

REPORT

ASSESSMENT OF POPULATION OF SMOOTH-COATED OTTERS *Lutrogale perspicillata* IN TUNGABHADRA OTTER CONSERVATION RESERVE (TOCR), NORTH KARNATAKA, INDIA

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(Received 4th July 2019, accepted 10th May 2020)

Abstract: Otters are considered as the ‘ambassadors of wetlands’. Among 13 species of otters in the world, five species are found in Asia. Smooth-coated otter *Lutrogale perspicillata* is the largest among Asian otters. The presence of Smooth-coated Otters in Tungabhadra River was not documented earlier thus, a rapid assessment survey was conducted for four months from March to June 2017 to assess the population of Smooth-coated Otters in 35 kilometers stretch of Tungabhadra River from T. B. Dam reservoir to bridge near Kampli town. About 158 positive sites for Smooth-coated Otters were recorded along the river indicating the healthy population of *L. perspicillata*. Out of 158 recorded positive sites 46.83% positive sites are composed by communal spraints, 37.97% of resting and grooming sites and 15.18% of holts/ den sites. Otters prefer rocky area (54.18%) more than mud banks (25.94%) and sand banks (19.62%) and their habitat preference was very close to water body. The present study appends new geographical locations in the distribution range of Smooth coated otters in Karnataka and also helps to understand the complex ecological interaction of *L. perspicillata* in T.B. River will helps to mitigate the conservation problems.

Citation: Abdul Samad, KSA, Santhosh, S and Hosetti, BB (2020). Assessment of Population of Smooth-Coated Otters *Lutrogale perspicillata* in Tungabhadra Otter Conservation Reserve (TOCR), North Karnataka, India. *IUCN Otter Spec. Group Bull.* 37 (4): 181 -190

Key words: Smooth-coated Otter, *Lutrogale perspicillata*, Tungabhadra Otter Conservation Reserve, TOCR,

INTRODUCTION

There are 13 species of otters in the world and five species in Asia, of which the Smooth-Coated Otter (*Lutrogale perspicillata*) is the largest. It is protected under

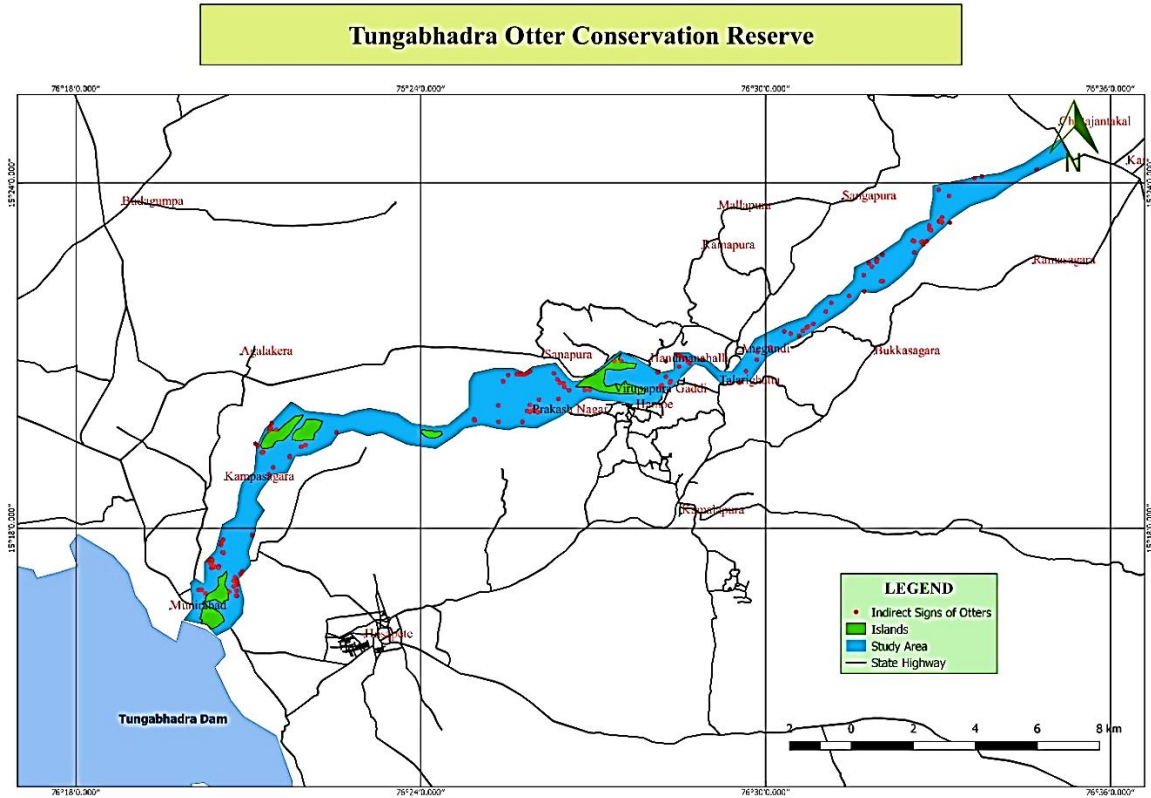
Schedule-II of Indian Wildlife (Protection) Act, 1972 and listed as “Vulnerable” by the IUCN (De Silva et al., 2015). Smooth-coated otters play a vital role in balancing the freshwater ecosystems as a top carnivorous species (Sivasothi, 1995; Acharya et al., 2010) and they may therefore significantly influence the overall spatio-temporal dynamics of the eco-region over a long period of time (Durbin, 1998; Prenda et al., 2001). The ideal habitats for *L. perspicillata* consist of fresh water bodies such as rivers, large lakes, back waters of reservoirs etc.; they also prefer rocky areas by rivers and mud banks covered by thick vegetation for shelter (Durbin, 1998; Kruuk et al., 1989; Hussain 1993). This species is found throughout South Asia and South-East Asian countries such as, Pakistan, India, Nepal, Bhutan, Bangladesh, Southwest China, Myanmar, Thailand, Vietnam, Malaysia, Indonesia, Brunei, and an isolated population is reported in Iraq (Pocock, 1941; Medway, 1969; Mason and Macdonald, 1987; Corbet and Hill, 1992; Hussain, 1993; Hussain and Choudhury, 1997; Kafle, 2009; Khan et al., 2009; Anoop and Hussain, 2004, 2005; Acharya et al., 2010, Perinchery et al., 2011, Khan et al., 2014; Manjrekar and Prabhu, 2014; Khan, 2015).

Otters are considered to be an effective indicator species to assess environmental quality and are validated as wetland diplomats to promote the conservation of freshwater biomes (Durbin, 1998; Sivasothi, 1995; Prenda et al., 2001). In India, otter species face threats of habitat destruction due to the construction of large-scale hydroelectric projects, reclamation of wetlands for settlement and agriculture, reduction in prey biomass, poaching and contamination of waterways (Meena, 2002; Nawab and Gautam, 2008; Shenoy, 2006; Taigor and Rao, 2010; Hussain et al., 2011; Perinchery et al., 2011; Hussain, 2013; Khan et al., 2014). As a result, the distribution of otters is restricted to protected areas, and only a few published reports record their distribution in different parts of India (Hinton and Fry, 1923; Hussain, 1993, 1996; Hussain and Choudhury, 1998; Nawab, 2009; Kumara and Singh, 2007; Nawab and Gautam, 2008). However, the ecology, behaviour and natural history of most wild otter species is poorly known and recent evidence indicate that their range and population is shrinking because of poaching and loss of habitat (Meena, 2002). This present study appends new geographical locations to the known distribution of Smooth coated otters in Karnataka, improving understanding of their complex ecological interactions and will help in planning to mitigate conservation problems.

MATERIALS AND METHODS

Study area

Tungabhadra Otter Conservation Reserve (TOCR) is 20 km² located between 15°16'1" to 15°25'1" N and 76°20'1" to 76°34'1" E (Map. 1), and was declared as the TOCR by the Government of Karnataka in 2015, under the Indian Wildlife (Protection) Act, 1972, to conserve the Rare, Endangered and Threatened (RET) species like Smooth-coated Otter (*Lutrogale perspicillata*), Muggar crocodile (*Crocodylus palustris*), four species of turtles and many more major aquatic flora and fauna found in the river stretch from Holey Mudlapura village near the dam on the river, to the bridge at Kampli, a town in Hospet taluk in the Ballari district of North Karnataka (Map. 1), which includes 9 anicuts (barrages that divert the river water to far off farmlands, in local Kannada language) like Bella, Hulagi, Shivapura, Turtha, Anegundi, Ramasagara, Upper Gangavathi, Lower Gangavathi and Kampli (Anonymous, 2017).



Map1: Map showing the study area and positive sites of otters at Tungabhadra Otter Conservation Reserve (TOCR).



Figure 1: Images of Smooth coated otters found in the study area

Methods

Four months' rapid survey was conducted between April to July 2017 along a 34 km stretch of the Tungabhadra river, starting from Holey Madlapura near the Tungabhadra Dam (TBD), and ending at Kampli bridge. This includes nine anicuts (Bella, Hulagi, Shivapura, Turtha, Anegundi, Ramasagara, Upper Gangavathi, Lower Gangavathi and Kampli), built across Tungabhadra River; some of them have a weir of 50-100 metres, and others are longer than two km. Most of the study centered around these anicuts, which covers 30% of TOCR. Before starting the intensive survey, a preliminary study was conducted in all these zones to gain an insight into the activity of the Otters; because activity appeared to be mainly nocturnal, indirect evidence like pug marks, scat, communal spraints, left over kills, nesting, denning and natal sites were considered as positive sites (Kruuk et al., 1986, Mason and

Macdonald 1987; Hussain and Choudhury, 1997, Anoop and Hussain, 2004; Chettri and Savage, 2014). Local peoples like farmers and fishermen were interviewed to understand the movement of otters in the river stretch. The study was carried out during the season when the water level in the river is lower and visibility is greater.

The main aim of the survey, however, was to prepare an index of positive sites of otter activity, which can help to identify the river stretch which needs to be monitored most closely for conservation purposes. Each positive site included communal sprainting areas (latrines), scats, pug marks, holts/denning sites, and basking and grooming sites located along the river side; these were identified, and the GPS locations marked for further studies (Map. 1), and photographic documents were made (Fig. 1) (Anoop and Hussain, 2004; Chettri and Savage, 2014). The positive sites were monitored for the whole day during the preliminary survey, to understand habitat use patterns by otters. Later, each positive site was visited twice in a week for four months, and otter behaviour was recorded (Melquist and Hornocker, 1983; Khan et al., 2014). Small islands located in the river were explored using a small boat to record any clues. Parameters were used to classify the positive sites like: (i) preferred location: rock, marsh, sand bank, mud banks; (ii) distance of the preferred location from edge of water; and (iii) presence or absence of holts, nests or breeding areas.

RESULTS

During the rapid biodiversity assessment, it is found that the population of Smooth-coated otters is high compared to rest of the other major fauna in TOCR. Out of 158 positive otter sites recorded in different parts of TOCR, 46.83% are composed of communal spraints (latrines) (74 sites), followed by 37.97% resting and grooming sites (60 positive sites) and 15.18% of holts/ den sites (24 positive sites) (Table 1, Fig. 2). The relative density at different anicuts was greatest near Rangasagara (35 positive sites), then 25 in Hulagi anicut, 24 at Bella and Anegundi anicut areas, 17 positive sites in Kampli anicuts, and 12 positive sites in Shivapura anicut areas. In contrast, only 9, 7, and 5 positive otter population sites were recorded from Turtha, Upper Gangavathi and Lower Gangavathi anicut regions respectively (Table 1).

Table 1. Positive sites recorded at different *anicuts* of Tungabhadra Otter Conservation Reserve (TOCR).

Site N ^o	Name of the <i>Anicut</i>	Communal Spraint	Holts / Den Sites	Resting/ Grooming Area	Total
1	Bella	14	3	7	24
2	Hulagi	10	3	12	25
3	Shivapura	5	2	5	12
4	Turtha	3	2	4	9
5	Anegundi	12	4	8	24
6	Ramasagara	17	6	12	35
7	Upper Gangavathi	3	1	3	7
8	Lower Gangavathi	2	0	3	5
9	Kampli	8	3	6	17
Total		74	24	60	158

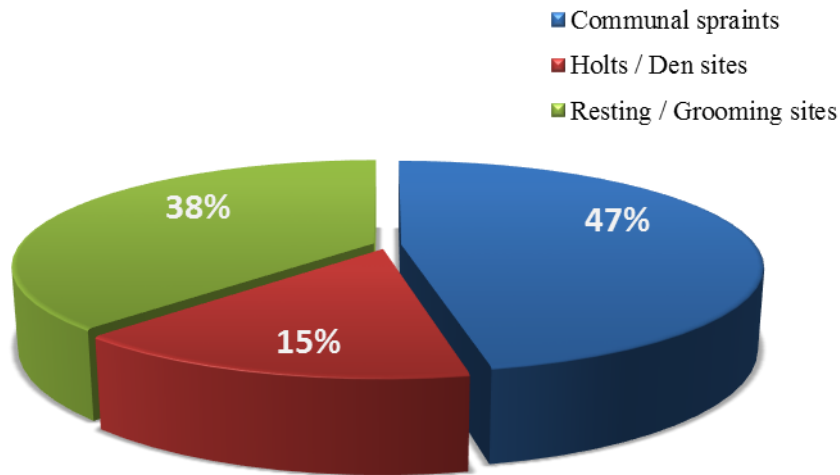


Figure 2. Percent occurrence of positive sites for *L. perspicillata* recorded at TOCR.

Looking at the different habitat types, more positive sites were found in rocky areas (54.43% positive sites), 25.94% positive sites on mud banks or islands, and only 19.62% positive sites were recorded on sand banks (Fig. 3). The distance between all positive sites and water resource was calculated to understand the habitat preference of otters: 65.18% of positive sites (103 sites) are found 1-5 metre from the water body, 23.41% (37 sites) within 5-10 meters from the edge of the water, and 12 positive sites (7.59%) were found about 10-15 meters away from water. Only 3.79% (6) of positive sites were found 15-20 meters away from the edge of the nearest water body (Fig. 4).

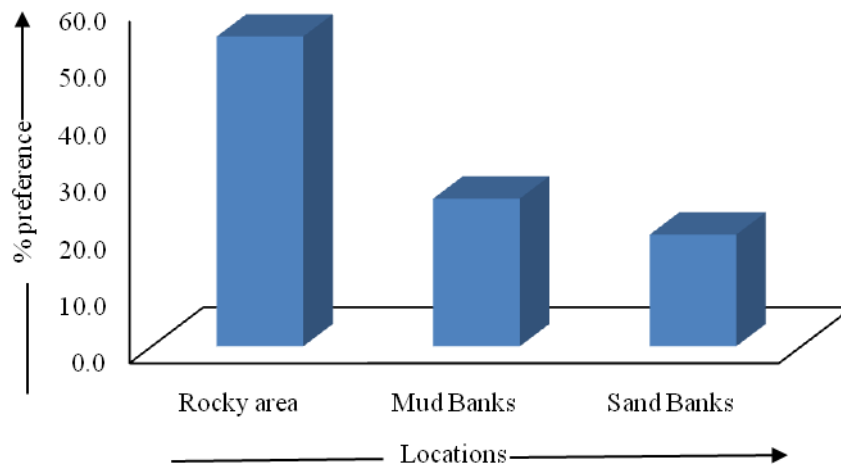


Figure 3. Habitat preferred by *L. perspicillata* around TOCR.

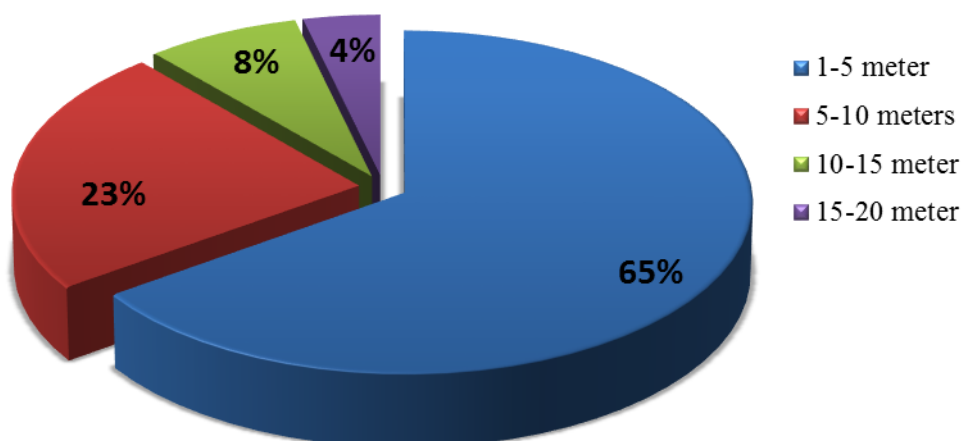


Figure 4. Distance between positive sites and water body preferred by *L. perspicillata* around TOCR

DISCUSSION

The distribution and presence of smooth coated otters can be equally determined by searching for tracks, spraints and other signs (Romanowski et al., 2013). Communal latrines, along with urine, is a way of olfactory marking in otters affected by many factors such as population density and structure, social status, reproductive cycle, dispersion and food availability (Erlinge, 1968; Kruuk and Hewson, 1978; Rostain et al., 2004; Prigioni et al., 2005). During the present study, many communal spraints latrines were recorded along the length of the river; this clearly represents the relative population density of the smooth-coated otters in the area. However, because of habitat destruction and anthropogenic disturbances, smooth-coated otters are declining throughout their range (Hussain et al., 2011) Deficiency of basic information is another problem for the conservation of this species (Hussain, 1996). Food availability, water resource, and shelter for resting, grooming and breeding are the vital factors known to govern habitat selection by otters (Kruuk, 1995; Anoop and Hussain, 2004; Nawab, 2009). In the present study, more positive sites were found in Ramasagara anicut, Hulagi anicut, and Bella and Anegundi anicuts: these anicuts of TOCR contain major fish species like Tilapia, Ruhu, Catla, Deccan mahseer etc. (Ramanjaneya and Ganesh, 2016) - fish that fishermen also depend on for their livelihood - implying that smooth-coated otters also rely on the availability of the food base as listed above. Haque and Vijayan (1995), and Anoop and Husain (2005), indicate that Smooth-coated otters predominantly feed on large fish, shrimps, crabs, frogs, insects, and sometimes upon birds and rats.

Significantly lower frequency of positive sites like spraints marks, holts / den sites and grooming sites are recorded from Shivapura, Upper Gangavathi, Lower Gangavathi and Turtha. Since these areas are more polluted with urban waste, leading to excessive growth of weeds, increased silting, and non-availability of clean water with sufficient prey base, it is concluded that the reduced otter population is due to an unsupportive and unhealthy habitat. Shallower and calmer regions are closely associated with the presence of smooth coated otters, as also shown by other studies (Hussain and Choudhury, 1997; Nawab, 2009; Acharya et al., 2010; Khan et al., 2014). The assessment revealed that the entire stretch of TOCR, in the past, has been an ideal habitat for the Rare, Endangered and Threatened (RET) species like Smooth-

coated otter, Mugger crocodile, Giant soft-shelled turtles, various fish fauna and other wildlife forms. As this study was done in hot summer with a parched riverbed in most of the areas of the TOCR, we did not encounter much wildlife in the *anicuts*, which are infested with invasive alien weeds and excessive siltation. The study basically relied upon indirect evidence, within a short period of time, though maximum manpower was deployed for scouting the length and breadth of each *anicut* to identify signs of the existence of a healthy population of the Smooth-coated otters. The number of positive sites decreases as the distance from water increases: it is concluded that otters prefer sites near water for grooming, breeding and defecating, as this optimises the rate of prey capture per efforts. Reducing the effort required for capturing prey was deduced to be the most essential factor for otters in selecting the habitat, as also suggested by other studies (Kruuk, 1995; Anoop and Hussain, 2004; Nawab, 2009; Acharya et al., 2010).

The reason for this may be that most of the TOCR stretch has a rocky surface and banks than mud and sand. The habitat provides sufficient food for otters, such as fish, crabs, amphibians etc. Though the study area is declared as “Tungabhadra Otter Conservation Reserve”, no strict conservation measures have been taken up. Potential threats like sand mining, excessive fishing, water pollution, eutrophication, excessive sedimentation, use of dynamite to harvest fish etc, are potential threats to the population of Smooth-coated Otters in the Tungabhadra River. There is a need to take up conservation measures such as patrolling by trained guards to prevent any instances of hunting, poaching and other threats to the life of otters, and the rest of the aquatic fauna. We also recommended that fishing in the areas of otter presence be restricted, fishing be discouraged during the breeding season, and a ban enforced on the harvesting of native species of fish, which are the major food base for otters. This species breeds once a year, and breeding season varies from one place to another, mainly depending upon favorable conditions for natal areas, an abundance of prey base etc. (Haque and Vijayan, 1995; Hussain and Choudhury, 1997; Hussain et al., 2011), Longevity and sexual maturity is governed by prey abundance.

CONCLUSIONS AND RECOMMENDATIONS

This study for assessment of the population and distribution of Smooth-coated Otter revealed that the entire stretch of Tungabhadra Otter Conservation Reserve (TOCR) provides an ideal habitat for this rare species of mammal. However, the issues like lack of flooding in monsoon and sufficient natural flow of water regularly result in degradation of the aquatic ecosystem. This is aggravated by excessive sedimentation in the pools and ponds in the riverbed, resulting in a lack of sufficient water in the river. But more serious problem facing the aquatic ecosystem is excessive growth of invasive alien weeds such as Water Hyacinth *Eichornia crassipes* and *Ipomoea*. Eventually eutrophication results in the decline of otter populations due to reduced food availability. It is therefore recommended that water be released into the river regularly during monsoon; the river should flood sufficiently that it can wash all the sediments and weeds away. There is also a need to educate the farmers to switch over to organic farming and give up the excessive use of chemical fertilizers in the catchment area of the Tungabhadra River, as this encourages eutrophication. All release of industrial effluents and municipal sewage into the river is to be prevented, to provide a safe habitat for riparian biodiversity.

Acknowledgements – The authors are very thankful to Wildlife SOS and SWaN a local NGO for their patrolling the riparian habitat and alerting the local fishermen about Otter hunters. We are thankful to Karnataka Forest department for providing permission, Karnataka Neeravari Nigam Limited (KNNL) and SMEC for helping during field study. The authors are also thankful to Kuvempu University for providing facilities.

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RÉSUMÉ

EVALUATION DES POPULATIONS DE LOUTRE A PELAGE LISSE *Lutrogale perspicillata* DANS LA ZONE DE CONSERVATION DE TUNGABHADRA (TOCR), SITUÉE AU NORD DU KARNATAKA EN INDE

Les loutres sont considérées comme les «ambassadeurs des zones humides». Parmi les 13 espèces de loutres dans le monde, cinq se trouvent en Asie. La loutre à pelage lisse *Lutrogale perspicillata* est la plus grande des loutres asiatiques. La présence de loutres à pelage lisse dans la rivière Tungabhadra n'a pas été documentée jusqu'ici, et ainsi, une enquête d'évaluation rapide a été menée pendant quatre mois de mars à juin 2017 pour évaluer la population de loutres à pelage lisse sur un tronçon de 35

kilomètres de la rivière Tungabhadra à partir du bassin de rétention TB jusqu'au pont près de la ville de Kampli. Environ 158 sites positifs de loutres à pelage lisse ont été enregistrés le long de la rivière, ce qui indique une population saine de *L. perspicillata*. Sur les 158 sites positifs enregistrés, 46,83% des sites sont constitués par des lieux de marquage communs, 37,97% par des aires de repos et de toilettage et 15,18% par des catiches et tanières. Les loutres préfèrent davantage les zones rocheuses (54,18%) que les plages de boue (25,94%) et les bancs de sable (19,62%) et leur habitat préférentiel est très proche d'un plan d'eau. La présente étude intègre de nouvelles localisations géographiques dans l'aire de répartition des loutres à pelage lisse au Karnataka. Elle nous aide également à comprendre l'interaction écologique complexe de *L. perspicillata* dans la rivière Tungabhadra et contribuera à atténuer les problèmes de conservation.

RESUMEN

RELEVAMIENTO POBLACIONAL DE NUTRIAS LISAS *Lutrogale perspicillata* EN LA RESERVA DE CONSERVACIÓN DE NUTRIAS TUNGABHADRA, NORTE DE KARNATAKA, INDIA

Las nutrias son consideradas “embajadoras de los humedales”. De las 13 especies de nutrias del mundo, cinco se encuentran en Asia. La nutria lisa *Lutrogale perspicillata* es la más grande de las nutrias asiáticas. La presencia de la nutria lisa en el Río Tungabhadra -cerca de Hampi- no había sido previamente documentada, de manera que condujimos un relevamiento rápido de evaluación, durante cuatro meses -de Marzo a Junio de 2017-, para evaluar la población de nutrias lisas en un tramo de 35 km del Río Tungabhadra -desde el embalse de la represa T.B. hasta el puente cerca de Kampli. Registramos 158 sitios positivos de nutrias lisas a lo largo del río, indicativos de una población saludable de *L. perspicillata*. De los 158 sitios positivos, 46,83 % están compuestos por letrinas comunales, 37,97 % por sitios de descanso y acicalamiento, y 15,18 % por sitios de madrigueras/cuevas. Las nutrias prefieren áreas rocosas (54,18 %) más que barrancas barrosas (25,94 %) y barrancas arenosas (19,62 %), y su preferencia de hábitat es muy cercana al cuerpo de agua. El presente estudio agrega nuevas localizaciones geográficas al rango de distribución de nutrias lisas en Karnataka, y también ayuda a entender la compleja interacción ecológica de *L. perspicillata* en la Represa T.B., lo que va a ayudar a mitigar los problemas de conservación.