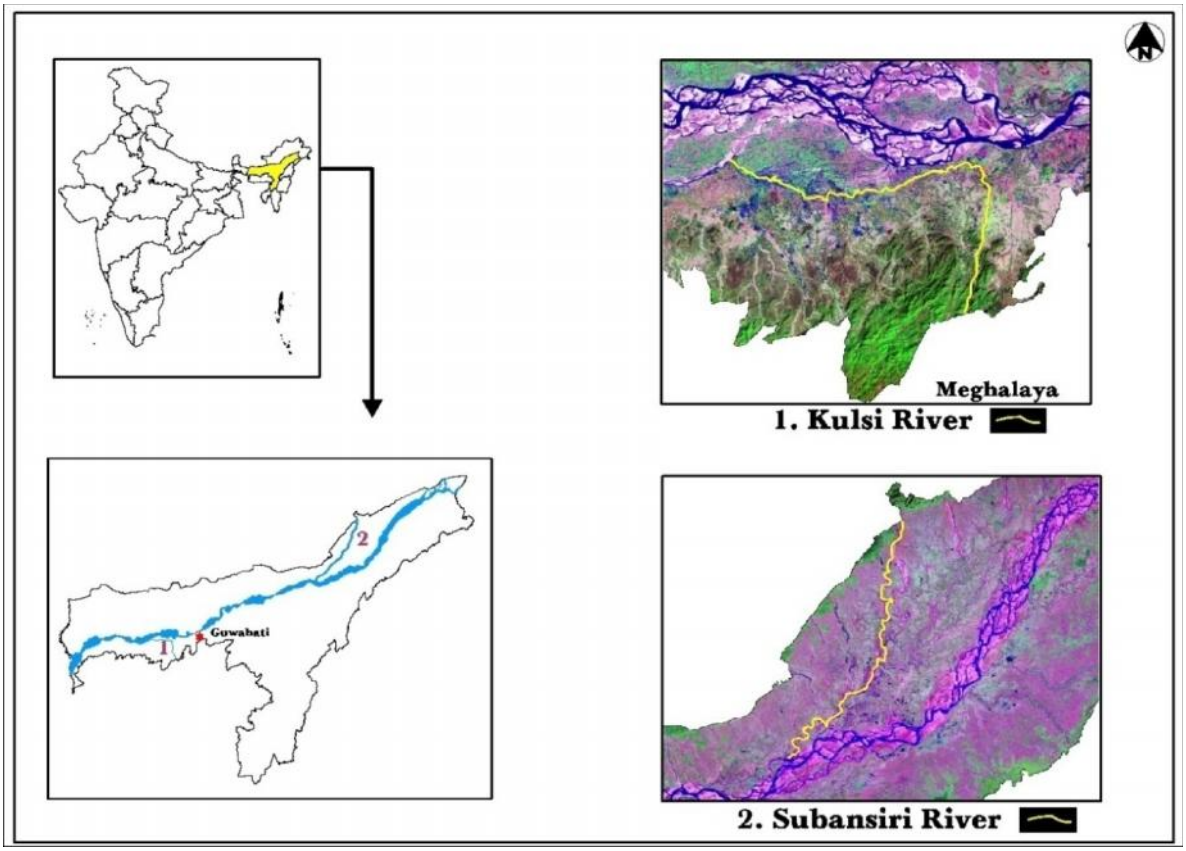


Fig. 1 Study Areas

Table 1. List of DCN sites where for Land- based Dolphin and habitat monitoring were conducted in June-July, 2014

Rivers	Sl. No.	DCN site	Average transect length (Km)
Brahmaputra	1.	Mirichapori	2.23
	2.	Guijaan	0.94
	3.	Akland Ghat	3.16
	4.	Bogibeel	1.13
	5.	Dihingmukh	2.70
	6.	Dichangmukh	2.92
	7.	Dikhowmukh	2.68
	8.	Bishwanath Ghat	0.57
	9.	Bhumuraguri	1.36
	10.	Dhanshreemukh	3.12
	11.	Roha	2.90
	12.	Kuruwa	3.00
	13.	Sualkuchi	1.13
	14.	Pahumara	3.01

	15.	Baghbor	2.31
	16.	Bohori	2.52
	17.	Goalpara	2.23
	18.	Chunari	3.00
	19.	Jogighopa	1.97
	20.	Dhubri	2.62
Subansiri	21.	Khabolu	1.88
	22.	Dikhrongmukh	2.60
Kulsi	23.	Kukurmara	2.16
	24.	Chammariya	3.03
	25.	Maalibaari	2.80

Methodology

1. Double observer Land based Monitoring: A fixed transect, of maximum 3 km length, was selected along the river bank to monitor Ganges dolphin every once in a week in 25 DCN sites. The transect was selected on the basis of the presence of dolphins and suitable dolphin habitats such as meanders, confluences, down- stream mid channel islands (Pilleri 1970, Sinha 1997, Biswas & Baruah 2000) etc., where the dolphin sighting probability is high. The transect was again broke down into several reach of 100m each. The reach was made to get the minute details of the habitat type of the area surveyed, vegetation cover and anthropogenic activities taking place in those reaches.

Two independent observers were used in this method. Such method is used in boat based transects (Smith *et.al.*, 2006, Braulik, 2012), however in land based monitoring this has been for the first time (Fig. 2). To maintain the independency of the observers, the primary observer (the observer which move first on the transect) moved 15 minutes ahead of the secondary observer (the observer with the second move on the transect). The primary observer with the GPS recorder recorded the GPS location, save the waypoint, time, number of individuals, age structure of the individuals sighted (new- born/ calf/ non- calf, Table 2), habitat type (Table 3), riparian types (Table 4), visibility conditions (Table 5) and anthropogenic activities along with the sighting and in each reach. The secondary observer is without a GPS recorder, however, has synchronised his time device (hand watch or mobile phone) with GPS recorder and his walking speed with the primary observer. Along with this information, the observers also collected the angle of sighting and the radial distance of the animal to ensure the distance of the animal from the transect line.

Table 2. Age- structures recorded for Ganges dolphin in Land- based monitoring

Age- structure	Definitions	Photographs
New- born	Less than 50cm long, body colour is brick red and found in close association with the mother.	
Calf	Less than 1 cm long, body colour black or dark chocolate. Dive out more frequently.	
Non- calf	More than 1m long, body colour dark brown. Dive less frequently.	

Table 3. Major habitat type recorded during the Land- based monitoring

Habitat types	**Definitions**	**Photographs**
Narrow straight channel (NSC)	A straight channel with a channel width of <600m for Brahmaputra, <250m for Subansiri, and <60m in Kulsi River.	
Wide straight	A straight channel	

channel (WSC)	with a channel width of >600m for Brahmaputra, >250m for Subansiri, and >60m in Kulsi River.	
Confluence (CF)	A junction point of one or more river/ tributaries to the main channel.	
Down- stream mid- channel island (DMCI)	A large raised river bed forming an island in the channel.	
Meander (M)	River bends where eddy currents and whirlpools were formed	
Braided channel (BC)	This is the point in the river where the main channel has been broke down into several small channels.	

Table 4. Major Riparian vegetation types recorded during the Land- based monitoring

Riparian types	Abbreviations	Photo description
Sand bank		Birds on sand bank of Brahmaputra.
Grassland		Cattles browsing on the grassland near river bank
Shrub land		
Matured forest		Thick matured forest near river bank.

Cultivated land		Boy monitoring his crop field near by river bank.
Tea garden		A dolphin surfacing near a river bank with tea garden.
Human settlement		Human settlement near river bank.

Table 5. Visibility Conditions recorded the Land- based monitoring

Visibility condition	Rank	Definition
Wind	0	Water surface is glassy or had only small ripples
	1	Small waves but no white caps
	2	Larger waves with whitecaps
Glare	0	No glare
	1	When glare is very severe (view completely obscured) but covering <10% of the field or when glare is slight (view only partially obscured)

	2	Severe glare covering more than 10% of the field of view or slight glare covering more than 50% of the field of view).
Fog/ Rain	0	No rain/fog
	1	Fog/rain obscuring no more than 10% of the field of view or slight fog/rain partially obscuring no more than 50% of the field of view
	2	Severe fog/rain obscuring more than 10% of the field of view or slight fog/rain partially obscuring more than 50% of the field of view

2. Encounter Rates of Ganges dolphins:

The encounter rate was the minimum estimation of the Ganges dolphins recorded with Double-observer Land based monitoring method. Site wise as well as overall encounter rate along with encounter rate of different age structure was estimated. The encounter rate was estimated using the following formula:

$$\boldsymbol{Encounter\ rate = Total\ number\ of\ sighting / Total\ transect\ effort}$$

3. Mark- recapture: The abundance was estimated using the independent double observer data. The sightings made by the two independent observers were matched by following the time of sighting and reach number. Since the time and the walking speed between the two observers were synchronised, time take by the two observers to cover the same reach was approximately equal. We used Chapman's modified Lincoln- Petersen mark- recapture estimator (Chapman 1951, Rugh et al., 1993) in program MARK to estimate the dolphin abundance in the following manner:

$$\widehat{N} = \left(\frac{(n_p+1)\times(n_s+1)}{m_{ps}+1}\right) - 1$$

$\widehat{N}_s$= population size estimate

n_p = number of animals sighted by the primary observer

n_s = number of animals sighted by the secondary observer

m_{ps} = number of animals sighted by both observers (matches or recaptures)

This estimator was used because it has a lower bias compared to the unmodified Lincoln-Petersen estimator and is unbiased for $n_p + n_s \geq \widehat{N}_c$. The correction factor for dolphins missed by the primary and secondary observers was then $\widehat{N}_c/n_p$ and $\widehat{N}_c/n_s$ respectively.

The associated variance V_c is then given by (Seber 1970):

$$V_c = \frac{(n_p + 1) \times (n_s + 1) \times (n_p - m_{ps}) \times (n_s - m_{ps})}{(m_{ps} + 1)^2 \times (m_{ps} + 2)}$$

The upper and lower ranges of the 95% confidence interval were then calculated as

$$95\%\ CI = \hat{N}_c \pm (1.96 \times \sqrt{V_c})$$

Primary observer with the GPS recorder holding to record the GPS location of sightings and sighting time.	Secondary observer without GPS recorder, however, record the sighting time with the time gadget available with him, time synchronised with the GPS time

Fig. 2 DCN member performing Independent double observer mark- recapture method in the field. The Primary observer moves 15 minutes ahead of the Secondary observer to maintain the independency.

4. Habitat assessment: Percentage coverage of each habitat type was done. Significant test for habitat preferences was done using SPSS software.

5. Threat assessment: The encounter rates for every anthropogenic activity were estimated in the similar way as described in section 2. Significant test for dolphin encounter rate with anthropogenic activities was done using SPSS software.

Results and Discussion

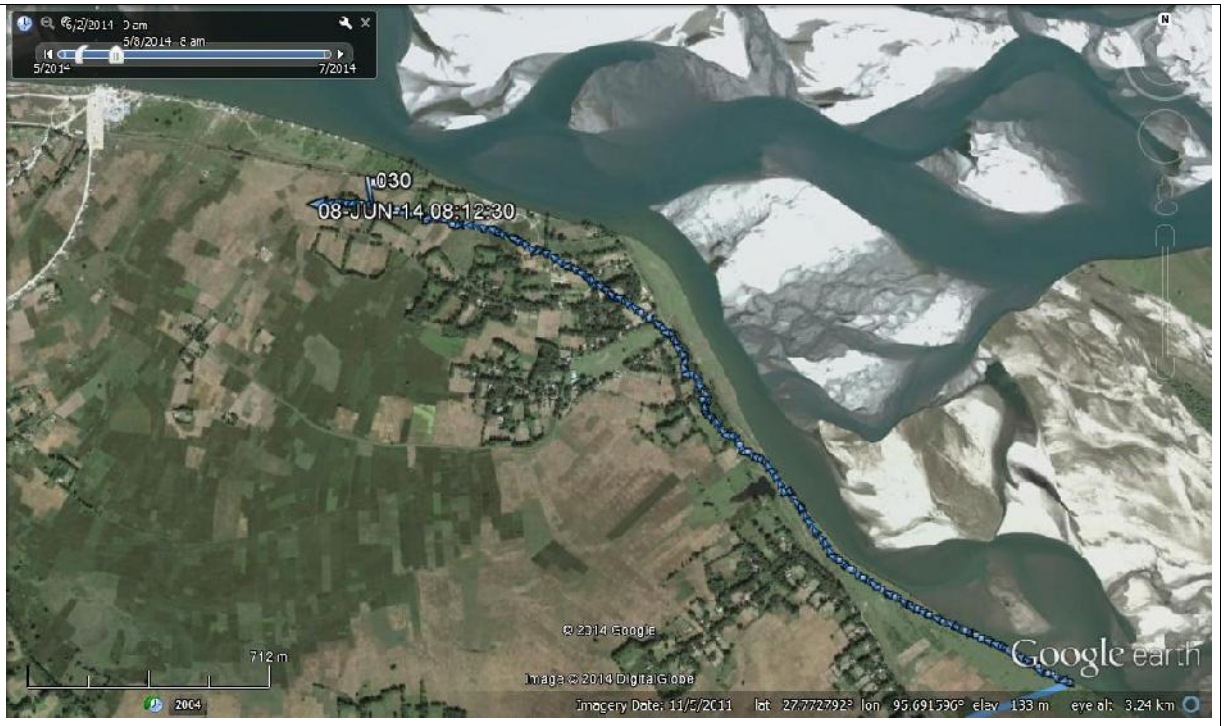
1. Survey Effort: In June, total 139 km river stretch were monitored in 5 days, whereas in July, total 47 km river stretch was monitored in 2 days (Table 6). The survey effort for in days and transect length was not similar for all the sites in these two months either because of the unfavourable geographic locations (very muddy) or weather and river (flooded) conditions. Out of the total 30 DCN sites, land based dolphin and habitat monitoring could be conducted in 25 DCN sites, out which Independent double observaer based Mark-Recapture method could be properly employed in 16 DCN sites, whereas single observer based Direct count method could be applied in other 9 DCN sites, due to technical difficulties.

Table 6. DCN site wise total transect effort given for the month of June and July, 2014.

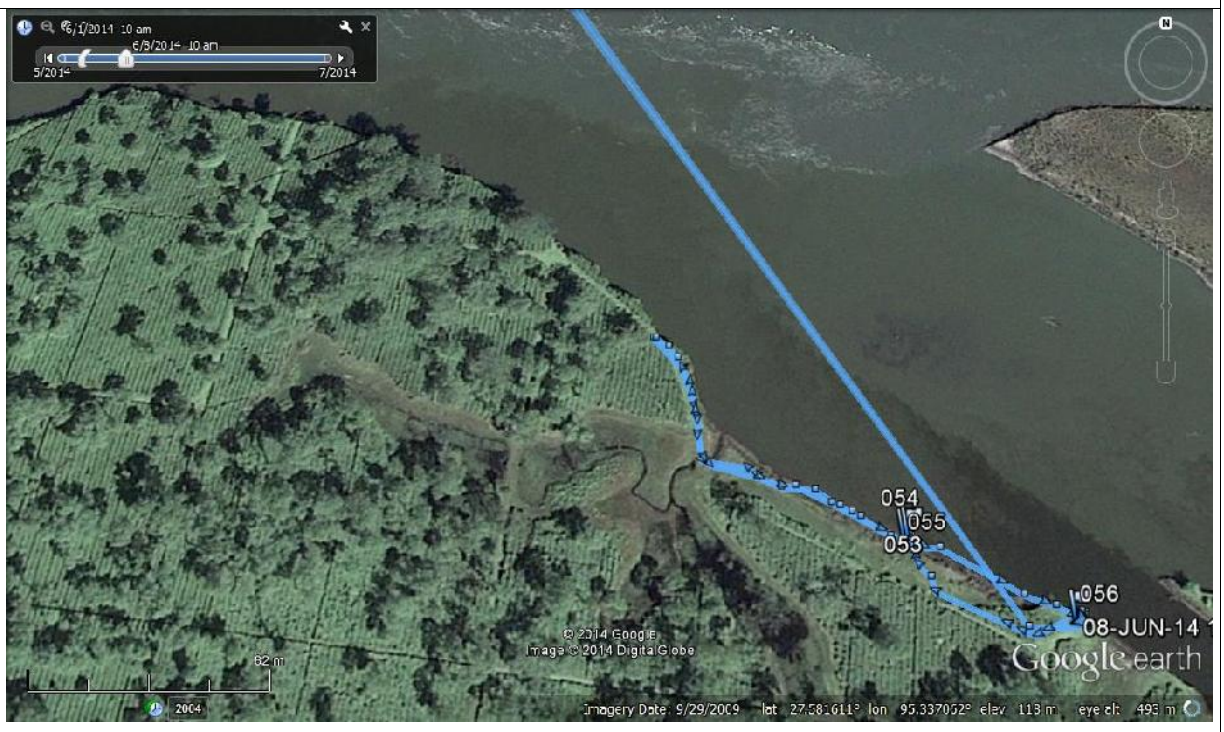
DCN sites	Transect length (km) during dolphin monitoring days in June and July, 2014						
	1st Jun	8th Jun	15th Jun	22nd Jun	29th Jun	13th Jul	27th Jul
Mirichapori	2.5	1.2	Unable to conduct	3	Unable to conduct	Unable to conduct	Unable to conduct
Guijaan	2.9	0.46	0.21	Unable to conduct	0.2	Unable to conduct	Unable to conduct
Bogibeel	3	3	3	3.3	3.5	3.1	3.2
Akland Ghat	1.13	1.13	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct
Dihingmukh	1.2	3	3.3	Unable to conduct	3	Unable to conduct	3
Dichangmukh	2.34	2.1	3.11	3.5	3.3	3.12	3
Dikhowmukh	1.1	2.91	3.9	4.17	Unable to conduct	1.32	Unable to conduct
Bishwanath Ghat	0.56	0.56	0.56	Unable to conduct	0.56	0.63	0.56
Bhumuraguri	1.64	1.61	1.25	1.25	1.25	1.25	1.26
Dhanshreemukh	Unable to conduct	3.3	3	Unable to conduct	3	3.31	3
Roha	Unable to conduct	Unable to conduct	3.2	2.4	Unable to conduct	3	3

Kuruwa	3	3	3	3	3	Unable to conduct	Unable to conduct
Sualkuchi	Unable to conduct	1.65	0.6	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct
Pahumara	3	3.1	3	3	3	3	3
Baghbor	2.5	1.65	2.4	2.4	2.4	2.4	2.4
Bohori	3	3	2.2	3	1.4	Unable to conduct	Unable to conduct
Goalpara	2.31	2.2	2.24	Unable to conduct	2.2	2.2	Unable to conduct
Chunari	3	3	3	3	3	3	3
Jogighopa	2.1	2.24	1.8	1.93	1.8	Unable to conduct	Unable to conduct
Dhubri	2.63	2.6	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct
Khabolu	1.96	1.79	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct
Dikhrongmukh	Not done	2.7	2.5	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct
Kukurmara	2	2.1	2.39	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct
Chammariya	3	3.1	3	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct
Maalibaari	Not done	3.2	2.4	Unable to conduct	Unable to conduct	Unable to conduct	Unable to conduct

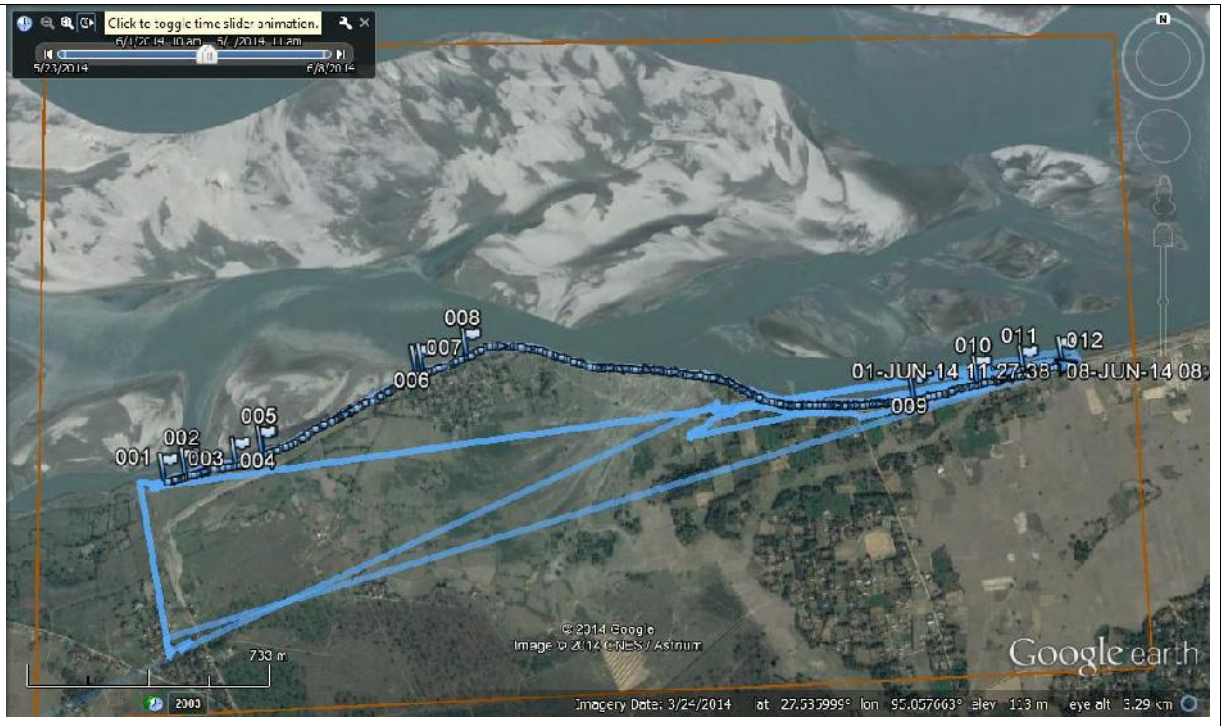
2. Track logs and Waypoints of sightings: The tracklogs done in the month of Jun- Jul, 2014, has been overlaid on the image of Google earth of 2014. The waypoints of Dolphin sightings made in these months have also been superimposed with the layers (Fig. 3). In few sites the transects has been appeared to be lying 0.5 to 0.25 km away from the river bank, this was because the images of the Google has been available for the dry seasons, whereas our monitoring was conducted during high flood season of June-July, 2014.



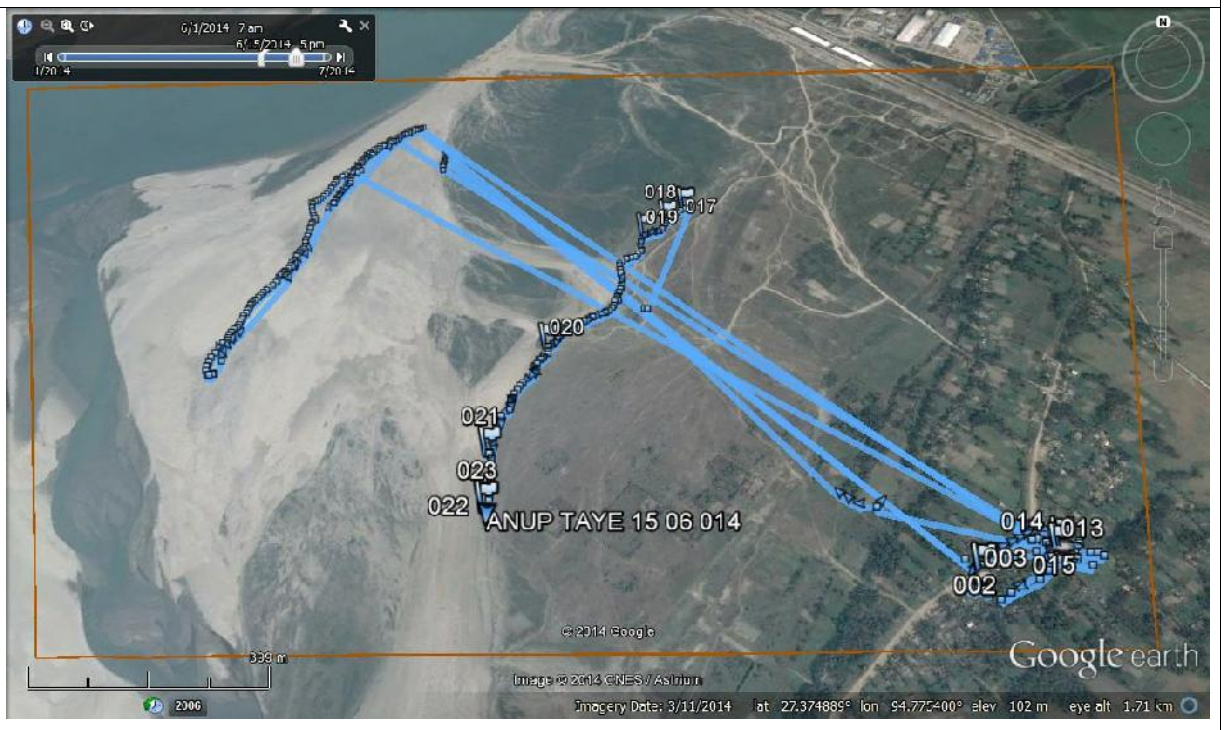
Mirichapori



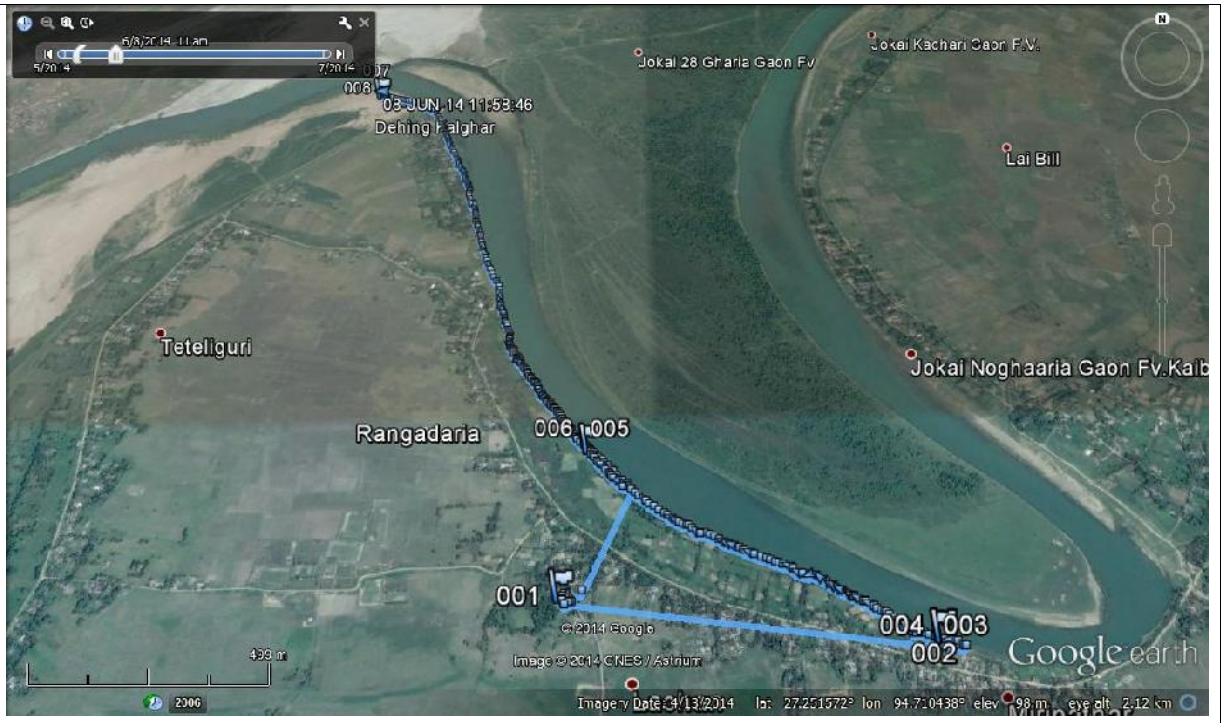
Guijaan, the track is short since the place is inaccessible and inconvenient for monitoring with land- based method.



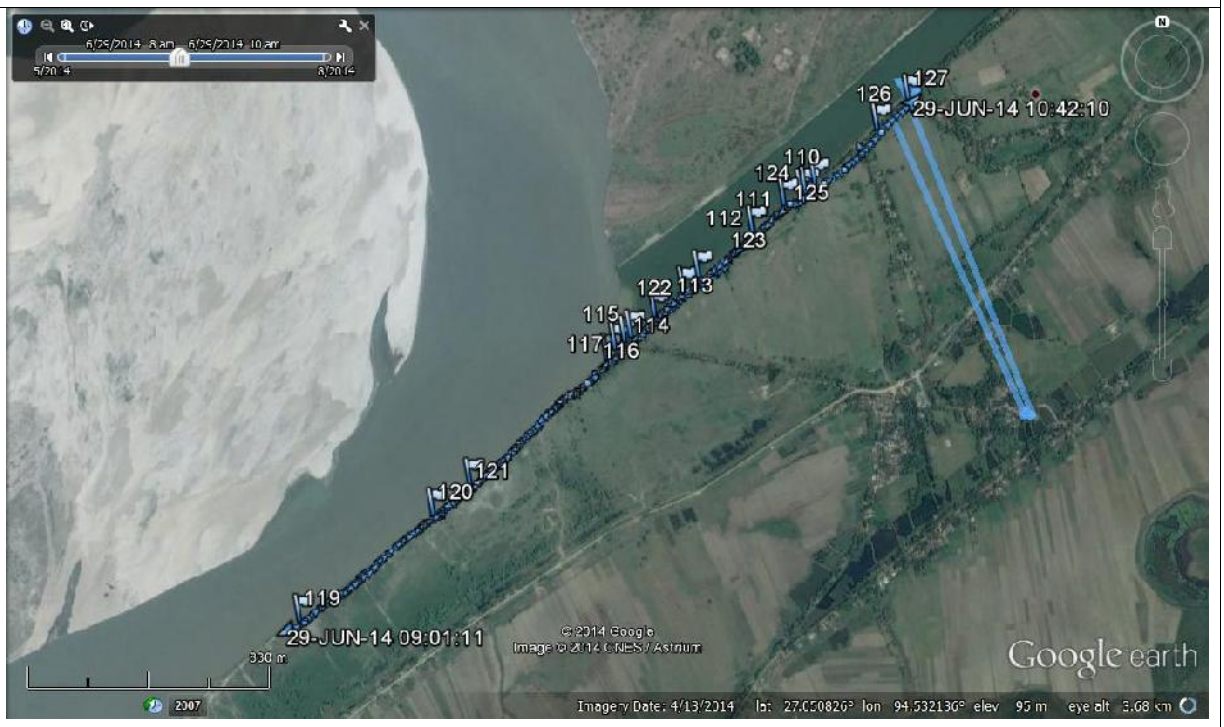
Akland



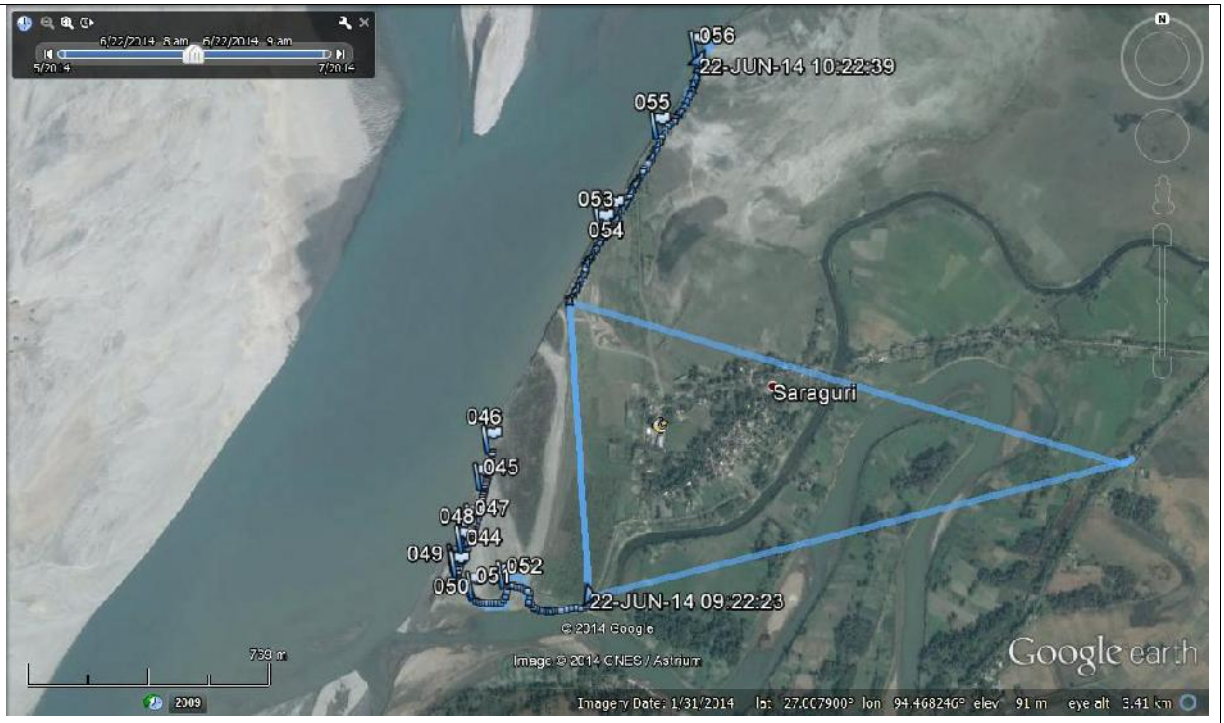
Bogibeel, transects has to be shifted during high flood time.



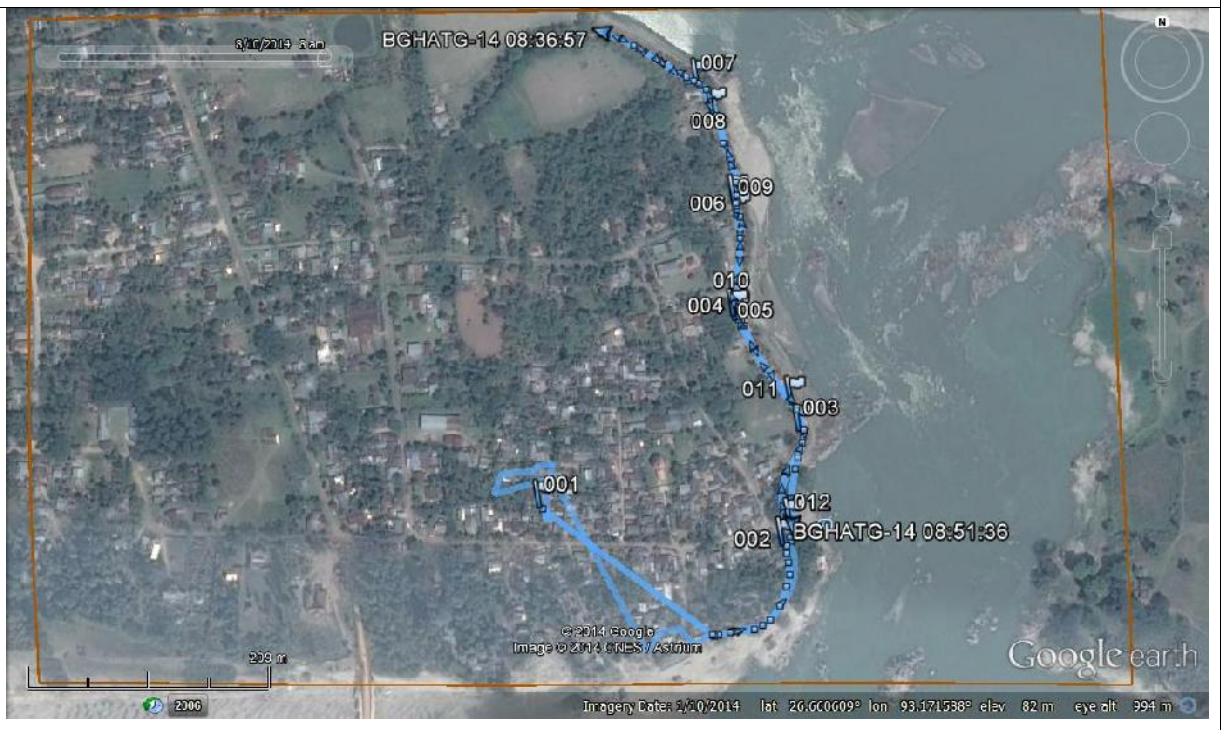
Dihingmukh



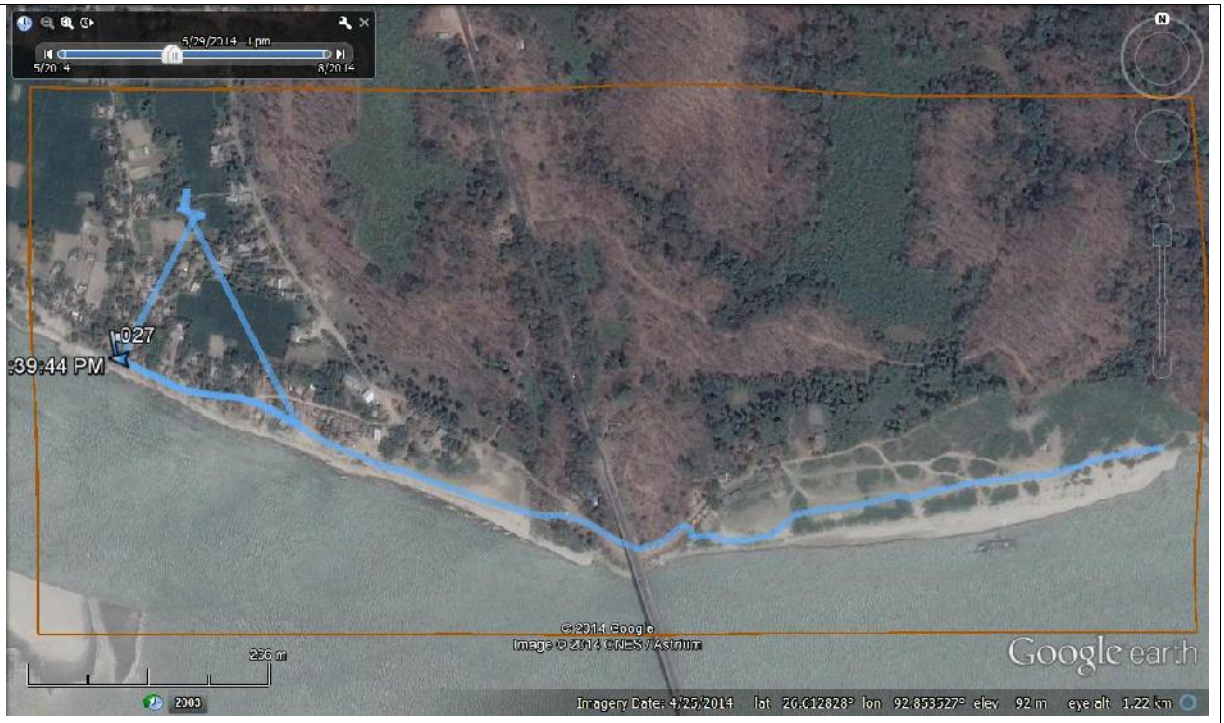
Dichangmukh



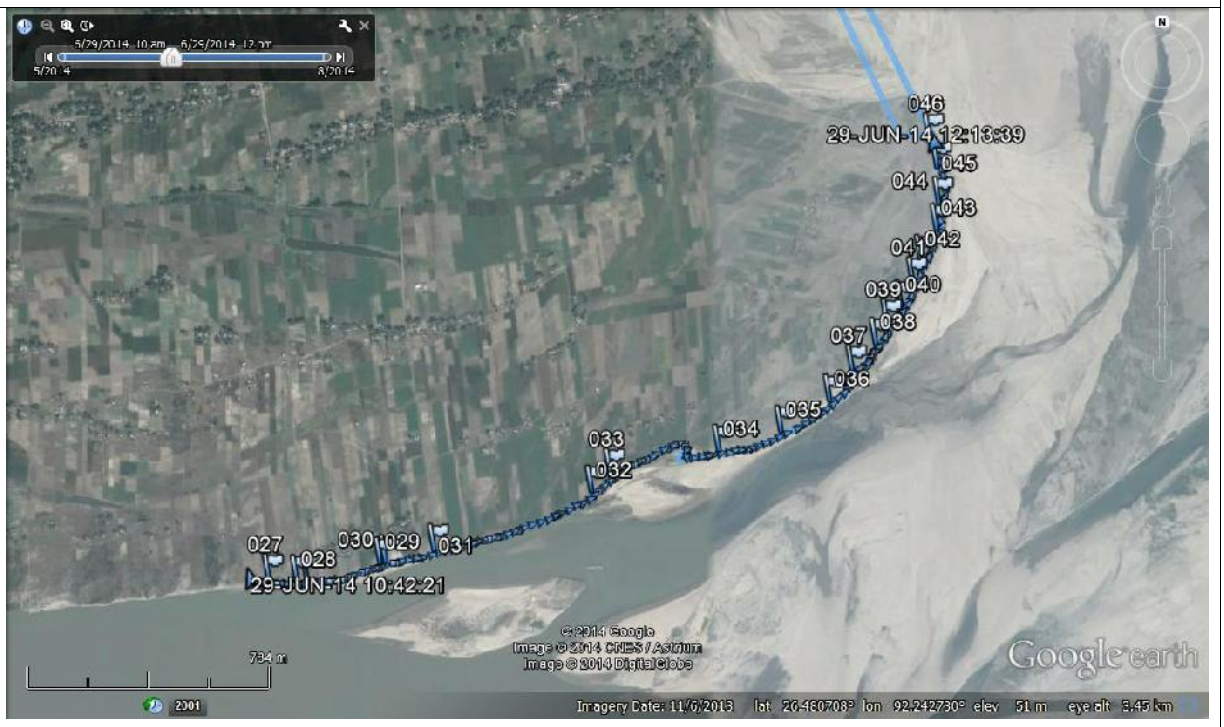
Dikhowmukh, transect has be traversed by a small channel.



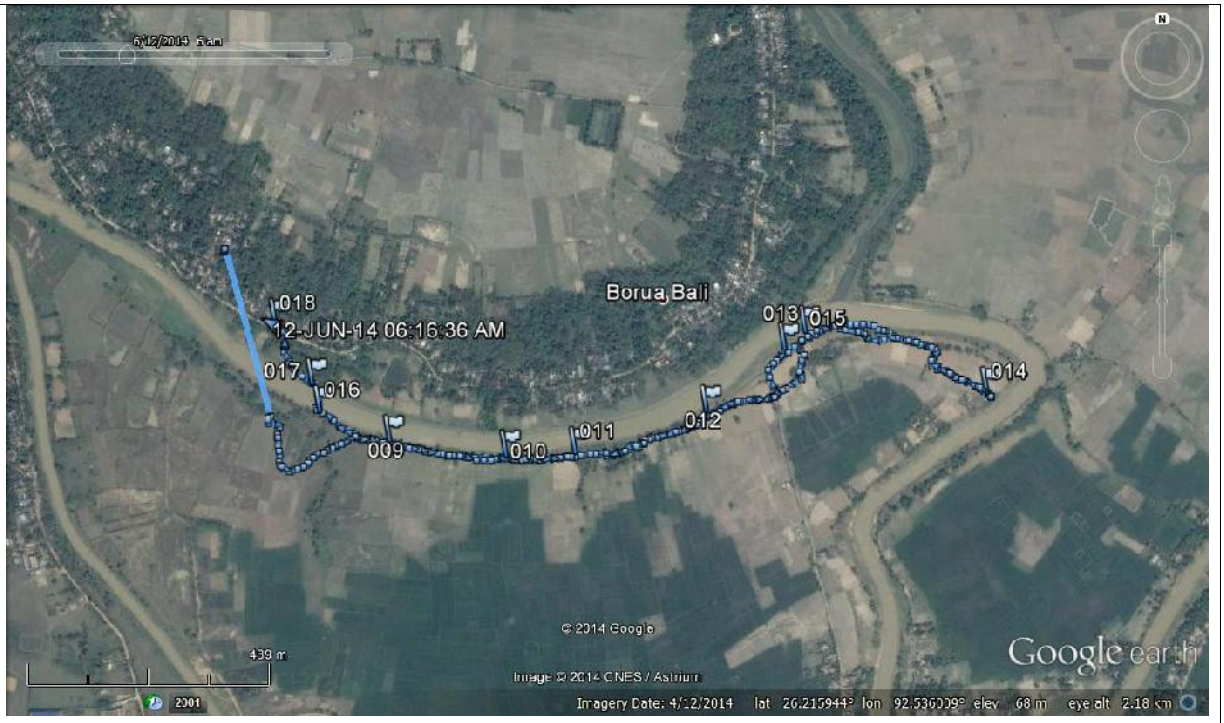
Bishwanath Ghat



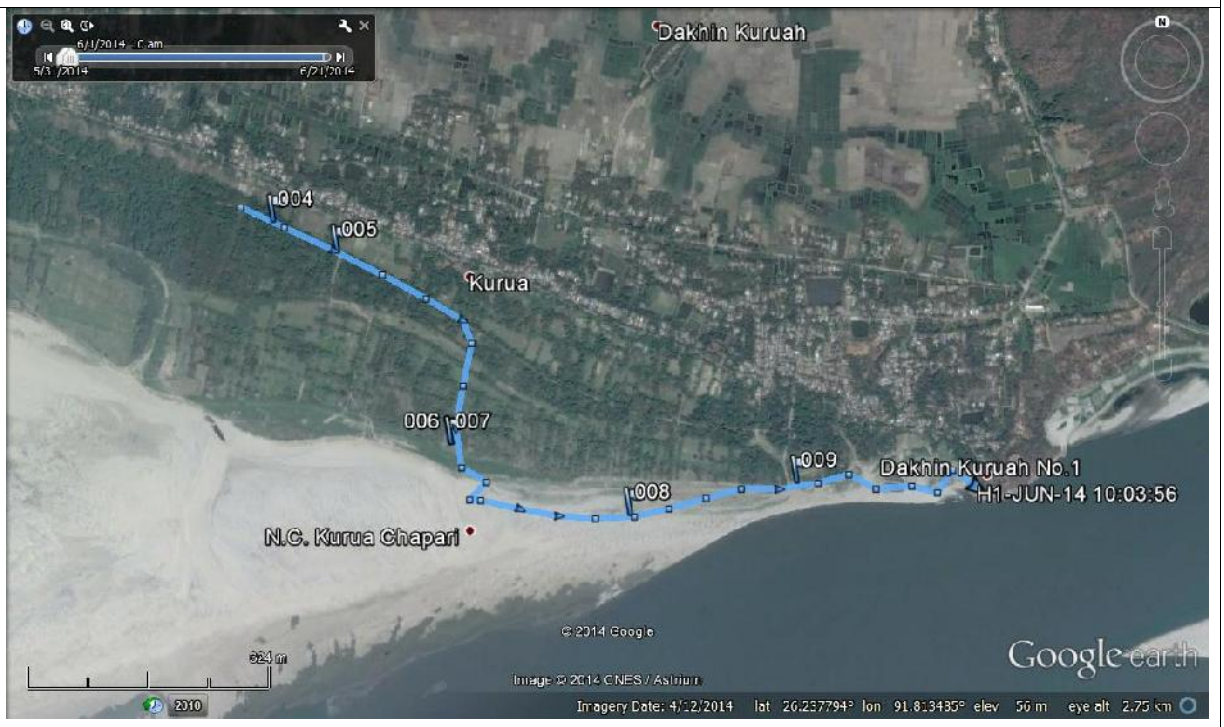
Bhumuraguri, track log has been done, however, no sighting was done during jun- jul month



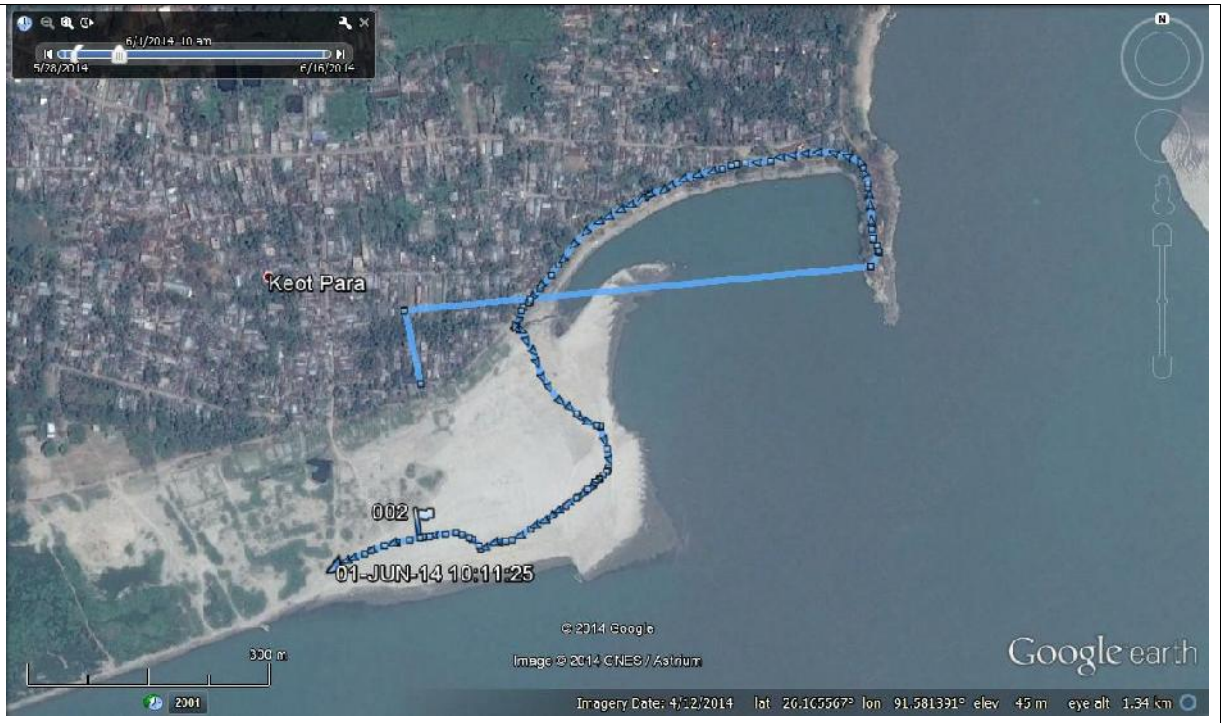
Jiadhanshreemukh



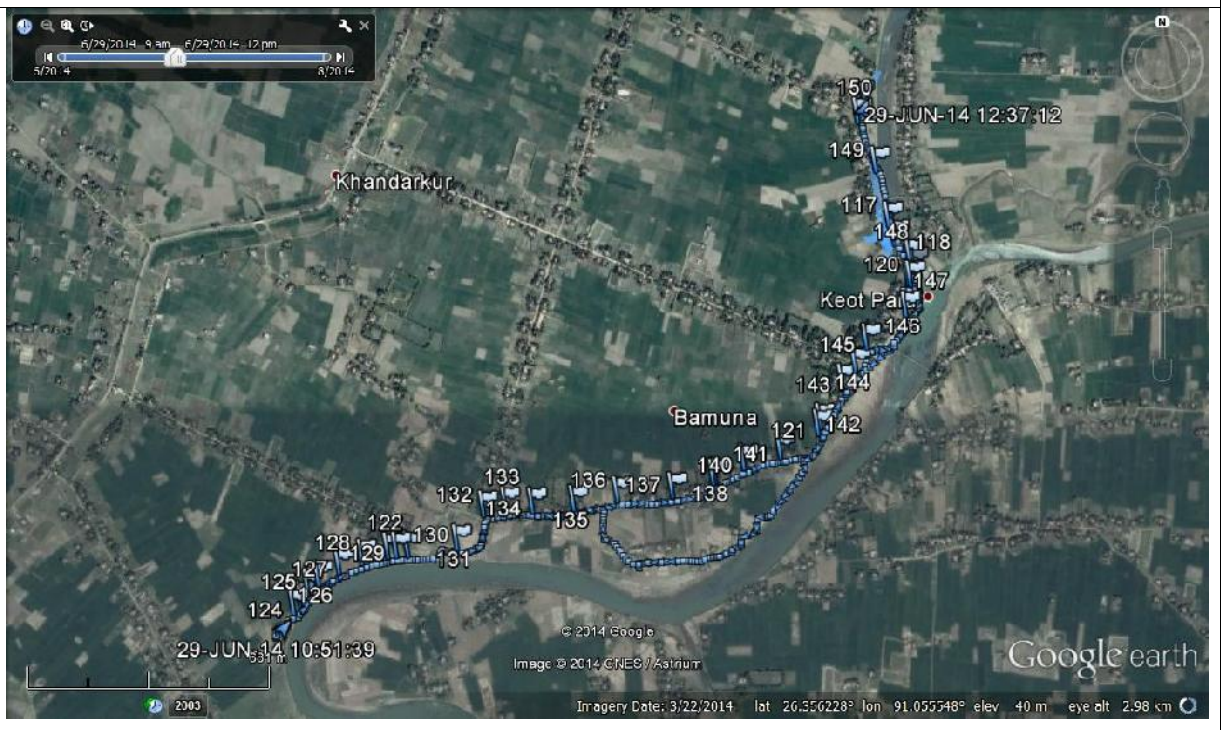
Roha



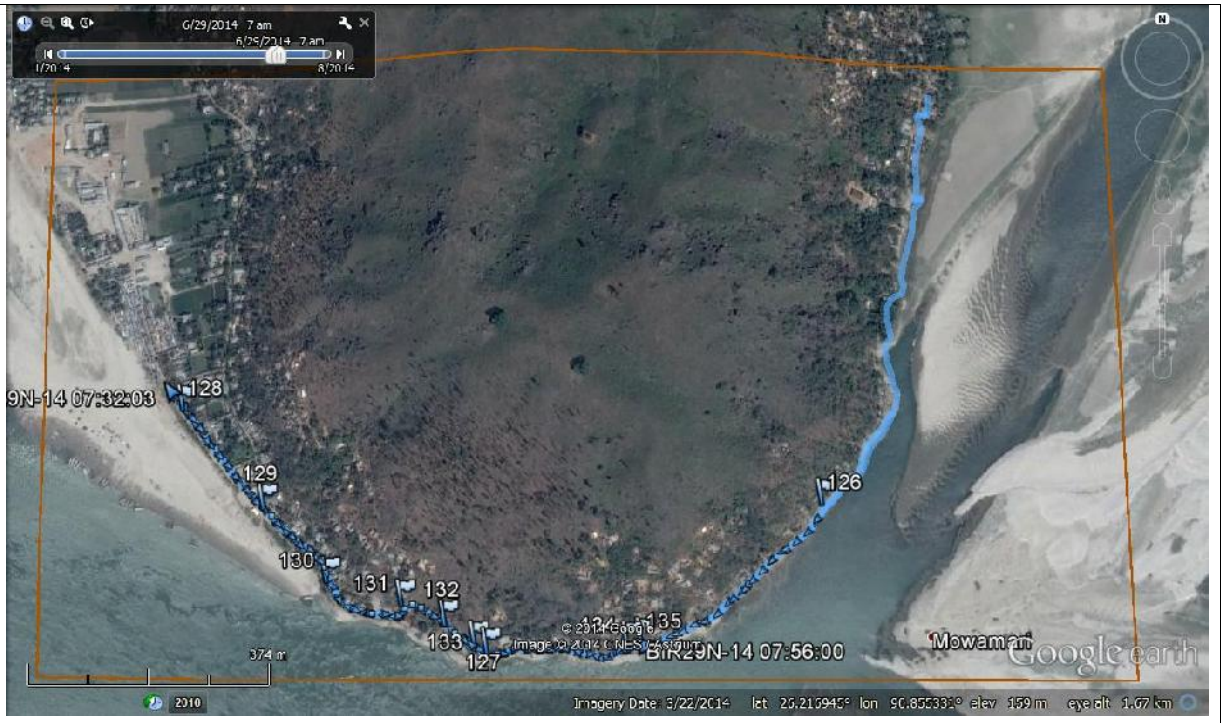
Kuruwa, as seen on the image, the track is far from the river, it was a high flood time.



Sualkuchi

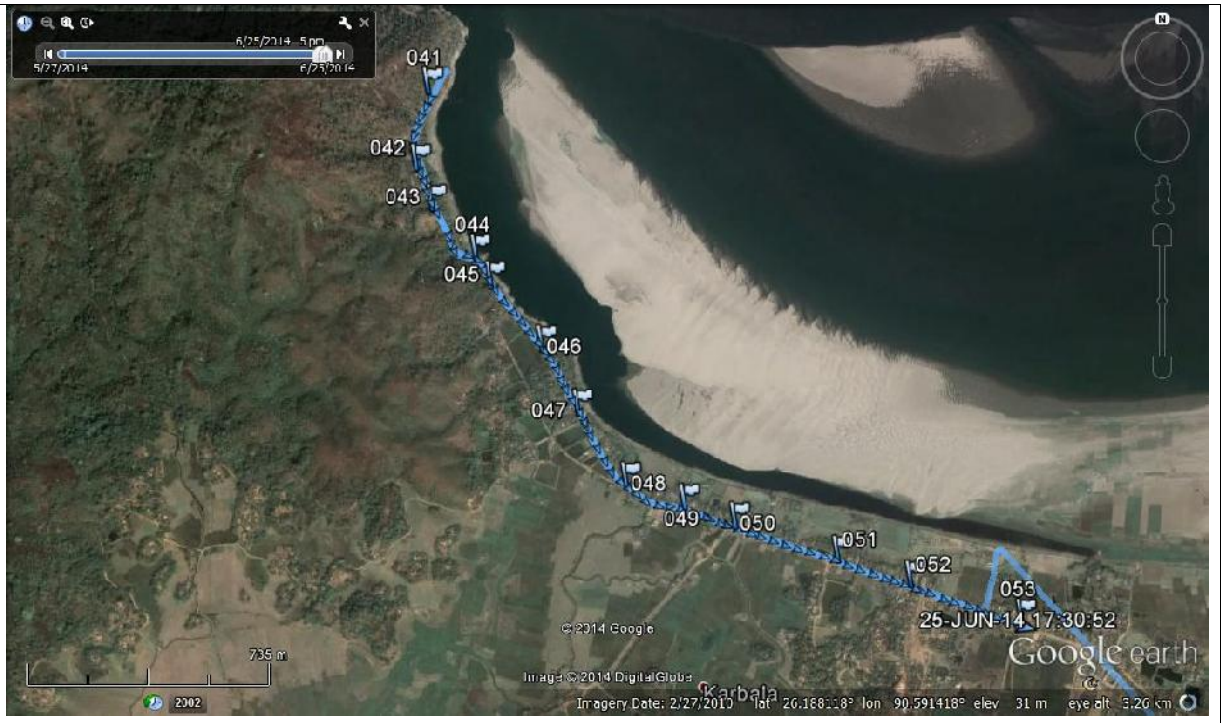


Pahumara

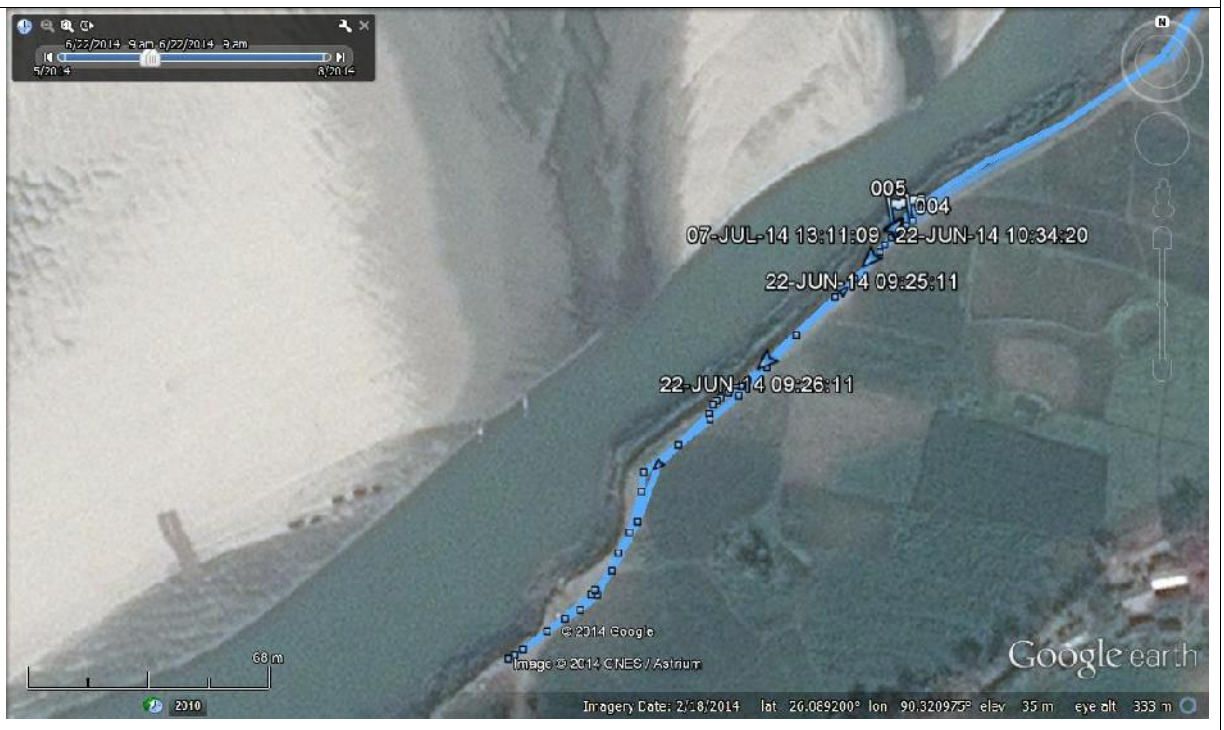


Baghbor

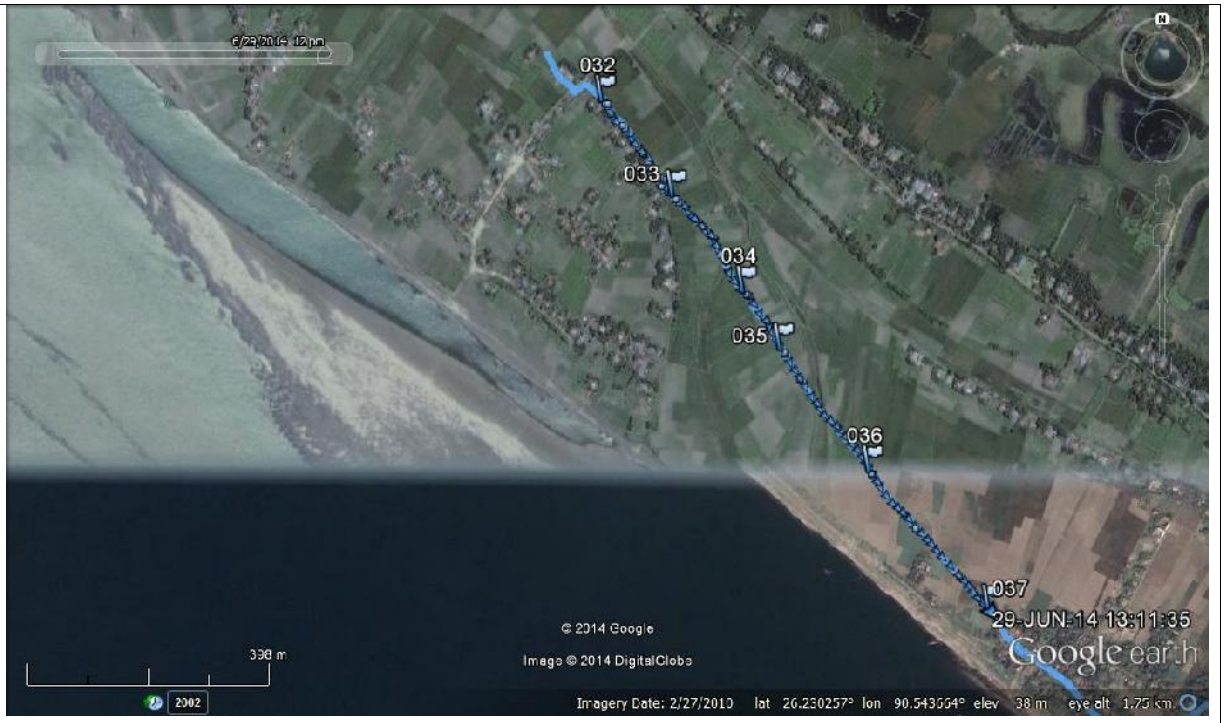
Bohori



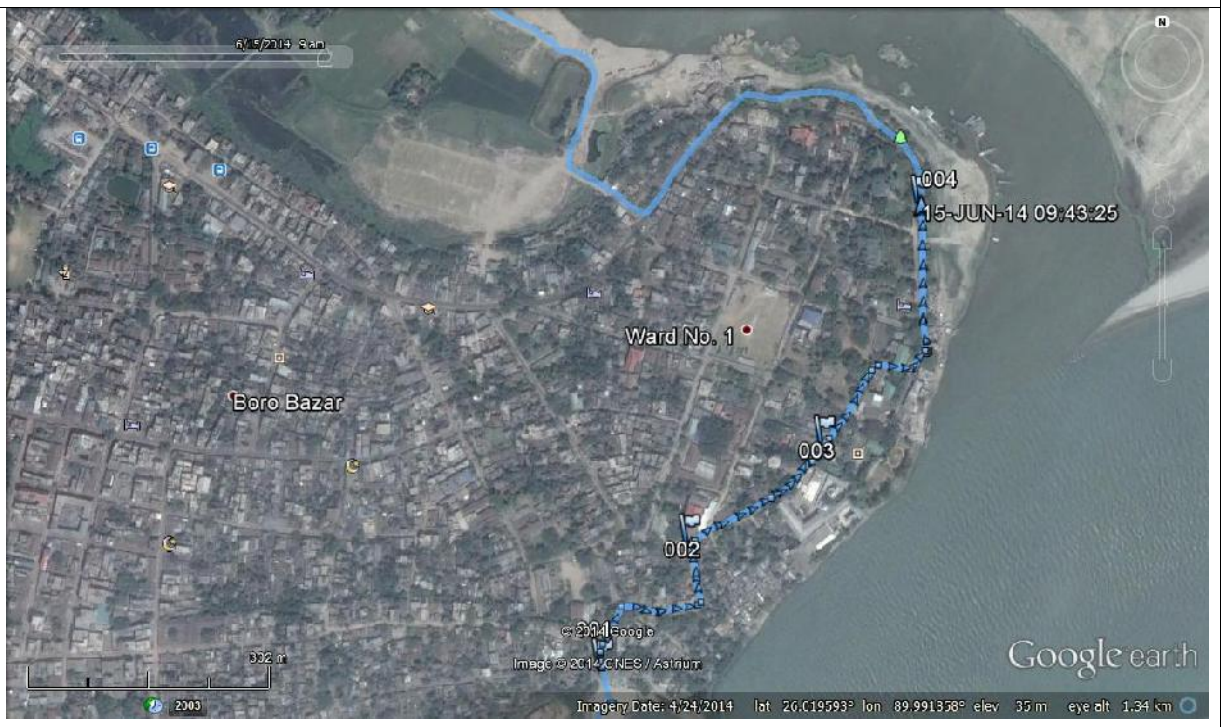
Goalpara



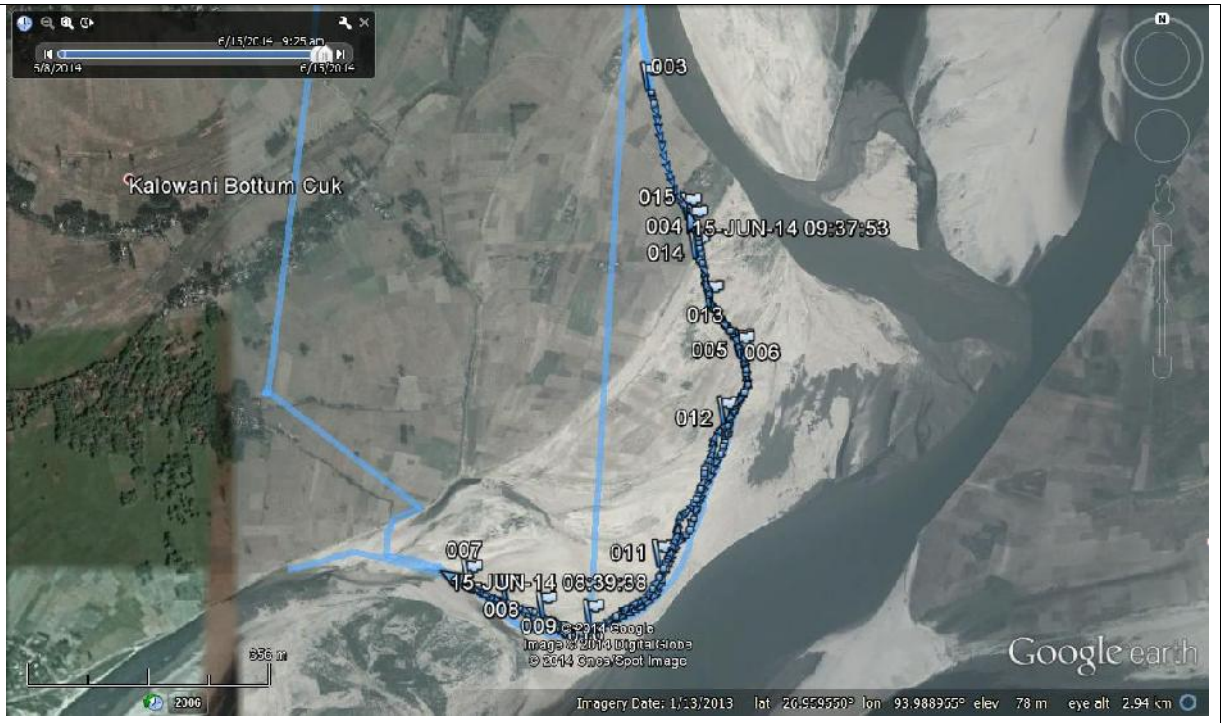
Chunari



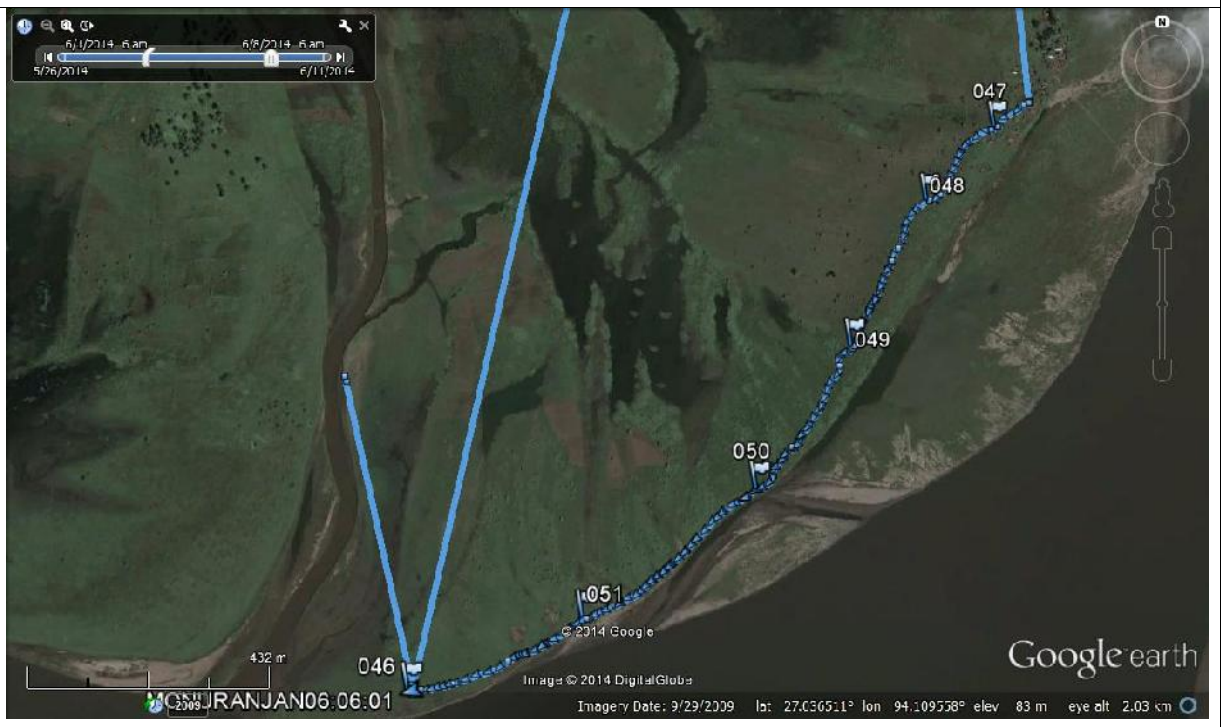
Jogighopa, the track done in the flood season.



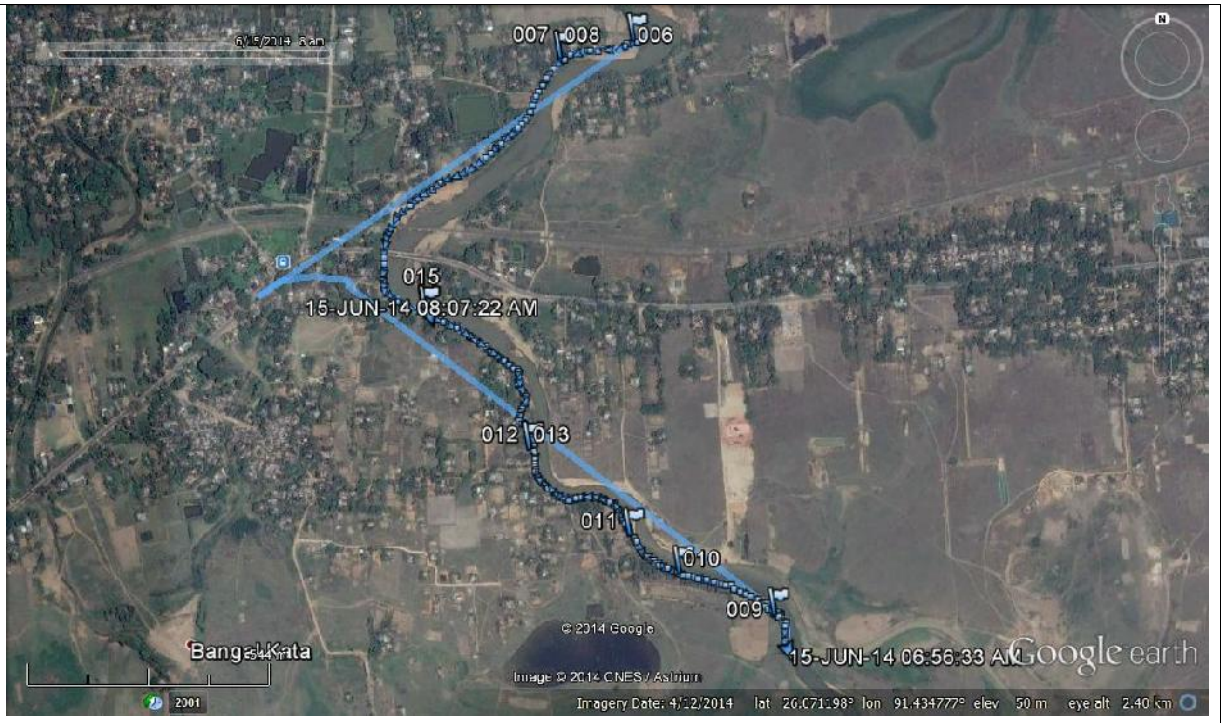
Dhuburi, track on the flooded area.



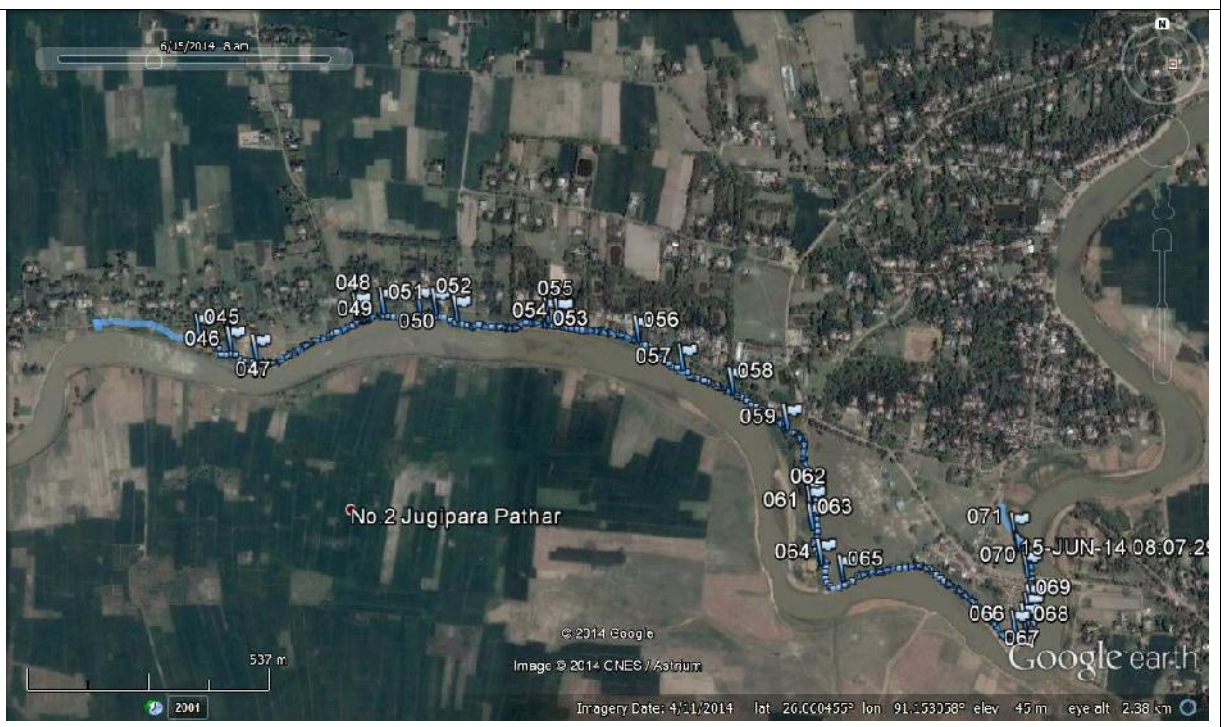
Dikrongmukh, Confluence of Subansiri and Brahmaputra River



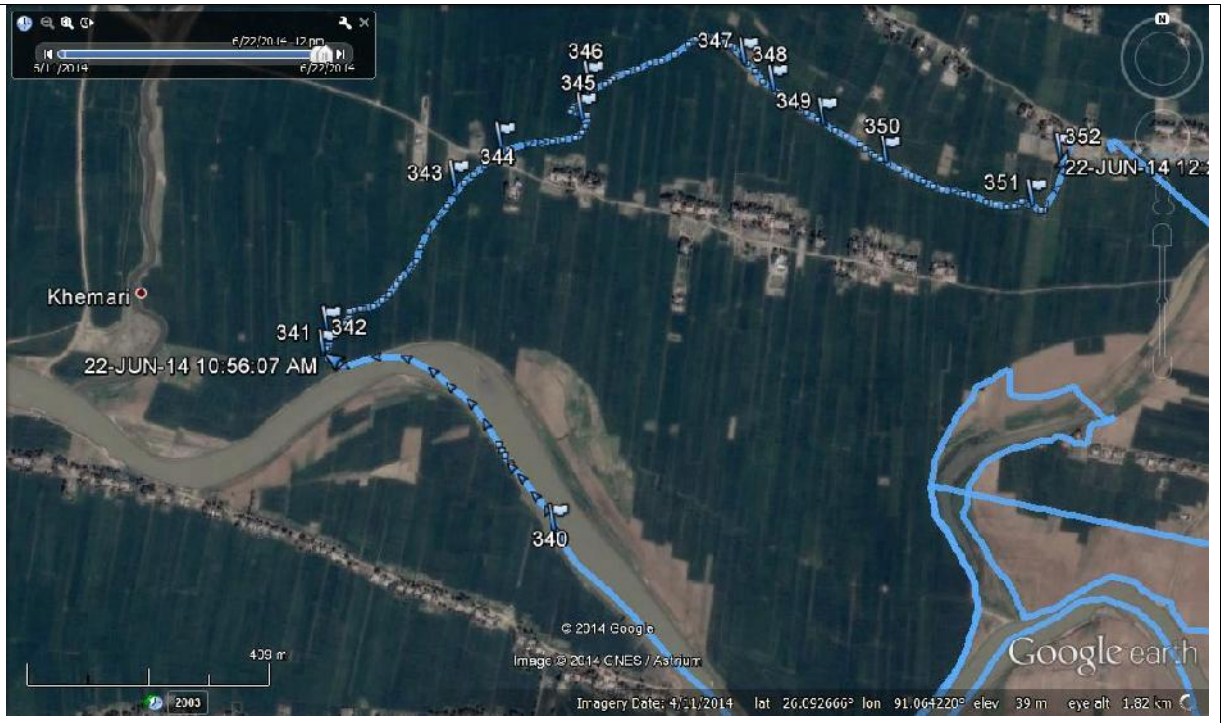
Khabolu, track on Subansiri river.



Kukurmara, track on Kulsi river



Chammariya, track on Kulsi river



Malibaari, track on Kulsi river.

Fig. 3 Tracklogs on the DCN sites of Brahmaputra, Subansiri and Kulsi rivers alongwith the sighting waypoints

3. Encounter rate: The total encounter rate for the month of June, 2014 was 0.85 dolphin/km (SE= 0.12) and for the month of July, 2014 was 0.98 dolphin/km (SE= 0.22). The highest encounter rate was estimated for DCN site Khabolu (4.13dolphins/km, SE= 0.13), lowest (0.33dolphin/km) for Chunari and no dolphins were encountered in Bhumuraguri, Roha, Sualkuchi and Dhubri in the month of June (Table 7). In the month of July highest encounter rate (3.40 dolphins/km, SE=2.48) was estimated for Dichangmukh, lowest was estimated for Dihingmukh (0.17 dolphin/km) and no dolphins were encountered in Akland ghat and Bhumuraguri (Table 7). However, in the month of June, the highest encounter rate (1.07 dolphins/km, SE=0.19) was estimated for the 2nd day effort, i.e. 8th June and in the month of July, the highest encounter rate (1.16 dolphins/km, SE=0.21) was estimated for the 1st day effort, i.e., 13th of July (Fig. 4).

Table 7. Site wise Encounter rate of Ganges dolphins for the month of June and July, 2014.

DCN sites	Encounter rate for the month of Jun. 2014		Encounter rate for the month of Jul. 2014	
	Average Encounter Rate	Standard Error	Average Encounter Rate	Standard Error
Mirichapori	1.64	0.30	_____	_____
Guijaan	1.06	_____	_____	_____
Akland Ghat	0.22	0.03	0	_____
Bogibeel	0.22	_____	0.00	_____
Dihingmukh	0.24	0.05	0.17	_____
Dichangmukh	3.31	0.24	3.40	2.48
Dikhowmukh	0.54	0.21	1.14	1.14
Bishwanath Ghat	1.34	_____	0.42	0.42
Bhumuraguri	0	0	0	0
Dhanshreemukh	0.27	0.16	0.24	0.24
Roha	0	_____	0.67	_____
Kuruwa	0.53	0	0	_____
Sualkuchi	0	_____	0	_____
Pahumara	1.72	0	1.08	0.26
Baghbor	1.32	0	0	_____
Bohori	0.48	0.08	0	_____
Goalpara	0.78	0.11	0.68	0.68
Chunari	0.03	0.03	_____	_____
Jogighopa	1.01	0	_____	_____
Dhubri	0	0	_____	_____
Khabolu	4.13	0.13	_____	_____
Dikhrongmukh	0.77	0.38	_____	_____
Kukurmara	0.92	_____	_____	_____
Chammariya	0.49	0.16	_____	_____
Maalibaari	0.18	0.00	_____	_____

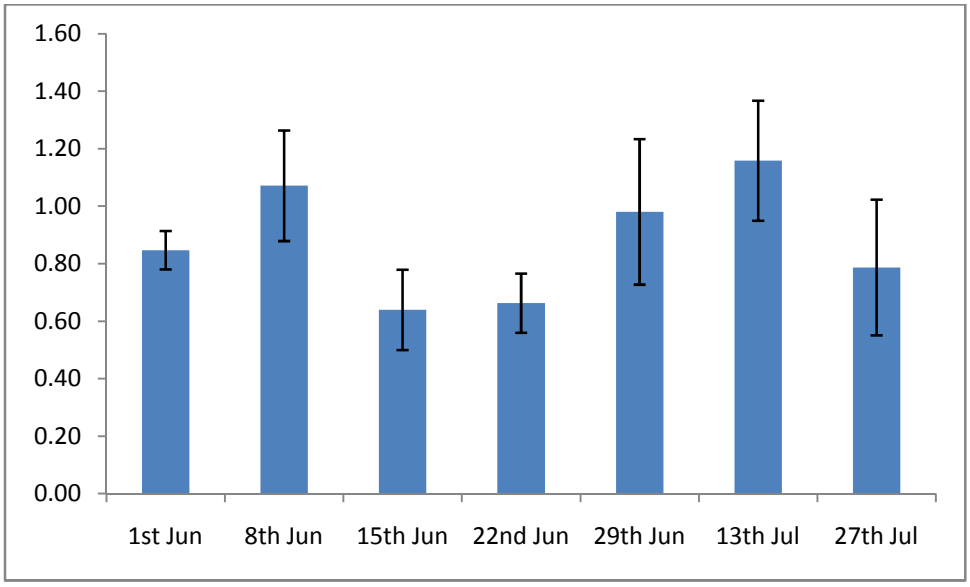


Fig. 4 Encounter rate for each day survey effort

4. Abundance estimation with Mark- recapture method:

For the month of June, 2014, the highest abundance was estimated for 8th June (52 dolphins, SE=2) with a total transect effort of 23.28km and lowest on 22nd June (27 dolphins, SE=3) with a low transect effort (Table 8). In the month of July 2014, highest estimate was for 13th July (31 dolphins, SE=3) with a transect effort of 12km (Table 8). The DCN sites participated in the mark- recapture method with their total effort is shown in table 9.

Table 8. Mark- recapture abundance estimate for each day survey effort

Day effort	Transect effort	Estimate	SE	95% CI_ Upper Limit	95% CI_ Lower Limit	Detection probability	SE
1st Jun	20.2	43	3	40	54	0.69	0.07
8th Jun	23.28	52	2	50	61	0.76	0.05
15th Jun	25.2	34	3	32	44	0.7	0.08
22nd Jun	19.34	27	3	25	38	0.65	0.09
29th Jun	20.4	28	1	28	36	0.83	0.06
13th Jul	12	31	3	28	43	0.64	0.09
27th Jul	14.4	13	1	13	22	0.75	0.11

The survey effort from all the DCN sites participated in the monitoring, were not considered in this particular analysis since the list mentioned in table 9 followed independent observer mark-recapture method and the rest followed only single observer method. Also, since only the counts

were utilised for the analysis and not the effort, the sites without sighting were also not included in the list.

Table 9. DCN sites participated in Mark- recapture with the total transect effort used for abundance estimation

DCN site	1st Jun	8th Jun	15th Jun	22nd Jun	29th Jun	13th Jul	27th Jul
Akland	---	---	---	3.3	3.5	---	---
Dihingmukh	1.2	---	3.3	---	3	3	---
Dichangmukh	2.34	2.1	3.1	3.5	3.3	3.1	3
Dikhowmukh	1.1	---	3.9	4.14	---	1.3	---
Khabolu	1.96	1.79	---	---	---	---	---
Kuruwa	3	3	3	---	---	---	---
Pahumara	3	3.1	3	3	3	3	---
Bohori	3	3	2.2	---	---	---	---
Baghbor	2.5	1.65	---	2.4	2.4	2.4	2.4
Jogighopa	2.1	2.24	1.8	---	---	---	---
Chammariya	---	3.1	---	---	---	---	---
Jiyadhanshiri	---	3.3	---	---	3	---	3
Dikrongmukh	---	---	2.5	---	---	---	---
Maalibari	---	---	2.4	---	---	---	---
Chunari	---	---	---	3	---	---	---
Goalpara	---	---	---	---	2.2	2.2	---

5. Habitat Assessment:

Highest percentage of dolphins were counted on the confluences and downstream mid- channel Island combined (46.96%), since these two channel types has similar kind of hydro- morphology and lowest in meanders (6.09%) (Fig. 8). Percentage of occurrence of meanders was also, however, low in transects followed by the DCN members. However, in chi- square test performed, we didn't found any significant difference between the percentages of dolphins seen in different habitats ($p>0.05$).

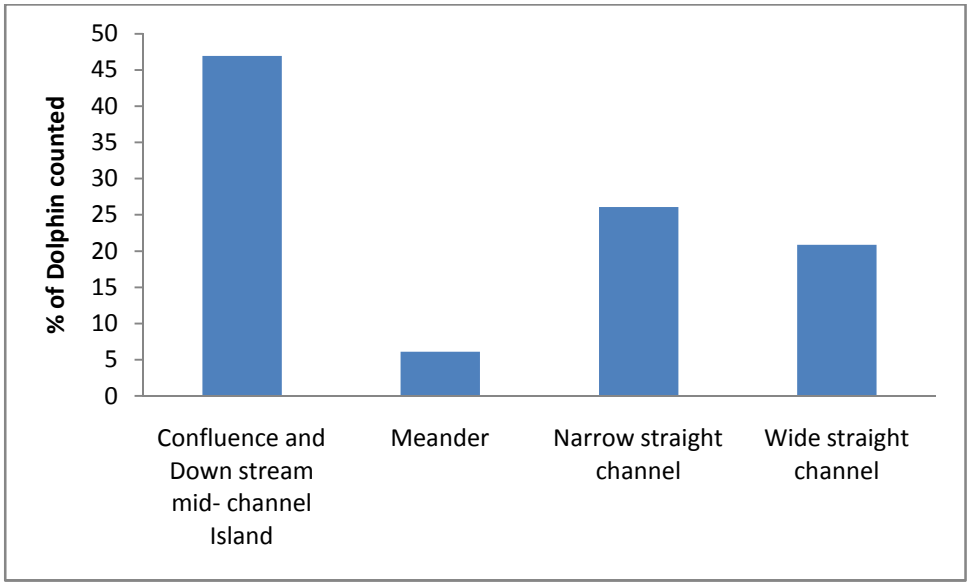


Fig. 8 Percentage of dolphin count estimated from different habitat types

Highest percentage of dolphins (49.13%) was counted in areas with cultivated lands in the riparian zone which was also, the riparian type found in abundant in the river banks of Brahmaputra and its tributaries (Fig.9). Chi- square test shows no significant difference in percentage of dolphin counted and different riparian type ($p>0.05$).

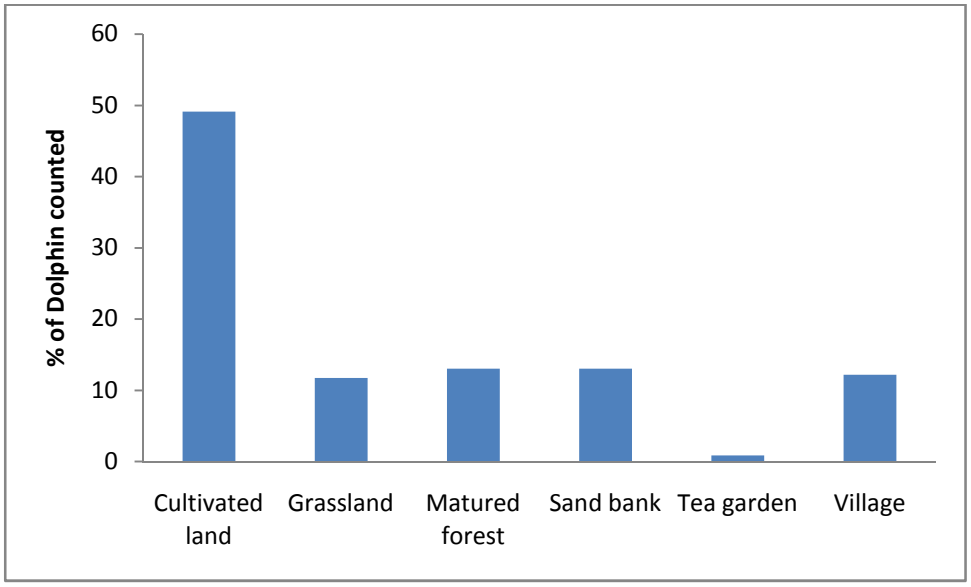


Fig. 9 Percentage of dolphin count estimated from different riparian types

Highest percentage of dolphins were counted from the parts of river with channel width from <100 to 500m (50.46%) and consequently decreases with increasing channel width (Fig.10). This is probably because the observer detection probability also decreases with the increasing distance.

However, no significant difference ($p>0.05$) was observed between the percentage of dolphins counted and different channel types with Chi- square test

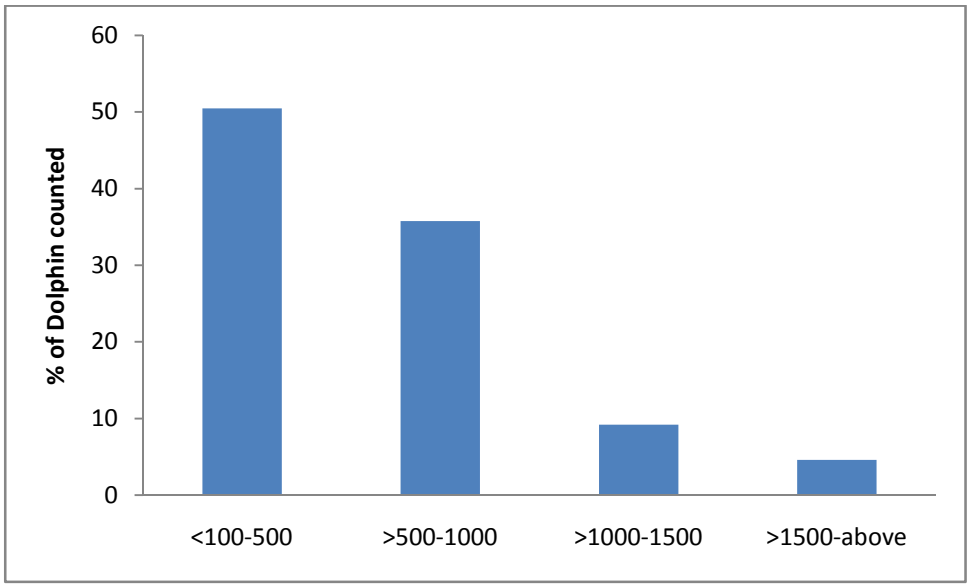


Fig.10 Percentage of dolphin count estimated from different channel widths

6. Threat assessment:

A chi- square test for the presence of dolphins and presence or absence of anthropogenic activities shows a significant relation. The stretches with higher anthropogenic activities were recorded with fewer dolphins (Table 10).

Table 10. Test of significance for the presence of dolphin with the presence of absence of anthropogenic activities.

	Gillnet	Mosquito net	Lift net	Cast net	Hook	Ferry *ghat*	Ferry crossing	Fishing boats	Sand mining boats	Irrigation pumps
Chi-Square	454.00	531.72	828.41	608.55	826.14	687.52	728.89	1034.89	876.67	187.32
df	3	3	6	4	6	4	5	11	5	1
Asymp. Sig.	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Frequencies of different anthropogenic activities couldn't be estimated with these data since

Recommendations

Since this was the initial stage of the DCN members performing Ganges dolphin population monitoring in the Brahmaputra river system with a newly developed methodology, few recommendations need to be imposed to the entire monitoring system. Since in the results we have observed that the transect effort is not equal in all the monitoring efforts, therefore:

1. It will be utterly important to maintain similar temporal and spatial monitoring effort in all the DCN sites: In a place like Assam where the climatic condition, geomorphology changes very frequently, e.g. if we consider Brahmaputra river from Assam- arunachanl border to india- Bangladesh border, it very diverse. To maintain a uniform effort is hence, is a difficult task, however, we can minimize these inconsistencies by maintaining the monitoring time and transect length upto the maximum extent.
2. Imposing mark- recapture method to the entire DCN sites is important: A uniform method of monitoring wildlife is very much essential to be maintained, since this will help us in comparing the population status of an animal in its entire distributional range. This will also help us to estimate the actual population with extrapolation.
3. A workshop on field data entry is an immediate requirement, since with this session data the habitat and threat assessment portion remain unfinished: In our previous training, the DCN members were trained for data entry in data sheets with a demo model of the original field. However, on the real field the basic requirement of the observer cum data recorder is that he/ she should very swift, since in just few seconds the observer has to detect the animal, size, time, GPS location, sighting distance, habitat type etc. and has to record every details in the data sheet. The perfectness will require more training and will develop with time. Regular workshops will help the data recorder to refresh and keep them alert what and when to record.
4. We have also observed improper data recording on the GPS recorder on the field, which needs a short term workshop for field equipments handling.

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