

**Habitat Ecology and Conservation of *Lutrogale perspicillata* in Narayani River, Chitwan National Park, Nepal**

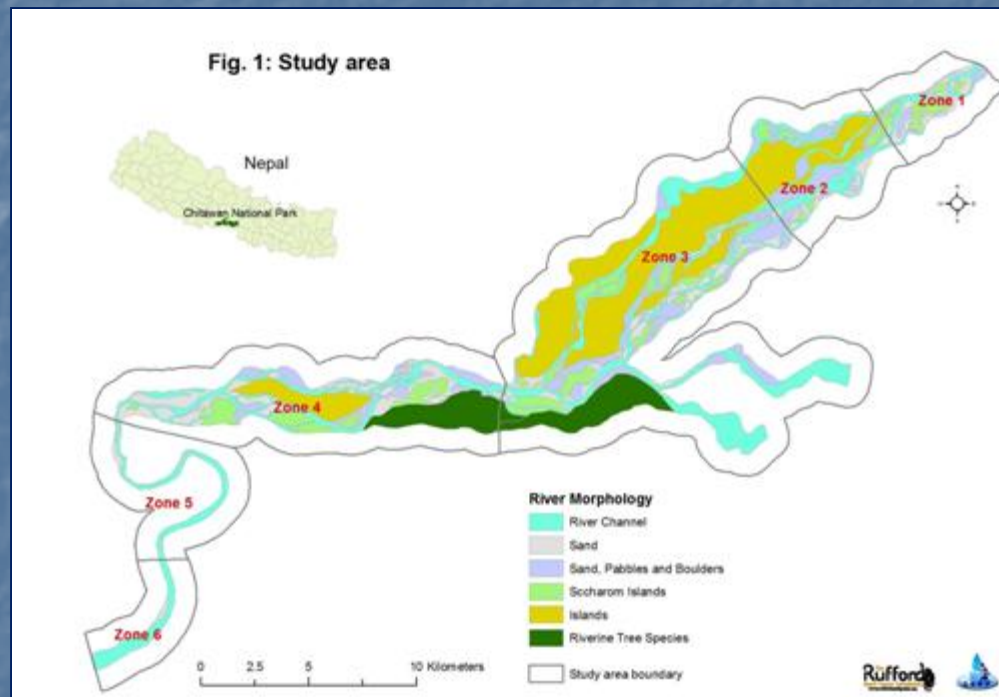


**Paras M Acharya  
Sunil L Rajbhandari**

## Introduction

- Out of 13 species of otter recorded worldwide, 2 species are recorded in Nepal: 1) Eurasian otter, *Lutra lutra*; 2) Smooth-coated otter, *Lutrogale perscipillata*.
- The common otter, *Lutra lutra* is included as Near threatened (Nt) species in the IUCN red list and in the Appendix I of CITES, Smooth coated otter, *Lutrogale perscipillata* in the IUCN Vulnerable (Vu) category and in the Appendix II of CITES.
- This study assesses the habitat ecology of *Lutrogale perscipillata* in Narayani River of Chitwan National Park.

# Study Area: Narayani River





## Methods

- Survey over 75 km stretch was conducted by canoes to assess the distribution of otters by checking 600 m stretch of river with 50 m width in every 1 or 1.5 km transect on both banks of the river. The sampling was conducted from *Sikrauli to Tribeni*.
- During the survey, the presence of otter was determined by different signs such as footprints, spraints, holts (dens), slides, and grooming sites. GPS location of otter signs was recorded. The habitat parameters such as substrate type, distance from bank, water depth, escape cover etc. were measured to know the relationship of these parameters to otter occurrence.
- Footprints were measured with a ruler, taking the greatest width, i.e. across toes one and five.
- Fishermen, nature guides, park rangers and game scouts, local communities were interviewed to generate information.
- Arc View GIS 9.0 was used to map the distribution of the otters in the park.









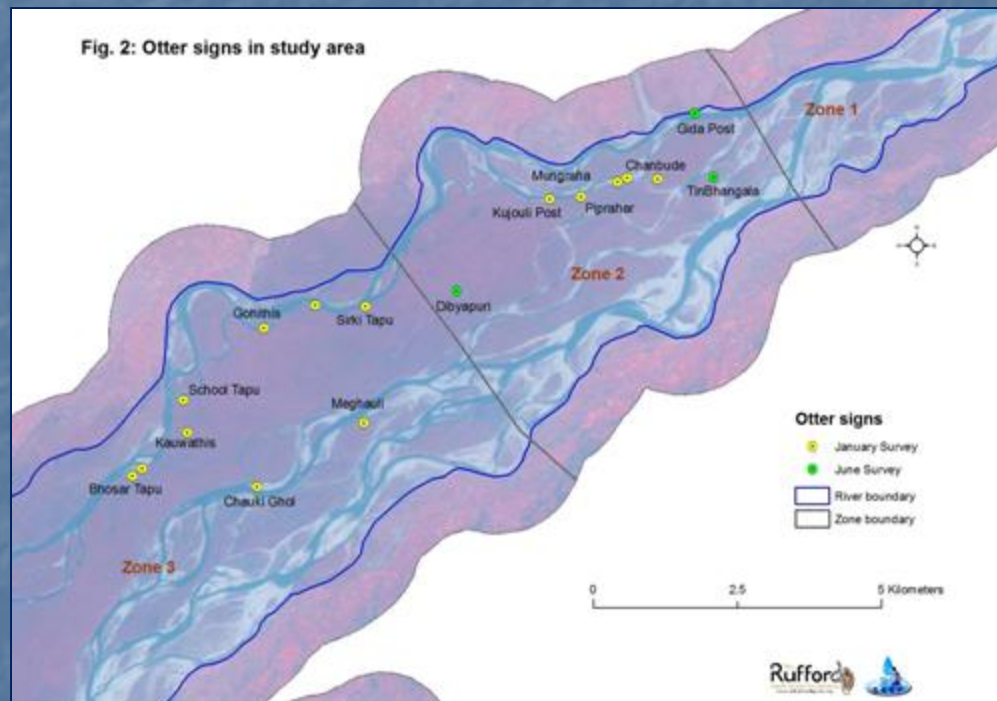


# Results

## Observation of otter signs

- The survey in January, 2009 recorded a large number of otter signs mainly tracks, scats, grooming, and resting sites in the western channel of Narayani river draining along the side of Nawalparasi district in the shallow channels with Sandy Island, muddy sand and elevated banks. Otter signs were also recorded in the eastern main channel of Narayani (Meghauri and Chauki Ghol).
- The survey in June, 2009 recorded otter signs largely tracks in shallow braided channels near Gidha , Teen Bhangala, and Dibyapuri of the channel draining along the Nawalparasi district. The tracks were mostly found on the bank within park banks adjoining the confluence of shallow channels with the main river, mud/sandy islands in between the shallow channels with dense coverage of *Saccharum spontaneum* (Figure 2).

# Location of Otter Signs





# Table 1: Tracks and habitat features recorded in January 2009

Location	Latitude	Longitude	Depth (m)	River width (m)	Substrate	Distance from Bank (m)
Meghauli	27°37'14.7"	84°12'26.3"	6.96	272	sandy	1.5
Chaukigbo	27°36'39.8"	84°11'18.4"	1.21	150	sandy	0.6
Mungaha Bhangala	27°39'32.1"	84°15'07"	2.12	22.5	muddy sand	0.6
Kujauli Post	27°39'21.0"	84°14'24.0"	1.5	45	muddy sand	0.6
Kujauli	27°39'21.8"	84°14'40.9"	0.6	39	sandy	0.9
Siki Tappu	27°38'20.6"	84°12'27.5"	1.5	36	muddy	1.5
Siki Tappu	27°38'23.8"	84°12'05.7"	1.8	36	sand	0.9
School Tappu	27°38'18.4"	84°11'23.2"	2.12	22.5	sand	0.3
Gohithis	27°37'09.5"	84°10'34.4"	0.6	36	sand	0.9
Gohithis	27°38'21.3"	84°11'55.7"	1.8	33	sand	1.2
Kaurwathis	27°36'45.2"	84°09'39.9"	1.5	45	sand	0.9
Kaurwathis	27°36'49.3"	84°10'05.9"	1.8	35	sand	1.5
Bhosarghat	27°37'27.9"	84°10'32.1"	2.12	75	sand	0.9
			1.97	65.15		0.943
			1.4	67.77		0.362

**Table 2: Tracks and habitat features recorded in June 2009**

Location	Latitude	Longitude	Depth ( m )	Substrate	Distance from Bank(m)
Teen Bhangla	27°39'24.2"	84°15'35.3"	1.2	boulder	1.5
Teen Bhangla	27°39'33.3"	84°16'07.9"	1.2	sandy	0.9
Teen Bhangla	27°39'33.9"	84°16'07.4"	0.9	sandy	0.9
Gidhapost	27°39'43.7"	84°15'36.0"	1.35	muddy sand	0.6
Gidhapost	27°39'53.7"	84°15'39.8"	0.45	sandy	0.9
Dibyapuri	27°39'30.0"	84°13'25.2"	0.9	muddy sand	1.5
Dibyapuri	27°39'29.7"	84°13'24.7"	1.5	muddy sand	0.6
Dibyapuri	27°39'30.5"	84°13'26.3"	0.45	muddy sand	0.6
			0.99 3.04		0.57 0.54

### Table 3: Measurement of tracks

Location	Latitude	Longitude	Distance from Bank (m)	Total Length (cm)	Total width (cm)
Meghauri	27°37'14.7"	84°12'26.3"	5	9.5	8
Chaukighol	27°36'39.8"	84°11'18.4"	2	9.5	7.5
Mungraha bhangala	27°39'30.3"	84°15'07.0"	2	9.5	8
Kujauri Post	27°39'21.0"	84°14'24.0"	2	7	7
Kujauri Post	27°39'21.8"	84°14'40.9"	3	11	7
Sirki Tappu	27°38'20.6"	84°12'27.5"	5	10	7
Sirki Tappu	27°38'23.8"	84°12'05.7"	4	10	8.5
Sirki Tappu	27°38'23.8"	84°12'05.7"	3	9	8
School Tappu	27°38'8.4"	84°11'23.2"	1	9	7
Gohithis	27°37'09.5"	84°10'34.4"	3	10	7
Gohithis	27°37'09.5"	84°10'34.4"	4	9	7
Kauwathis	27°36'45.2"	84°09'39.9"	1.5	8	7
Kauwathis	27°36'49.3"	84°10'05.9"	2	7	8
Bhosarghat	27°37'27.9"	84°10'32.5"	3	10	8
Bhosarghat	27°37'27.9"	84°10'32.5"	1.5	9.5	7.5
Bhosarghat	27°37'27.9"	84°10'32.5"	2	9.5	8
				9.22	7.53
				1.05	5.14

**Table 4: Scat Location and habitat features**

Location	Depth (m)	DFEW*	HFWL* (m)
Meghauli (27°37'14.7"N,84°12'26.3"E)	2.1	7.2	2.4
Chandbude (27°39'32.1"N,84°15'32.5"E)	1.8	1.8	1.3
Chirchire (27°39'30.2"N,84°15'31.4"E)	2.1	1.8	1.2
Mungraha (27°39'32.8"N,84°15'13.2"E)	2.1	5.1	2.1
Piprahar (27°39'22.2"N,84°14'44.0"E)	1.8	6.0	0.9
Kujauli Post (27°39'21.0"N,84°14'24.0"E)	1.5	2.1	0.9
Sirki Tappu (27°38'23.8"N,84°12'05.7"E)	2.4	2.4	0.9
Gohithis (27°37'09.5"N,84°10'34.4"E)	0.75	3.6	1.2
	1.82	3.75	1.36
	0.48	1.97	0.54





## Table 5: Grooming sites with habitat parameters

Location	DFW*	ECD*	Substrate
Siki Tappu (27°38'23.8"N, 84°01'09.7"E)	1.8	18	sand & mud
School Tappu (27°38'58.4N, 84°01'13.2"E)	2.1	15	sand
Gehithis (27°37'09.5"N,84°10'34.4"E)	9	1.8	sand & barren mud
Gelathis (27°37'09.5"N,84°10'34.4"E)	5.4	1.8	sand & mud
Kanuvathis (27°36'43.2"N,84°09'39.9"E)	0.9	31.5	sand
Mungraha (27°39'33.8"N 84°01'13.2"E)	7.8	7.3	sand & mud
Megharai (27°37'14.7"N, 84°12'26.5"E)	7.8	7.3	sand & mud
	4.97 3.1	6.4 14.0	

# Threats

## Fishing

- Fishing practice was rampant throughout the river basin. Chitwan National Park have provided the fishing license to fishermen living on fringe of the river to regulate fishing, human movement, and exploitation of aquatic resource and improvement of crocodile habitats.
- *Mullahs* from *Tribeni* use large nets (*Tiyarii* fishing net) to collect all the fish from the specific area which further threatens the fish assemblages, otters, and crocodiles.

## Industrial Pollution

- There is a little doubt that pollution could be the cause of otter population decline. Discharges from the Gorkha Brewery and Bhrikuti Paper and Pulp factory and Pharmaceutical and Gill Mary were the major sources of pollution in Narayani River affecting otters, crocodiles, fish and other fauna.

## Grazing

- High grazing pressure was recorded in *Gohithis*, *Badraughat*, *Ratanpur*, *Gaidakhasa and Seri*. Lacks of places for cattle grazing, inadequate awareness and inadequate patrolling have seriously disturbed the riverine habitat thereby threatening the otter populations.

## Sands and Boulder extraction

- Sand and boulder extraction was observed around the key otter habitat near Gidha Post. Such activities were also observed in between Gohigajara and Tribeni. These activities may severally affect otter habitats.





# Recommendations

- The exact spatial and temporal distribution of otters in Narayani could be obtained only through undertaking detailed research to investigate status, habitat requirements, , population size, feeding habits, breeding,
- The zone between II and III should be protected as an otter sanctuary of park through strict patrolling and monitoring by local Game Post Offices.
- Promote level of awareness to local licensed fishermen/ fishermen of crocodile project about importance and values of otter in river system.
- Community based otter group should be established in local level under the supervision of park's warden to monitor key otter habitats, and enhancing the awareness level to local communities/ buffer zone CF users, rangers, game scouts, water users about otter conservation.
- The industries located in the catchments of river e.g. Gill Mary Distillery, and Pharmaceutical Industries should follow the proper treatment process and maintain the standards and monitor the consequences of discharge to aquatic systems in consultation with Chitwan National park.
- CNP should dialogue with Valmiki Tiger reserve authorities regularly to solve the issues of river basin management and mugger crocodile and gharial conservation and poaching of wildlife.
- The CNP should make a monitoring plan to study the impact of Gandak barrage in the migration and movement of fish, dolphin, gharial, marsh crocodile and otters.

## Conclusion

- Signs of otters mainly track, scats, resting site, grooming/rolling site and holts were found in abundance along the length of Narayani within the park from *Gidha post* to *Bhosarghat* (zones II and III). The large numbers of otter signs on the sandy islands of protected bank of the river in between these two zones were due to prevalence of sandy islands, shallow water courses, woody debris, patches of islands in between the channels.
- The absence of otter signs downstream from Amaltari to Tribeni barrage may be attributed to several reasons such as stagnant condition of river, due to impact of dam, rocky cliffs and boulders on shoreline, less escape coverage and high fishing pressure. Some areas like Kathona and Vellogi in downstream reaches have few sandy islands but otter signs were not recorded due to deeper water, rocky cliffs and less escape cover. Footprints measured in different places showed larger footprint with a maximum length of 10 cm and width of 8 cm corresponds to presence of *Lutrogale perspicillata*.
- Spraints were deposited by otters on sandy banks with dense coverage of *Saccharum* and *Phragmites* spp. with an average water depth of 1.5 m . Increasing human disturbances over fishing, cattle grazing, sand and boulder extraction, industrial pollution, inadequate awareness, industrial pollution are the existing threats that need to be addressed by protected area authorities in collaboration with key stakeholders.

The researchers would like to thank The Rufford Small Grants Foundation for supporting this study

