

Status of Smooth Indian otter (*Lutra perspicillata*) and conservation of freshwater ecosystem outside protected areas of Bardia National Park in Karnali River, Nepal

Project period: March 2008- February 2009



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This project was divided into two components; awareness and research. Accordingly, this report is divided into two sections. The first one describes awareness activities carried out during the project period while the second section briefly presents the findings of the study on distribution and threats facing smooth coated otter in the project area. Detailed study report has not been presented here for space and interest of the reader. Name lists and details of participants in these activities have been omitted to produce a concise yet informative report.

Background of the project

The otters, Ganges river dolphins and gharials, at the apex of freshwater food web, are good indicator species of health status of riverine ecosystems they inhabit. Otters are semi-aquatic animals depending mainly on freshwater ecosystem for feeding and require undisturbed forest and scrub adjacent to the water for dwelling. In the entire South and Southeast Asia there is a severe conflict between otters and humans as a result of ever increasing human population and expanding agricultural fields along the riverbanks and other otter habitats that also provide water for agriculture. Along with this, a direct competition is also perceived by the fishermen between them and the otters for the fish resources of the wetlands. This ultimately leads to indiscriminate killing of otters whenever possible.

Many important habitats of smooth coated otter and other freshwater animals have also been sacrificed for economic development in the region. In the Southeast Asian countries, there does not seem to be any intentional otter trapping though it is prevalent in India, Nepal and Bangladesh. In Nepal this species is known to exist in the Koshi, Narayani, Karnali, and Mahakali River systems. Similarly Ganges river dolphins and gharials are both endangered species struggling for survival in the project area. As a result they are surviving in fragmented population in some isolated areas. Thus the project is of utmost importance under these circumstances. River sections inhabited by otters are also home to other large freshwater animals like Ganges river dolphins, crocodiles and gharials. Thus conservation of these crucial species can only be achieved through adequate awareness among through local communities in these areas.

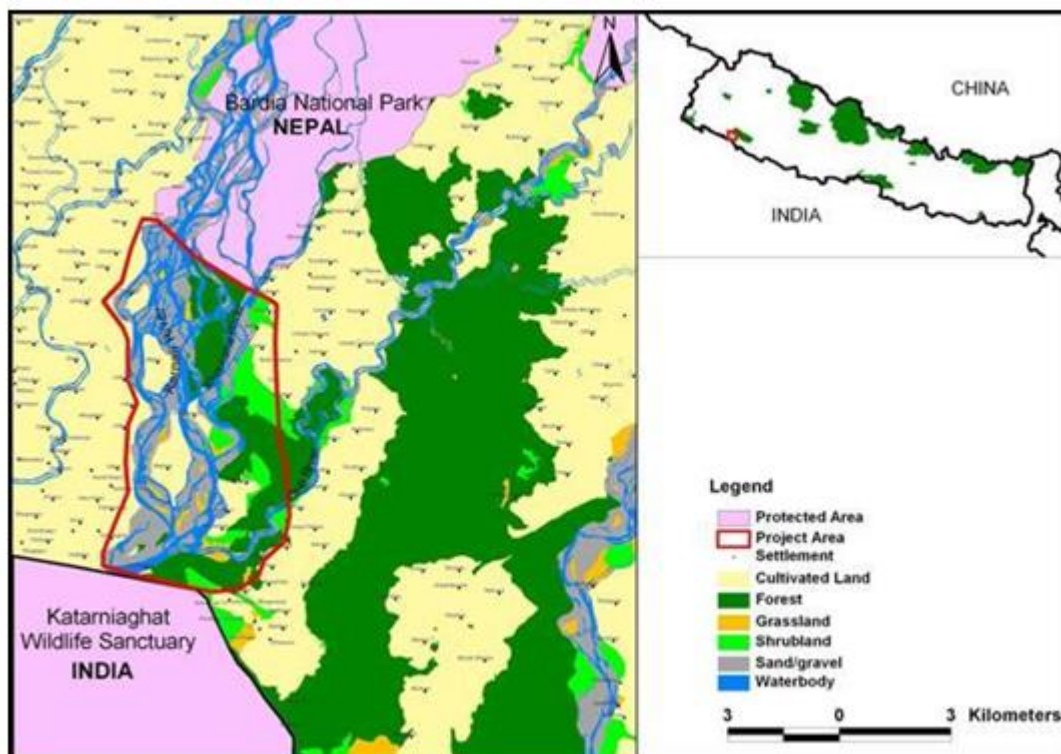
Project Area

Socio-economic perspective of Karnali River basin

The villagers inhabiting the lower Karnali basin consist of indigenous *tharus* and *sonaha*, with the *tharus* comprising the majority of inhabitants. Other communities inhabiting the area arrived after the eradication of malaria in the 1950's and have settled and deforested virtually all land along the floodplain, except areas incorporated within national park (Smith, 1993). Regarding the ethnicity of respondents in the area, surveys showed that *tharu* community (61%) dominates the entire Karnali river basin having migrated from Dang a couple of decades ago. Chettri (18%), Brahmin (13%) and other communities migrated to this area from the mid-hills after malaria eradication (Joshi, 2004).

Major Occupation of inhabitants

Regarding the occupation of respondents, the preliminary survey of study area showed that majority of the people (63%) of Karnali river basin regard agriculture as their major occupation though it may not be able to provide them sufficient food grains for the entire year. Many people (39%) regard daily wage activities to be their major occupation (Joshi, 2004).



Project area; Karnali Flood plain downstream of Bardia National Park

Objectives of the project

At a time when challenges for conservation are rising, the two major objectives of the project were:

- (i) Assessment of distribution and threats facing the smooth-coated Indian otter and
- (ii) Aquatic biodiversity conservation awareness focussing on major species like Ganges River Dolphins, crocodiles and gharials outside the protected areas in Karnali River.

Major activities to achieve the objectives

Objective (i) Direct field observations were carried out to assess distribution and threats of the otters. Details of the methodology to achieve the objective have been described in Section II of the report.

Objective (ii) Awareness was a major component of the project. This component encompassed biodiversity and conservation aspects of the freshwater ecosystem to raise awareness. This objective was achieved through local consultations, group discussions and wide involvement of students in the area. Indigenous tharu and sonaha communities who traditionally have a high dependency on the aquatic ecosystem for subsistence and livelihood inhabit the area. These communities were the target groups of awareness component of the project. School level interactions, drawing competition, poster and booklet publication, orientation and distribution of the awareness materials were the main activities carried out to achieve the objective.

Implementation modality

The project was implemented through the local community based organization (CBO), an umbrella organization of community forests; Khata Community forestry coordination committee (CFCC-Khata). This organization was set up under the initiation of Terai Arc Landscape (TAL) program, jointly implemented, by WWF Nepal and the Government of Nepal. Grantees' previous experience of working in the area along with relation with this organization was a major incentive behind implementing the project through this organization. As the organization has been working in this area for the last 6-7 years, their outreach has been utilized by the project to increase effectiveness in implementation. This resulted in a reduction in the operation cost of the project along with utilizing the local knowledge of the partners. Members of community based anti-poaching unit, which is an important part of CFCC-Khata, were also mobilized during the project to conduct surveys and also facilitate orientation and discussions sessions among school children and community members.



Part I

Awareness

Publications



As a part of awareness and orientations for conservation of freshwater ecosystem, posters were developed and printed. The poster covers major aquatic animals of the Karnali River namely dolphin, gharial and otter. It briefly describes distribution, life- history, habitat and ecology and legal status of protection of these animals by various international and national laws of Nepal. The poster also presents a list of possible actions that can be taken by local communities for conservation of these species and the freshwater ecosystem as a whole. These posters have been distributed to

eco-club members and people residing in the close proximity of the river system.

Similarly, a booklet entitled "Otters' little world" was also published in Nepali language. This booklet described the biology, habitat and ecology of otters along with illustrations. It also mentioned about the other larger animals of the aquatic ecosystem. Major threats and possible conservation measures for the freshwater ecosystem were mentioned in the booklet. This booklet was specially designed for school children and was appreciated by students of



all ages due to the information and illustrations which made it interesting.

Orientations and discussions

Orientations and discussions were held with students and local communities during various stages of the project, mainly in the later half. They were mainly planned during such periods when these programs would not disturb the regular school activities. As the project area is clustered, gathering students even beyond school hours was possible especially with the help of local community-based anti-poaching units who are active throughout the project area. Posters and recently published booklets on Otters and the freshwater ecosystem were distributed to school children and detail orientations were conducted on the subject matter and content of the booklet.



This event was carried out at 8 different locations within the project area and also included children who did not attend school. Major reasons of including “out of school” children was to generate interest for conservation among them and to share the information they have on various aspects of freshwater ecosystem as they spend more time in close proximity with the rivers fishing and as cattle herders. A total of around 300 students between the ages of 9-17 participated actively in these discussions.



They were asked to share their understanding on the freshwater ecosystem and the major species therein. The students also shared their knowledge on perceived threats to the aquatic biodiversity in the area at present and discussed their possible roles in conservation and management of the resources.

Competitions

School level competitions covering issues related to dolphins, gharials and otters were held at 3 locations where students from 7 schools around the project area participated. These competitions were in the form of quiz contest, drawing competition and essay competitions covering the local and national freshwater biodiversity issues. All these competitions were fruitful in generating ample amount of interest among the students regarding freshwater ecosystem and major animals there in. It also reflected how well the posters and booklets published and distributed prior to these competitions had been accepted by the students of the area.



Local capacity enhancement as an outcome

Community based anti-poaching units (CBAPU) are an integral part of CFCC-Khata. These units are motivated to curb illegal poaching of animals and even to control the use of poison in the surrounding river channels. They possess valuable information on status, distribution and threats facing wildlife in the area. Sighting their local level knowledge on these species and the geography of the area, members of the CBAPO were mobilized for otter surveys in the area. Members were oriented on survey techniques for otters. These people are capable of identifying spraints and footprints of otters along the riverbanks and their knowledge was complemented with scientific equipment like GPS and standardized survey techniques. Thus their involvement in otter survey has been an additional asset for their possible future involvement.



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Part II

Study report

1. Introduction

The smooth-coated otter is distributed throughout southern Asia from Indonesia, through Southeast Asia and westwards through southern China, India and Pakistan, with an isolated population in Iraq (Prater 1971, Hussain 1993, Hussain & Choudhury 1997). Its current status in the Middle East including Iraq is unconfirmed whereas its presence has been confirmed from Nepal, India, Bangladesh, Bhutan, southwest China, Myanmar, Thailand, Vietnam, Malaysia, Sumatra, Java and Borneo (Corbet & Hill 1992). This species is usually found around larger water bodies in the form of wide and deep river sections and dams favouring rocky shores and banks with vegetation (Kruuk 2006).

The smooth coated otter is one of the least studied species in Nepal. Although protected under the aquatic animal protection act, data on the smooth otter is deficient and it is one of the most threatened species in Nepal. Very few studies have been carried out on its population status, distribution and conservation threats. Some anecdotal evidences suggest that the population is declining rapidly in the country. Currently they are facing immense pressure in four fronts: degradation and loss of riparian habitat, poaching for their pelts, disturbance by human activities and their feeding behaviour brings them in direct conflict with fishermen, who see otter as the major competitor for fish catch.

2. Study area

The Karnali River system

In the western Himalayas of Nepal, a vast network of mountain streams converges to form the Karnali River Basin. Eventually converging with the Ganges River in India and emptying into the Bay of Bengal, the Karnali River meets the Gangetic plain below the gorge of Chispani, Nepal. The Karnali River basin lies between mountain ranges of Dhaulagiri and Nanda Devi, in the western part of Nepal. In the north it lies in the rain shadow of the Himalayas. The Karnali River arises from the south of Mansarovar and Rakas Lakes. The main feeder streams of the Karnali River that originate from the hills of the region are Seti and Bheri Rivers. The Seti River 202 km, in length joins Karnali in the Doti district. Similarly Bheri, 264 km in length, joins Karnali River at Kuineghat in

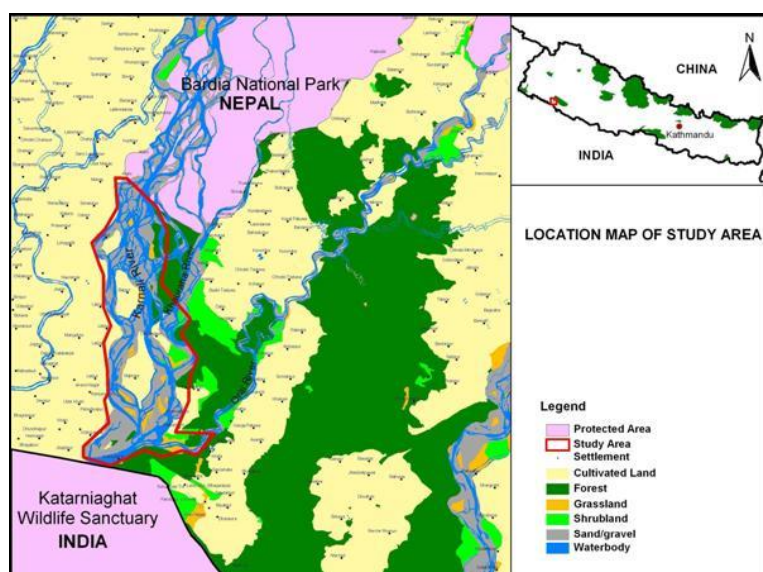
Surkhet (Shrestha 1995). It branches out into two channels near downstream of Chisapani, namely Karnali (Kauralia) in the west and Geruwa in the east. The Karnali branch on the west forms the political boundary between Bardia and Kailali district whereas the eastern branch Geruwa forms the western boundary of the Bardia National Park (BNP) but most of it remains outside the jurisdiction of the park. Both these rivers rejoin after flowing apart for 52 km to form Ghagra, 3 km upstream of the Girijapur barrage in India. The total drainage area of Karnali within Nepal is 43,000 sq. km. (Shrestha 1995).

A monthly hydrograph of the years 1962-77 shows a mean discharge of 300-400 m³/s, during the four months of the low water season, January-April. In contrast, there was a mean discharge of 1500-4200 m³/s during the four highest months of the monsoon, June-July (Gyawali, 1989). The high flow of Karnali transports and deposits large amount of sediment that form the braided alluvial channels of the basin below Chisapani. The bed materials from unstable steep cobble/sand banks create bar formations and Channel Islands that regularize the release of stream energy. The bottom of Karnali is mostly boulder-strewn at its upper reaches and sandy at the lower reaches. Its depth varies from 3-10m but in deep gorges depth varies from 50-100m (Shrestha, 1995).

Geruwa River

Karnali River bifurcates into two major channels just below Chisapani at the foothills of *Churia*, Karnali (Kauralia) in the west and Geruwa in the east (also known as Karnali and illustrated as Karnali in the map above). These two channels are intertwined as they flow downstream. The eastern channel holds the maximum share of water volume. The western channel forms the political boundary between Bardia and Kailali districts whereas Geruwa forms the western boundary of the Bardia National Park (BNP). The river is further sub divided into number of channels forming numerous islands among these bifurcations. Most of the small islands are inhabited by human settlements.

The eastern channel of Karnali River flows approximately for 37km in Nepal between Chisapani and Kothiaghat. Only 10km of this length falls outside the jurisdiction of BNP (WWF NEPAL 2006). This stretch of 10km outside the protected area was covered in the present study as per the objective of the project. During its flow of 37km, Khauraha Khola and Orai River join Geruwa. The Khauraha Khola is a channel of Geruwa itself that flows into the Bardia National Park and later rejoins the main channel at the southern tip of the protected area. Geruwa River is inhabited by dolphins (*Platanista gangetica*), Otters (*Lutra perspicillata*), Gharial (*Gavialis gangeticus*), Crocodile *Crocodylus palustris*, and various species of turtles (WWF NEPAL 2006).



Orai River

The river Orai flows from the Churia foothills west of Babai through the Bardia National Park and joins the eastern branch of Karnali, the Geruwa River at Khothiaghat. Unlike the rivers of Kailali that flow through human settlement, this river is quite undisturbed at its upper reaches as it flows through the protected area. Due to lack of water on the upper part of this river, the problem of siltation occurs during the dry period.

3. Methodology

3.1 Reconnaissance surveys

In order to identify the areas of high otter activity, a preliminary survey was conducted prior to initiation of the status survey. The preliminary survey was followed by a detailed survey along Karnali River to find out the distribution of otters in the channels.

3.2 Key informant survey and local consultations

Numbers of individuals were consulted to gather local knowledge on the distribution and issues related to freshwater conservation in the area. The surveys and consultations were informal and open-ended discussions. The fishermen, who traditionally interact with the river ecosystem and come across aquatic animals, were given high priority during the consultations. Local residents inhabiting riverbanks were invited for group discussions and to help identify sites of major distribution of otters.

Primary and secondary data was collected to achieve the objectives of this study. Secondary data was collected from Internet links, various publications and books collected from related organizations. Tools such as reconnaissance survey, key informants survey and focus group discussions were used to collect the relevant primary data on historical and recent distribution and conservation issues related to smooth-coated otter in the area. Consultations were carried out with local communities and fishermen who utilize resources of the aquatic ecosystem in the area. These people are also the major source of information regarding information on animal species in the river system. Focus group discussions were conducted to precisely identify and map the existing threats and their sources. Discussions were conducted to generate ideas regarding measures for reducing threats to otters specifically and aquatic ecosystem in general. Group discussions in the later phases were also utilized to disseminate information on aquatic biodiversity and generate awareness among the residents of the area on freshwater biodiversity conservation with a focus on the major species.

3.3 Distribution mapping

As otters are nocturnal animals, and scarce in many areas, it is rarely possible to see individuals, let alone count them. Most studies use field signs, in the form of faeces (spraints) and footprints. These are used because otters tend to defecate on prominent places, such as on rocks, tree trunks, islands and river banks. Resting sites (couches) and Holts (otter dens) are can also be used, but may not always be recognizable in areas where there is greater human disturbance.

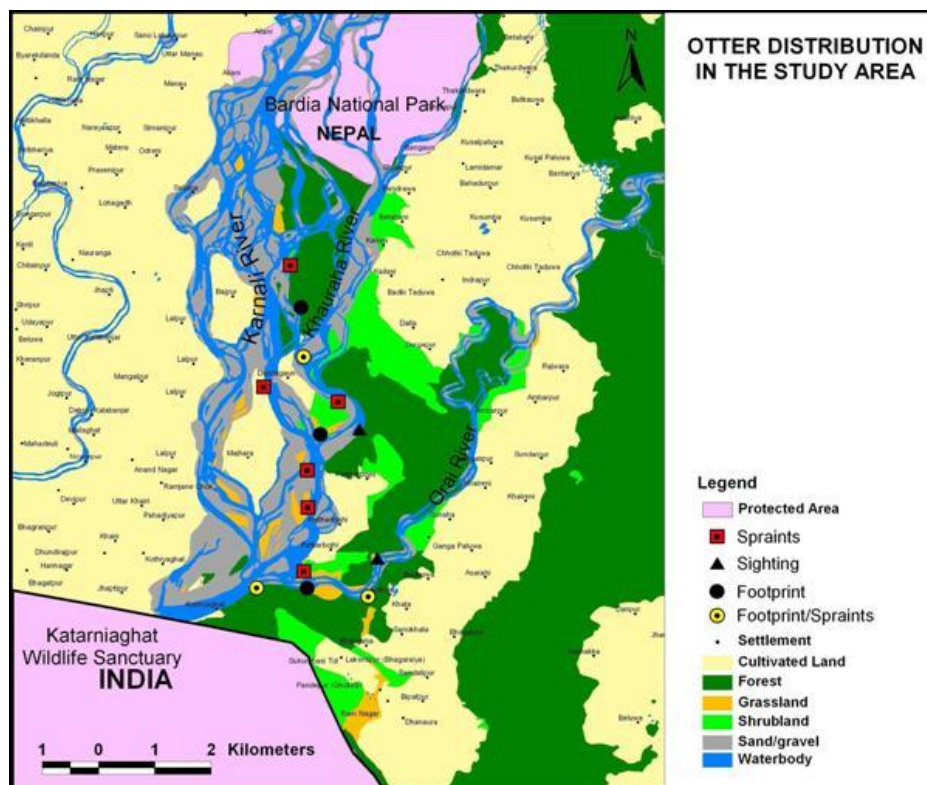
To access the distribution of the smooth-coated otter, direct field observations will be conducted. Before initiating a detailed survey, an initial survey was conducted to gain an insight of otter activity, use of dens and spraint sites along the riverbanks. After the initial survey, the river section was divided into a number of sections according to convenience and possible landmarks. These sections were intensively surveyed for otter signs. As the river section was only around 24km (comprising of Geruwa, Khauraha and Orai walking along both banks of each river), the entire sections within the study area were covered mainly on foot. Otter signs were mapped with the use of GPS and presented on a map of the area. Following a general rule of surveying the freshwater animals during low water levels, the survey was carried out during a number of phases at the end of September through October when the water level starts to recede at the end of monsoon. The decision was also based on the outcomes of local consultations where this period was specified as the best one for spotting otter signs, especially footprints on the muddy banks.



4. Results and Discussion

4.1 Distribution of otters

The distribution of otter signs in the study area was found in disturbed as well as undisturbed areas. But most of the signs were along the undisturbed areas where there was forest cover on the banks in general. Very few signs were found on the western banks of Geruwa River which is disturbed by the traditionally gold mining *sonaha* community as well as fishermen community restricting the otter movements. Most common signs were of otter spraints with only rare sightings of the animal in relatively undisturbed areas mainly within community forests of the area which are very dense with little human interferences except during the season of fuel wood, thatch grass and timber collection.



Otter signs in the form of spraints and foot prints usually of individual or a pair of animals rather than larger groups. Spraints were also mostly of individual animals on the banks. This certainly means that larger groups of otters may not present in the area. It also implies that breeding may not be taking place as it should be though littering generally occurs during October and the cubs come out of the den during February (Hussain et al. 2008). But the presence of similar size of footprints means that the population might not be very healthy comprising of animals of similar age groups whereas cubs should higher in number. The average home range of a male *Lutrogale perspicilata* was estimated to be around 17km and that of a female with pups was around 5.5km (Hussain 1993) which also supports that the fact that the number of otters in the area may not be very high. There was only a single case where two pairs of young footprints were seen with that of a mature otter.

4.2 Threats

Major threats to Asian otter and other large freshwater animal population are loss of wetland habitats due to construction of large-scale hydroelectric projects, reclamation of wetlands for settlements and agriculture, reduction in prey base, poaching and contamination of waterways by pesticides (Hussain et al. 2008). Inadequate rural development efforts around lowland Karnali River basin have exerted an additional pressure on wildlife and biodiversity by increasing the dependency of the rural poor on natural resources. Ultimately, most of the wetlands and waterways have a decreasing prey base for sustaining otter populations. This also implies for endangered species like Ganges river dolphins and gharials inhabiting the same ecosystem. Local communities



inhabiting the Karnali river basin in the lowlands also have traditional beliefs about medicinal and religious values of otter skin and parts. This also results in opportunistic poaching as well as intentional poaching in rare cases. Fishing is prohibited within the protected area whereas a license is provided to locals by the District Development Committee (DDC) in river sections outside the protected area. Generally, one individual acquires the contract and subcontracts it to numerous fishermen of the area (WWF NEPAL 2006). Shops around Kothiaghat sell substantial amount of dried fish. It is noteworthy to mention that the process of drying of fish demands additional amount of firewood, which in turn exerts an extra pressure on the adjoining forests resulting in



deforestation and erosion (WWF NEPAL 2006). A comparison of river sections showing the presence of otter signs suggests that human activities decrease the availability of suitable habitat and over-fishing decreases food supply as also suggested by Houghton (1987).

The fishermen commonly use numerous types of fishing gears, drag nets, cast nets, gill nets, drift nets and hook lines. Gill net fishing is widely practiced along Karnali River in deeper sections whereas cast nets are frequently used in pools along the river. Fishermen using drift and gill nets are generally commercial fishermen whereas drag nets and fishing

hooks are used by individuals for domestic consumption. Hook lines are also common but the

catch is relatively less as compared to time consumed. In the present study different sizes and types of gill nets were recorded. Floating gillnet used in flooded river appear deadly since they are not easily detected visually and acoustically by dolphin. They are set across river during monsoon (May- July) when important animals like dolphins lose their sonar ability due to murky runoff and become easy victims (Shrestha, 1995).



Despite the fact that there has not been any instance of entanglement of larger animals in these gill nets, they do pose a threat to aquatic biodiversity as a whole mainly due to the fact that they catch species of all sizes thus largely disrupting a breeding population which can have grave consequences for the population in the long run. Fishing is extensive outside protected sections of Karnali River and there are also cases of fishermen entering the protected areas during fishing. Fishing during low water levels puts an additional pressure on the larger aquatic animals like otters, Ganges River dolphins and Gharials by restricting the availability of prey species as well as

disturbing the receded area (WWF NEPAL 2006).

Settlements in the islands formed among the bifurcating river channels and seasonal settlements along the river banks during low water level by *sonaha* community for gold mining with the use of traditional methods is also a constant nuisance for otters along these areas. The activity of gold mining is a lengthy process and can disturb a locality for a few days to weeks. More crucial is the fact that these communities move all along the Karnali (Geruwa) River during the low water level and thus in a way disturb the entire western bank of the river and small isolated islands that can be potential sites for otter dwelling. These sections would otherwise be less disturbed by human activities. Along with this the eastern bank of the river erodes and slumps frequently during high floods in monsoon every year. Maintenance and repair of the spurs and dykes along the eastern bank also causes high level of disturbances for otter during the daytime. Embankment of the eastern bank with the use of gabion wire mesh for considerable lengths also destroys potential dwelling sites of otters as well as disturbing the habitats and foraging grounds for otters.

5. Conclusion

The number of signs, along the three river sections do not indicate a very healthy otter population in the area though the density of spraints and signs does not support to determine the actual numbers of otters in the area study, as there is no direct relationship between the number and density of spraints/signs and that of otters. It is also notable that the absence of otter signs does not necessarily infer the absence of the animals though the occurrence of adequate number of sings does certainly indicate a healthy river ecosystem (Houghton 1987). No population estimates could be made, mainly due to the nature of these animals as well as lack of any methodology to determine their status. Based on local consultations, it can be concluded that the otter population has declined in the recent decades by a great extent. This was mainly related to human interferences in the form of fishing and poisoning the river ecosystem, constant bank erosions of the banks and degradation of forest quality along certain sections of the rivers. Most parts of these river sections remain profoundly disturbed hindering otter habitats on the banks.

Only certain river sections outside Bardia National Park remain undisturbed mainly along the community forests. The western banks of Geruwa are exceptionally disturbed by the *sonaha* communities along with inhabitants of the islands among the bifurcations of Karnali. Traditional method of Gold mining which involves the movement of temporary shelters of *sonaha* communities along the western banks of Geruwa has almost destroyed the otter habitats on that side and thus there were very few signs of otter presence. At the same time, frequent bank erosions on the

eastern banks and yearly embankments on this side further degrade and disturb the otter population. Fishing has also increased in recent with a declining fish population in these river systems and this has also been a reason for declining otter population.

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