

2nd Progress Report, February, 2013

Project: Understanding populations of Ganges River dolphins *Platanista gangetica* in Nepal and initiating local efforts to conserve remaining population

Location: Nepal

Principal Investigator: Mr. Shambhu Paudel

Email: oasis.excurrent@gmail.com

BACKGROUND

Ganges River dolphins *Platanista gangetica* have been studied in many areas; however, less is known about upstream populations and their habitat in Nepal. Once distributed within the four river systems of Nepal, they may now be found only in the Karnali and Sapta Kosi river. These small populations may go extinct in the near future unless effective conservation initiatives are started. Current information is needed to develop an informed action plan for its conservation in Nepal. Thus, this study will assess the status and habitat condition of the species in Nepal and raise awareness among local people about their conservation.

Objectives of the study:

1. To identify the population status along Nepalese waterways (four major river system where dolphins were noted once)
2. To understand the character of available habitat (depth and width of river, disturbance, habitat types and riparian types) in the river systems
3. To identify the possible livelihoods alternatives for the river dependent community (fisherman)
4. To raise awareness among local residents living near to the river system and increase their participation in conserving dolphins and their habitat

Significance of the project:

Once dolphins were recorded in four major river systems (Karnali, Narayani, Mahakali and Koshi) of Nepal but now, only two river systems (Karnali and Koshi) harbour this magnificent species. Lack of detail information on the current situation of this species contributed indirectly to its potential extinction. Thus, it is imperative to better understand its population status and habitat character, as well as the threats it faces and socio economic status of fisherman living near to these river systems, to develop comprehensive conservation action plan specifically. Paudel (2012) reported that Ganges River dolphins in Nepal will be the first to disappear from their range if the existing scenario continues and no conservation initiatives are started. He further mentioned that lack of interest from concerned authorities and few systematic investigations are major impediments to conserving the species.

Deliverables of the project will be useful for field-level conservation planning of dolphin population and its prime habitat for conservation organizations in Nepal. Department of National Park and Wildlife Conservation, responsible government body for wildlife conservation, and other its partner organizations like WWF/Nepal, NTNC and IUCN will use the information for conservation initiatives. Importantly, information reported by this project will act as touchstone for the preparation of a Dolphin Conservation Action Plan in Nepal. Importantly, project will initiate the co-operation between local concerned conservation government organizations of India/Nepal (local parks official of Nepal and India) at boundary by involving the active role of local conservation CBOs. This is very crucial to update the downstream population of dolphins below Nepal/India boarder (for example in Karnali segment of the project) and hence, for the conservation action.

Project activities:

1. *Conservation research and management*
 - 1.1 Population estimation
 - 1.2 Habitat assessment
 - 1.3 Nepal-India Trans-boundary Initiative

2. *Community education and capacity building*
- 2.1 Fisherman survey
- 2.2 Group discussion
- 2.3 School teaching program
- 2.4 Stakeholder consultation

Expected output:

Conservation research and management

1. Population status of Ganges River dolphins known in Nepalese water ways with their probability of detection and occupancy of habitat
2. Characteristics of available habitats known in each river systems
3. Prime habitats that are urgently needed to preserve
4. Factors responsible for the presence/absence of dolphins in river systems

Community education and capacity building

1. Level of supports for conservation efforts from the local residents living within the 1Km distance from the bank of major river where dolphins were noted will be increased
2. Resource competition between dolphins and fisherman will be reduced
3. Best alternatives of livelihoods for river dependents will be documented

CURRENT PROJECT STATUS

S.N	Objective	Action	Status	Brief note
1	<i>Conservation research and management</i>			
1.1	Population estimation	Post Monsoon	Completed	
1.2	Habitat assessment	Post Monsoon	Completed	
1.3	Trans-boundary initiatives		Completed	
1.4	Hot spot identification		Completed	
2	<i>Community education and capacity building</i>			
2.1	Fisherman survey		Completed	
2.2	Group discussion (river dependents community)		Completed	
2.3	School teaching program		Completed	
2.4	Stakeholder consultation		Completed	
2.5	Poster Publication		Completed	

TO DATE RESULTS AND ANALYSIS

POPULATION ESTIMATION AND HABITAT CHARACTER

Post monsoon estimation:

All total 16 dolphins (maximum) were counted in two major river systems, Sapt Koshi (SK) and Karnali (K) river systems of Nepal. No dolphins were recorded in other Mahakali and Narayani river systems of Nepal. Within the span of 27 Km (consisting K2 and K3 segment only) of Karnali River, seven dolphins were sighted, which is very close to the Nepal/India boundary or downstream from the Chisapani Bridge.

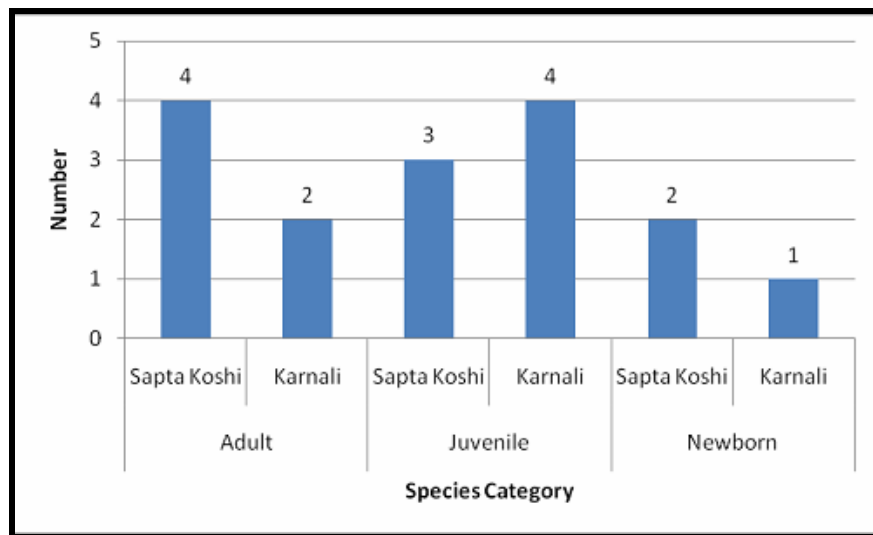
Karnali Population Records							Remarks
SN	Segment	Distance	Replication		Maximum Count/Segment	Density/Segment	
			First	Second			
1	K1	14.5	0	0	0	0	
2	K2	17	2	1	2	1/8.5 Km	
3	K3	15	5	5	5	1/3Km	

Dolphin in Sapta Koshi sighted only downstream of the Koshi barrage, which covers about 6.3 Km in length from the barrage. Within this short span, nine dolphins were sighted which is very good status compare to others distribution region in Nepal.

Sapta Koshi Population Records							Remarks
SN	Segment	Distance	Replication		Maximum	Density/Segment	
			First	Second			
1	SK1	24.62	0	0	0	0	
2	SK2	14.94	0	0	0	0	
3	SK3	19.33	0	0	0	0	Reserve Area
4	SK4	19	0	0	0	0	
5	SK5	5	0	0	0	0	
6	SK6	6.3	7	9	9	3/ 2Km	Below Koshi Barrage

Dolphin Categories:

Considering species categories, large numbers of adult and new born populations were recorded in Sapta Koshi in comparison to the Karnali. Numbers of adult and newborn recorded in Sapta Koshi were 4 and 2 respectively.



Hot Spot/Major Sighting places:

Following locations were identified as hot spot for the Karnali river systems:

<i>River System:</i>	KARNALI			
SN	District	VDC	Frequently Sighting Location	Remarks
1	Kailali	Durghauli	Thaharneeya Ghat	
2	Bardiya	Rajapur	Tigraghat	
3	Kailali	Tikapur NP	Sunkati Ghat	
4	Bardiya	Dhaulatpur	Dhaulatpur Ghat	
5	Kailali	Narayanpur	Rajapur Ghat (sati ghat)	
6	Kailali	Dhansinpur	Rajapur Bridge Area	
7	Kailali	Dhansinpur	Srilanka Village	
8	Kailali	Dhansinpur	Nepal/India Boarder; Mohana and Karnali confluence area	

Almost all the area below the Sapta Koshi barrage was most potential site for the detection of dolphins. Therefore, it is considered that downstream from the barrage area are major hot spot area for the Ganges river dolphin sighting. Major hot spot area of Sapta koshi river systems for dolphin sightings:

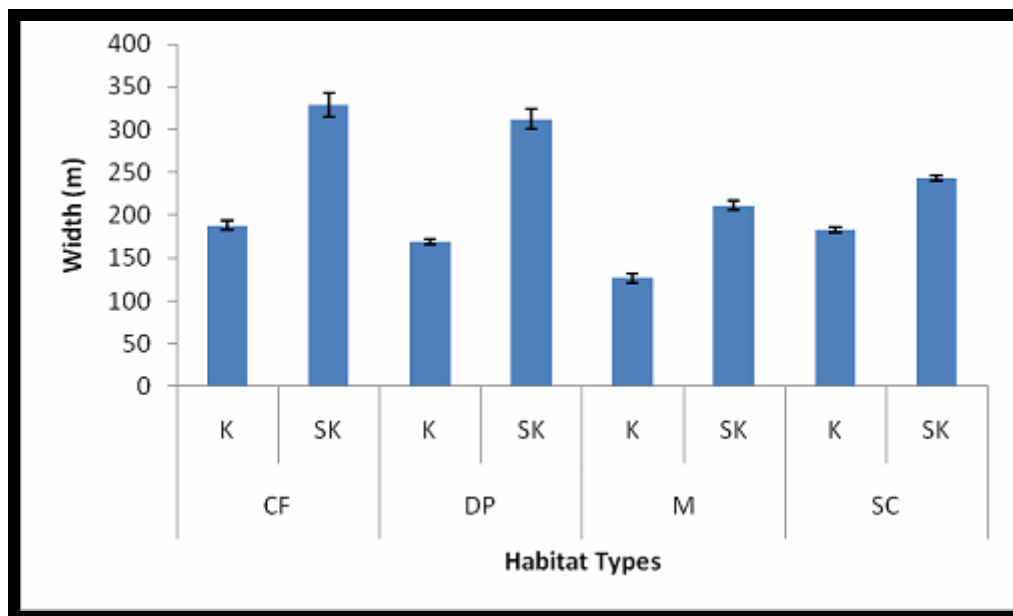
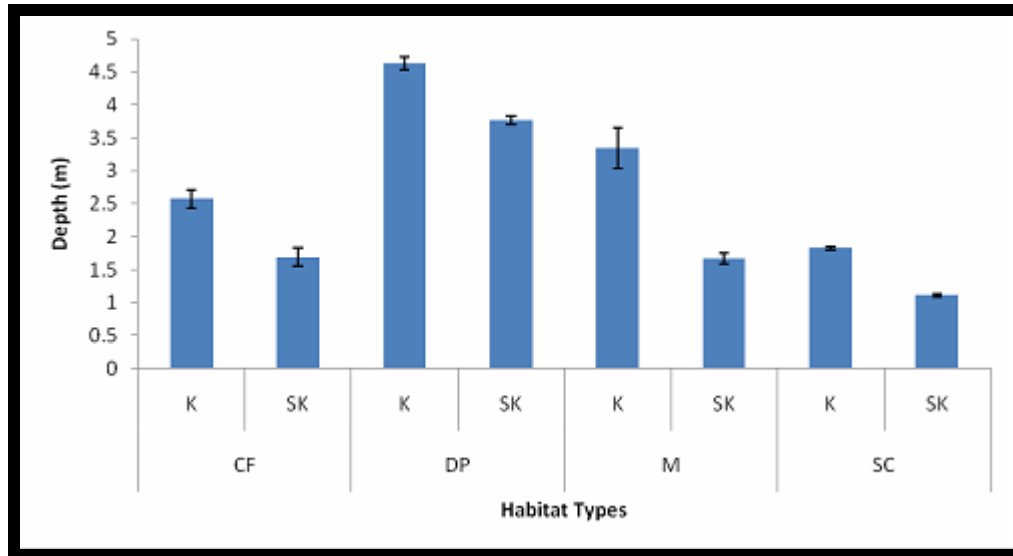
<i>River System:</i>	SAPTA KOSHI			
SN	District	VDC	Frequently Sighting Location	Remarks
1	Saptari	Gobargadha	Koshi Barrage Area	
2	Sapari	Gobargadha	Whole 7 Km area of Gobargadha area (cover whole downstream area from	

Habitat Characteristics:

Mean Depth of Karnali River system is greater than Sapta Koshi, which is 2.577 m. Specifically; maximum depth was recorded for DP (4.62m) than it was followed by M, CF and SC habitat respectively in Karnali. Very less depth was recorded for SC habitat category for both river systems (see below).

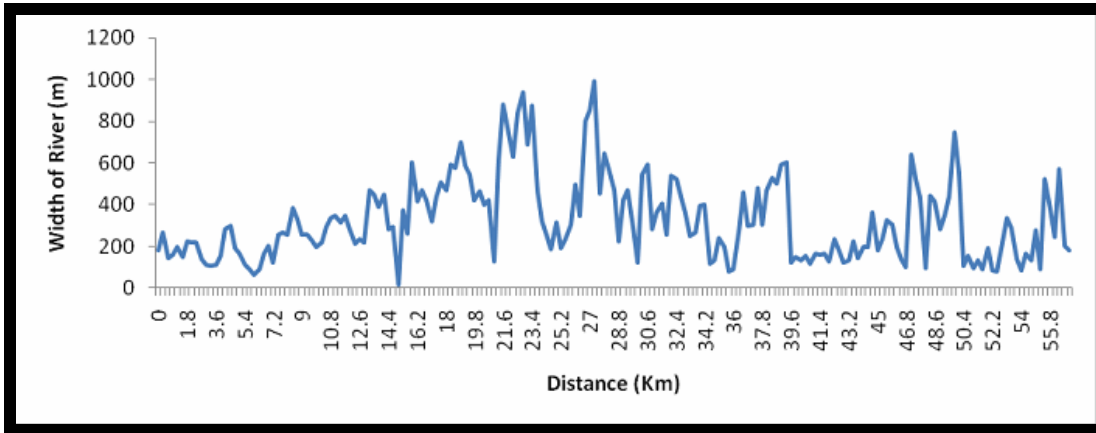
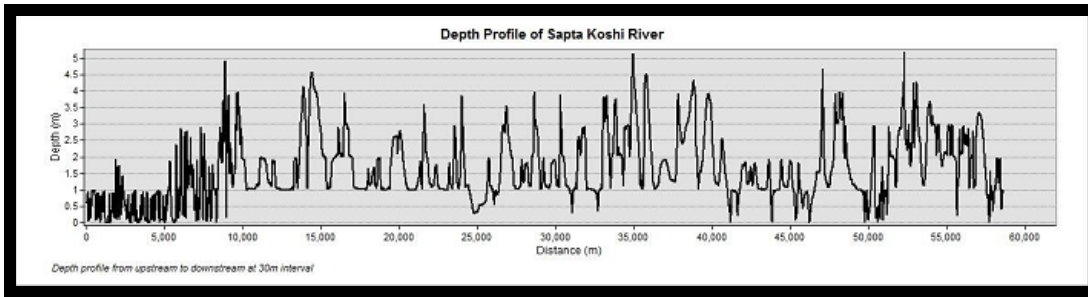
But the mean width of Sapta Koshi was greater than the Karnali, which is 250.70m. For each category of habitat, width is also greater in Sapta Koshi than Karnali.

Habitat Types	River System	Depth	(m)	Width	(m)
		Mean	SE	Mean	SE
CF	K	2.57976	0.137087	187.88	5.548045
	SK	1.689898	0.139554	328.5862	13.43038
DP	K	4.626954	0.098142	168.8462	3.36822
	SK	3.765586	0.06005	312.2554	11.38255
M	K	3.343314	0.311111	126.5374	5.100388
	SK	1.670382	0.087832	211.6123	5.276026
SC	K	1.829019	0.023799	182.9349	2.409064
	SK	1.114348	0.02055	243.4489	3.536928

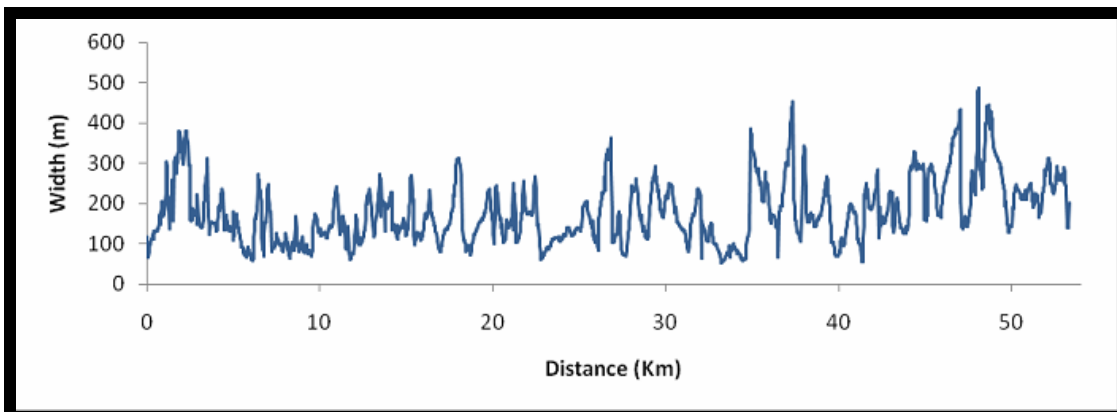
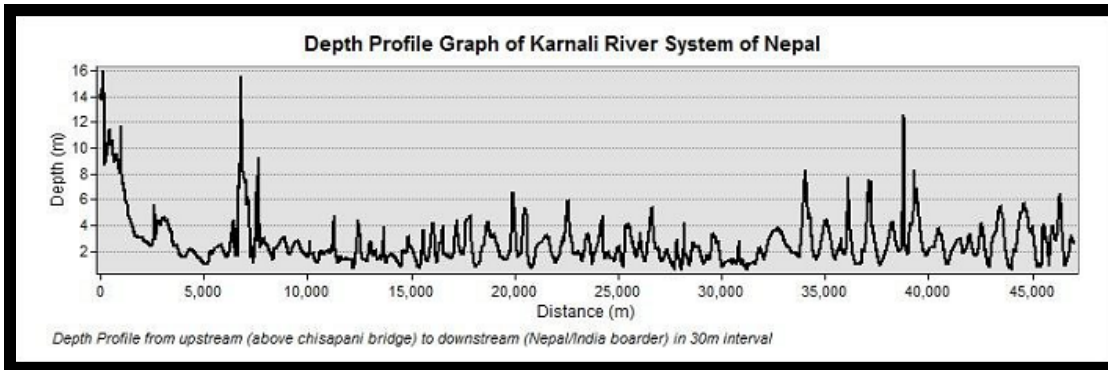


WIDTH AND DEPTH PROFILE OF THE SAPTA KOSHI AND KARNALI RIVER SYSTEMS:

Koshi River: Variation of the important factors, affecting dolphin distribution and abundance, namely width and depth of the river segment was assessed using coefficient of variation (COV) for primary investigation. COV for the depth and width of the river was 81% and 50% respectively. From this it is clear that width and depth of the river is highly fluctuating and, therefore habitat is very fragmented.

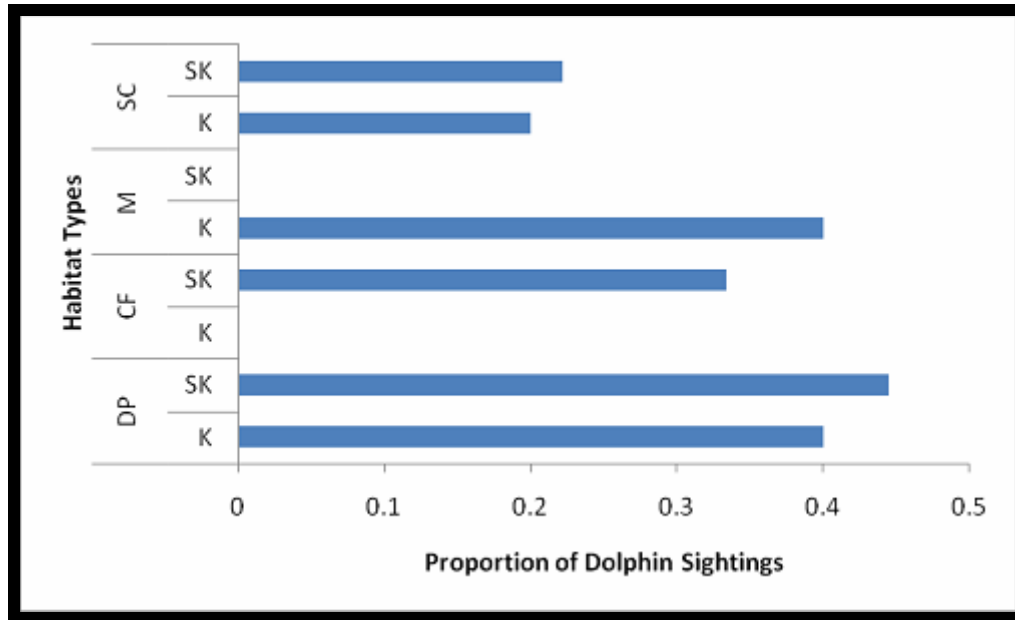


Karnali river: COV for the depth and width of the Karnali River systems were 69% and 43 % respectively. This variation is less than Sapta Koshi river systems; however still indicate the significant variation on the depth and width of the river system.



Sightings According to habitat types:

Large number of sighting was made on DP habitat on both river systems, which is flowed by M, CF and SC respectively. No dolphins were detected in CF in Karnali and for Sapta koshi, no dolphins sighted in M habitat type.



Disturbances:

Karnali:

Near chhisapani bridge in Karnali, large number of machines were used for the extraction of sand particles. Dolphins were sighted in ghat area, where people used to cross the river using engine or large wooden boat. Interestingly, disturbances of people do not affect the presence or absence of these animals in river systems, but fishing activities can affect its presence and abundance along the river. Irrigation intake in Chisapani Bridge can affect this small population during low water season, when water depth is very low.

Sapta Koshi:

Fishing activities are major problem in the Sapta koshi river systems. Koshi barrage area is very important area for dolphin presence, but unfortunately this area is affected by the illegal fishing activities. There is high overlapped between dolphin and fisheries around barrage area. Dolphin movement affected by the barrage structures in Sapta Koshi. Only during monsoon period, dolphins can migrate upstream (at that time water level will increased and that favor dolphin migration upward). Therefore, specific conservation strategy is required for Sapta Koshi area.

List of disturbances in river systems of study area:

SN	Disturbances	River Systems (Frequency) Sapta		Remarks
		Koshi	Karnali	
1	Large Bridge	2	3	In Sapta Koshi- Koshi Barrage and Chatara bridge; Karnali- Chisapani bridge, rajapur bridge and Khagraula bridge)
2	Large Irrigation Intake		1	Near Chisapani bridge
3	Extraction of sand by large machines		15	
4	Ghat (local transportation area across river)	4	11	Use of large excavator for extraction
5	Water Diversion Cannel		2	For cultivation practices
6	Fishing Boat	10	2	For fishing activities
7	Human Activities	17	2	Swimming, bathing etc.

FISHERMAN SURVEY BRIEF DATA ANALYSIS

A total of 163 interviews were carried out to fishermen who fish in the upstream water of three rivers of Nepal, 34% of the respondent's fish in the Karnali River, 37% in the Narayani and 29% in the Sapta Koshi. Respondents lived in four different districts (Bardiya, Nawalparasi, Saptari, Sunsari) and 45 villages. Of the thirteen castes the fishermen belonged, a few of them were most abundant: 87% of the Karnali fishermen belonged to Sonaha cast, 45% in the Narayani river were Botes, followed by 23% of Chaudharies, and in Sapta Koshi river 94% belonged to Malha cast.

The age of the respondents ranged from 16 to 94, mainly dominated by men but with a 13% of women engaged in fishing too. Education status is low in general, where 70% of the responded were illiterate, 23% with primary, 7% secondary education and one of the respondents with higher education. Almost all respondents (94%) lived in their villages permanently and 70% of they had been living in the same village for the last 50 years.

Fishing is for most a family profession and in 78% of cases their fathers have already been fishermen. For almost 80% fishing was the main activity and more than 50% had been fishing for more than 40 years, since 88% started fishing before the age of 15. Of all the fishermen interviewed 37% of them had stopped fishing and the main reason (44%) was because his/her boat was no more available for fishing. However, none of the respondents thought it would be a good job for their children. 35% of them think that to have a private firm could be the best job for their children followed by 31% who think that working for the government is the best option, and 12% think it is also a good option working for a NGO.

Important Fisherman variables	Mean	SE	Remarks
Days per week fishing	4.82	0.16	
Preferred time to fish	14.83	0.27	24 hours format
Hours fishing winter	3.6	0.09	
Hours fishing summer	5.68	0.23	
Mean time fishing	4.14	0.15	
Number of Months fishing	3.33	0.14	
People involved	4.72	0.46	
Upstream distance movement for fishing	2.85	0.13	In Km
Downstream distance movement for	2.54	0.19	In Km
Mean travel to fish	5.4	0.29	
Mesh size	1.78	0.16	In cm
Net length	64.42	6.67	In m
Net width	4.55	0.35	In m
Years using that gear	18.89	0.49	
Mesh before	1.35	0.11	In cm
Mesh after	0.95	0.13	In cm
Monthly earning	63.28	2.49	In US dollar

Fishing is an activity in which most of fishermen spend much of their time. More than half fish at least 6 days per week but, however, 20% of fishermen fish only one or two days per week, 70% of them belong to those fishermen who have another job or occupation. The preferred time to fish was the afternoon for almost 90% of the respondents and the best season the one with low water level for 65% of them. The great majority of the respondents (more than 90%) for whom fishing is the main activity fish between 2 and 5 hours per day in winter (50% of them fish during around 3 hours). In summer, 70% fish between 3 and 5 hours daily (the majority around 4 hours) but 20% fish during more than 9 hours per day. 90% of fishermen whom fishing is not the only activity fish between 1 and 3 hours in winter and between 2 and 4 hours in summer.

Interviewed fishermen use three fishing gears mainly: Phekuwa jaal, Pakhure jaal and Maha jaal, each one of these used approximately by 25% of the fishermen. The remaining 25% of fishermen use other gears such as Bagaune jaal, Dadiya, Ghumauwa or Khaap jaal, Paat or Hate jaal and Tiyari jaal. Thirty-five respondents affirmed to fish more than 5 hours daily in summer (around 75% of them fished with Phekuwa jaal) but only two said to fish more than 5 hours in winter.

The net used to fish varies in length, width and mesh. Almost 60% of interviewed fishermen used nets less than 10 meters long but, some of them used intermediated lengths and 30% used long nets of more than 100 meters. Net width varies less, more than 70% use nets of around 3 to 4 meters wide and almost all used nets smaller than 12 meters wide. The more common mesh was smaller than 2 cm, used by more than 80% of the interviewed, the remainder of fishermen used nets slightly higher but no more than 7 cm.

About 60% of respondents noticed a decline of catches throughout the time and almost 40% detected a reduction in the number of boats for this reason. Mesh size of the net was changed by about 25% of fishermen in last year's but no reduction tendency was detected, typical form overexploited fisheries. Respondents usually fish in areas close to their villages. 70% travel to fish less than 5 km and almost all no more than 7-8 km. Most popular place for fishing are tributaries where half of the respondents fish uses to fish of then, then the main channel behind sandbars and islands followed by the main channel near a bank, but mid main channel was the less popular place to fish.

The majority of fishermen (65%) had their own boat and a small proportion of them (5%) had two boats. 81% of respondents' boats were "single man traditional wooden boats" and the others were "more than one modern boat". Most of the times are involved from one to three people in fishing, but occasionally may be up to 30. Monthly income is less than 100 American dollars in 95% of the respondents and less than 50 American dollars in 45% of the whole interviewed, moreover, effective number of months for fishing usually is not more than 6 for the majority. However, often fishermen have another occupation of which also receive earnings but no more than 100 American dollars in most cases (80%) and there throughout the year but more usually only for 5 or 6 months (although in the case of agriculture may be extended throughout the year).

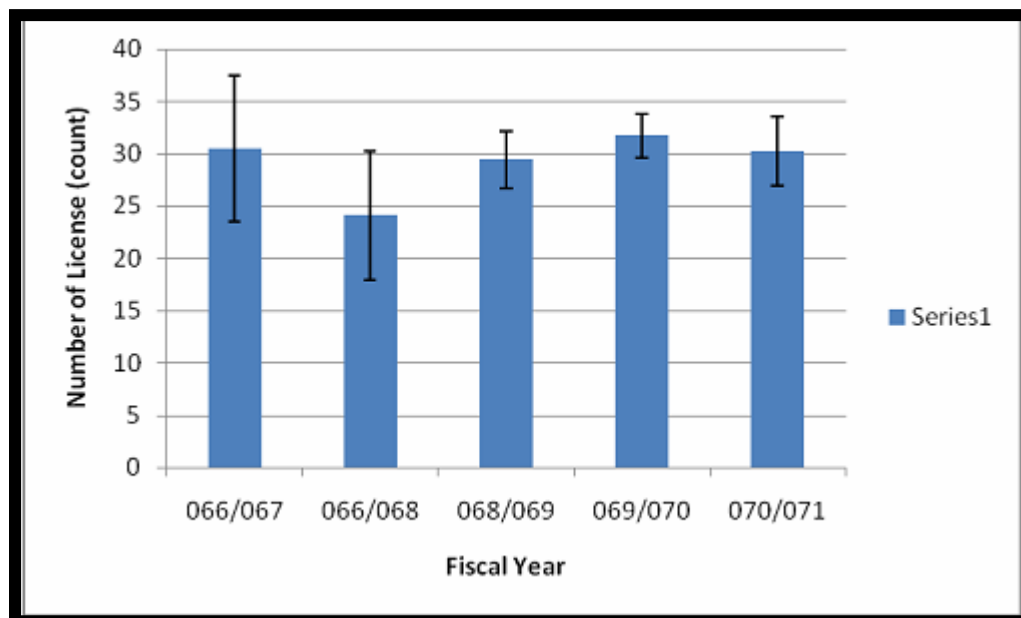
Among the fishermen who responded to if they saw dolphins often, 98% answered that currently only saw dolphins rarely but not in the past, when more than 70% sure they see dolphins often and at least 15% more said see them occasionally. Most fishermen replied they see more dolphins a particular time of year before and usually only one at a time or two but only a very few times three or more, however, in the past some fishermen sure they saw groups of up to 8 dolphins. Around 30% thought that the decrease in the number of dolphins was due to the widening of the river and presence of less water than before. Almost 70% remaining thought that was due to high human disturbances, water pollution and/or the development of structures like dam or irrigation. Dolphin sightings occur more commonly in deep areas (more than 3 meters) but occasionally in shallow waters or meandering and are typically seen close of the boats (a few meters).

Fishermen think that two main things can be done to conserve dolphins, first the awareness among the fishermen and river dependent communities and then to establish enterprise, training facilities for river dependents to perform other activities instead of fishing. However almost 60% do not have any concept on the mechanism of diversification of livelihoods of fishermen or river dependents, although more than 70% thought that can be possible the development of tourism trail along river stretch for dolphins sightings. Among them who have any concept on other livelihoods almost 40% thought that the best alternative is any job skill based training like masonry or carpentry. The 60% remaining thought best choice is to job in a micro enterprise using invasive species like water hyacinth, although they are only present close to the village of 40% of the fishermen interviewed, or engage in aquaculture in group (artificial pond).

LICENSE DISTRIBUTION BY AUTHORITIES FOR FISHING ACTIVITIES:

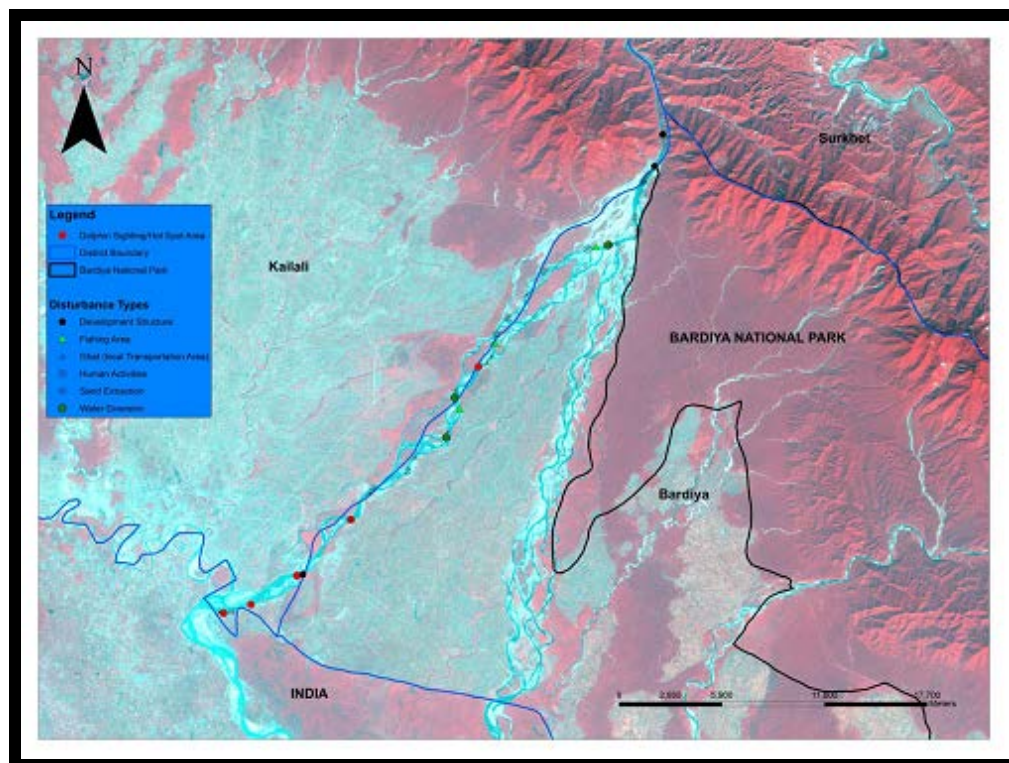
Sapta Koshi is suffering from high exploitation of resources from both local Nepali and Indian people, who depends upon water resources for their survival. Each year Koshi tappu wildlife reserve also provided license for fishing activities without any carrying capacity assessment of certain area. Unfortunately, dolphin sighted beyond the regime of reserve area, like below the Koshi barrage area, which are threats by imminent pressure from local people.

In Karnali main stream there is no any prominent pressure from local people, where dolphin concentrated during low water season. But in Mohana, tributary of Karnali where dolphin sighted during only monsoon period, district development committee issue license for fishing activities. Therefore, Mohana is also suffering from high exploitation of resources throughout the year. Bardiya National park do not issued license due to risk of poaching and other possible threats from local people.

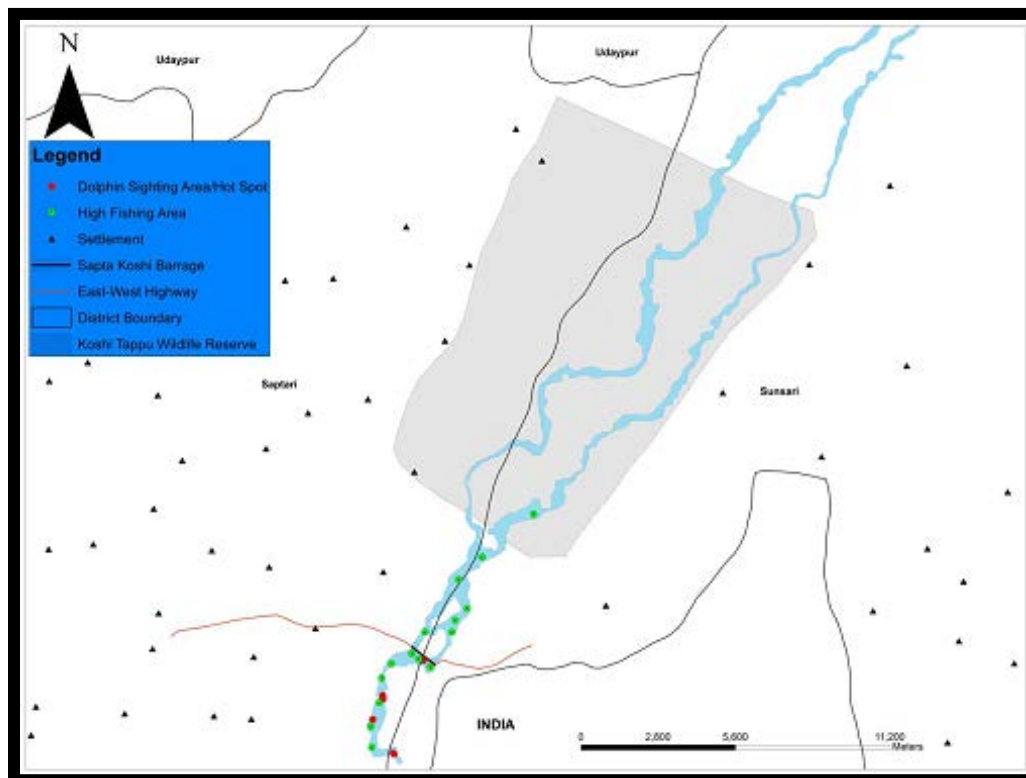


SIGHTINGS AND DISTURBANCE MAPPING

Karnali River System Mapping



Sapta Koshi River System Mapping



SCHOOL TEACHING/AWARENESS CAMPS AND GROUP DISCUSSION

SN	River System	Location	No of School	No of Students	Remarks
1	Sapta Koshi	Upstream	4	320	
2	Sapta Koshi	Downstream	4	420	
3	Karnali	Rajapur	2	120	
4	Karnali	Dhansinpur	2	110	
Group and Stakeholder Discussion					
1	Sapta Koshi	Upstream			1
2	Sapta Koshi	Downstream			1
3	Karnali	Kailali-Dhansinpur			2
India-Nepal Transboundary Meeting					
1	Trans-boundary Meeting was completed with the administrative support from Baridya National Park at Bardiya, Nepal				Completed
DOLPHIN WATCH GROUP FORMATION					
1	Dolphin Watch Group	Upstream Sapta koshi	1 group formed		
2	Dolphin Watch Group	Downstream Sapta koshi	1 group formed		
3	Dolphin Watch Group	Karnali-Dhansinpur/Dhungana tole	1 group formed		

EVALUATION AND CONCLUSION

Conservation Research and Management projects

Population status of Ganges river dolphin is very low in Nepal and is projected as declining population in Nepal. Highly fragmented habitat factors contributed its sparse sighting patterns and therefore conservation and management of specific habitat is imperative.

Population status in Sapta Koshi is better than Karnali. However, all population sightings in Sapta Koshi are below the Koshi barrage. Therefore, detection of dolphins in the future will be uncertain unless conservation and management strategy of the hot spot area is started in Sapta Koshi. Also, high pressure from local people is prominent in Sapta Koshi than Karnali, where almost all ethnic groups depend upon fishing activities. Almost all hot spot area is overlapped by fisheries in Sapta Koshi. Therefore, it is urgent to reduce the pressure over river systems by providing alternatives for their livelihoods.

Average depth of river systems during low water season is very less than its required amount in all river systems. At the same time diversion of water to different purposes could be potential threats for this small population in the future. Extension of Koshi tappu wildlife reserve to the India/Nepal boundary may be feasible option to conserve this small population in Sapta Koshi.

Therefore establishment of captive breeding of this population will be better option to maintain its viable population in Nepal.

Community Education and Capacity Building projects

Local people are very much aware regarding the dolphin population, distribution, status and its threats. They are worried with its declining population, however they believe that increasing awareness level in some highly river dependent communities is imperative.

Youth are engaging in fishing activities during their early age. Therefore, livelihood program addressing the youth can reduce the pressure on river systems in future. Engaging river dependents through utilizing invasive species like waterhyacinth, pater (local species use for preparing carpet), fishing enterprise using artificial ponds and as local tourist guide for dolphin sighting will be a best alternatives for reducing pressure over river systems. Developing tourist trail along the dolphin sighting area will be needed as soon as possible for both river systems.

ANNEX- Photos

School Teaching Programs



Figure 3 Chatara Bridge across Saptakoshi (Upstream) Figure 4 Dolphin Survey Team at Saptakoshi



Figure 5 Group Discussion at Sapta Koshi Figure 6 Fishing Activities for survival in Sapta Koshi

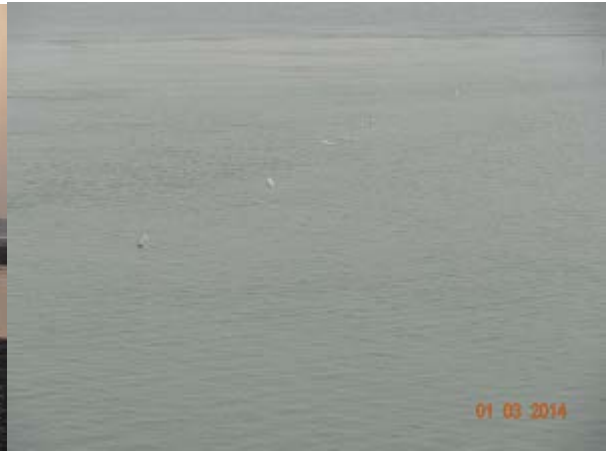


Figure 7 Great Barrier for dolphin movement: Koshi Barrage across Sapta Koshi River Figure 8 Fishing Strategy by local people near Koshi barrage



Figure 9 Local species Pater collection for preparing carpet (livelihood strategy for survival. It can be viable option for local people livelihoods) Figure 10 Group Discussion at Koshi Barrage



Figure 11 C-POD deployment near Koshi Barrage Figure 12 Water hyacinth: Option for involving local people in enterprise



Figure 13 Pater: Second option for enterprise development Figure 14 Chisapani Intake: Threats for dolphin during low water season



Figure 15 Chisapani Bridge at Karnali: Upstream distribution point of dolphin Figure 16 Chisapani Bridge



Figure 17 Preparation for dolphin survey at Karnali Figure 18 Bathing at Karnali: Disturbance for dolphin



Figure 19 Typical home of Sonaha Community along Karnali River Figure 20 Sand extraction by local people in Karnali



Figure 21 Dolphin Survey team for Karnali Figure 22 Local ghat where people used to cross one to another place



Figure 23 Sonaha residents along Karnal Figure 24 Development Structures: Rajapur Bridge. This is hot spot where dolphin frequently sighted.



Figure 25 Extremely difficult to capture dolphin sightings. Surfacing of dolphin in Karnali Figure 26 Dolphin Watch Group Member involving in awareness camp



Figure 27 Dolphin Watch Group Member with school teachers Figure 28 Celebrating wetland day



Figure 29 Dolphin watch Group (downstream Sapta Koshi) Figure 30 School Teaching Program in Karnali



Figure 31 Students Participating in Dolphin Awareness Program in Karnali Figure 32 Group/Trans boundary Meeting in Karnali River