NOTE FROM THE EDITOR

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Dear Friends, Colleagues and Otter Enthusiasts!

We have just closed the first issue of 2016 and start now with a new issue with this editorial. We have manuscripts continuously being submitted and there will be at least 4-5 manuscripts in this second issue of 2016 before opening a new issue in early 2017. So keep coming back to our website and see what is new.

Since a long time we have been waiting that an impact factor will be finally assigned to the IUCN OSG Bulletin. You are probably all aware that there are practically two official ones and a lot of "predatory" ones. So it is a pleasure to announce that Scopus – the most stringent and conservative data base has now included our journal into their database and that a first IF of 0.16 based on the articles published in 2014-2015 has been asigned. I am aware that this is a low IF but it is a start and if you cite the relevant articles from our journals in your other articles outside the IUCN OSG Bulletin also our IF will automatically rise.

Those that had a look will see that we have several new special issues and I am very thankful to the editors of special issues to take all the efforts to get Proceedings or literature reviews published.

I understood that many met in June at the International Otter Colloquium in Singapore and I got very positive feedback on the science and the touristic highlights of Singapore. Dependent on what the organisers will decide we may have a special issue with manuscripts from the conference.

Please provide us photos as we need good resolution pictures for the title page.

And as always I want to express my thanks to my worlds-best webmaster who puts all your manuscripts online, is always ready to perform last minute or post-publishing changes if they are necessary. Lesley, thank you so much for your efforts.

S H O R T N O T E

NOTES ON THE OCCURRENCE OF THE EURASIAN OTTER (*Lutra lutra L.)* IN THE FOREST OF BALAGHAT, MADHYA PRADESH, INDIA

Jyotirmay JENA[1]*, Dhirendra BHARGAVA[2], Jimmy BORAH[3], Soumen DEY[1]

[1]*WWF-India, Satpuda Maikal Landscape Programme, Jabalpur-482020, Madhya Pradesh, India*
[2]*Chief Conservator of Forest, Balaghat Forest Circle, Balaghat, Madhya Pradesh, India*
[3]*WWF-India, Species Division, Lodi Estate, New Delhi, India*
**Corresponding author: bapinou@gmail.com*

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Abstract: Eurasian otter presence was recorded in Balaghat forest range of Madhya Pradesh while conducting camera trapping study for large carnivores. The species shows a wide spread distribution from Europe, Nepal, Sri Lanka, Northern Africa, South East Asia. Though Eurasian otters have been recorded from Northern and Southern India, this is the first ever photo capture of Eurasian otter from Balaghat Forest Circle of Madhya Pradesh state in Central India.

Keywords: Eurasian otter, ecosystem, distribution, central India

Citation: Jena, J, Bhargava, D, Borah, J and Dey, S (2016). Notes on the Occurrence of the Eurasian Otter (*Lutra lutra* L.) in the Forest of Balaghat, Madhya Pradesh, India . *IUCN Otter Spec. Group Bull*. **33** (2): 59 - 63

Otters play an important role in the aquatic ecosystem as top carnivores and thus influence the function of the ecosystem. Often considered as an indicator species of the fresh water ecosystem or fluvial ecosystem, they provide indication of the overall health of the aquatic ecosystem. Globally, the Eurasian otter is distributed starting from Europe, south-east Asia, India, Nepal, Russia, China, Myanmar, Thailand, Indonesia, Malaysia, Taiwan and also some parts of Africa (Roos et al., 2015).

In India, the Eurasian otter is distributed from the foothills of Himalayas (Kashmir, Himachal Pradesh) to Sikkim and Assam in northeast of India (Prater, 1948; Hussain, 1999). The species is also recorded from Southern India. Though otter presence in Balaghat dates back to 1907 (Low, 1907) as mentioned in the district gazetteer, it remained un-noticed to the scientific community.

Though Eurasian otter is found in variety of habitat such as lakes, rivers, streams, rivers, swamps, coastal area and estuaries their distribution in India was recorded only in the above mentioned area. Also very little is known about the status of their populations from the country. It is believed that there has been a rapid decline due to loss of habitat and poaching for meat, pelt and pet (Hussain, 2002; Mohapatra

et al., 2014). In this article we report presence of Eurasian otter from Balaghat forest circle of Madhya Pradesh state of India, which is also the first photographic evidence from the area.

The Balaghat Forest Circle is one of the intact and contiguous forest patches in Central Indian Landscape and important part of Kanha-Pench tiger conservation unit. The forest of Balaghat circle is connected to three protected areas namely Kanha, Pench, Navegaon-Nagzira tiger reserve and facilitate dispersal of tigers. Hence the area is very much important in terms of landscape level conservation. However the conservation focus of the landscape has been around some of the charismatic species such as tiger (*Panthera tigris*). But the landscape supports a wide array of faunal and floral diversity. Though the faunal assemblage of protected areas are well understood, very little is known about other wildlife beyond the protected areas, in forests such as Balaghat. Otters historically have been recorded in the large river of the landscape such as Narmada and from Kanha Tiger Reserve (personal communication with Forest Officers). However, presence of otters beyond the protected area is little understood or documented. During our recent camera trapping study for large carnivore in Balaghat, we photo captured otters in several areas of the Balaghat forest circle (Fig. 1).

Following the photo capture of the otter from the forest of Balaghat, we tried to collect information about their presence from local community. The local fishermen confirmed the presence of otter in the Dhutti dam of river Wainganga. The second author had direct sighting of otters (one occasion) after subsequent visit to the dam. (Fig. 2). Also further camera trapping from the dam site resulted into successful photo capture of the otter (Table 1). Though Balaghat forests support good number of wildlife populations, this is the first ever photographic record of Eurasian otter from this forest as well the occurrence is reported for the first time.

The Eurasian otter has been listed in Appendix I of CITES and Near threatened as per IUCN Red List, due to decline in population. In many areas the information on distribution as well population status is lacking.

The recent ongoing survey in Balaghat presently only covers approximately 820 sq. km. The forest type varies from Sal dominated forest to miscellaneous forest, and numerous annual and perennial streams crossing over the area. A large chunk of the study area is still remote and the anthropogenic pressure is comparatively less. The presence of otters in the Balaghat forest requires more extensive studies in terms of population and habitat use. As a territorial forest division area with relatively lesser protection regime compared to the protected areas in central India, Balaghat would require more intensive policy based actions, research on factors affecting its survival and awareness campaigns among communities for the long term survival of the species.

Acknowledgement - The authors are grateful to the Principal Chief Conservation of Forest (Wildlife) Madhya Pradesh for permitting us to work in Balaghat Forest Division. We also thank Dr. S.A. Hussain and Dr. Nicole Duplaix for their expert suggestion in identification of the species. We are grateful to the field staff of WWF-India, SML team particularly to Mr. Avinash Dubey for his immense contribution to regular monitoring of camera traps. Also the authors are grateful to Dr. Dipankar Ghoshe, Director Species Programme, WWF-India for his continuous encouragement. We would like to thanks WWF-UK and WWF-Sweden for funding the entire study in Balaghat.

Serial No	Photos	Date of Photo capture	Distance from water (in meters)	Elevation (in meters)
1		5th December 2015	520	546
2		6th January 2016	553	579
3		7th & 8th May of 2016	0	314

Figure 1: Camera trap photographs of Eurasian otter from Balaghat forest

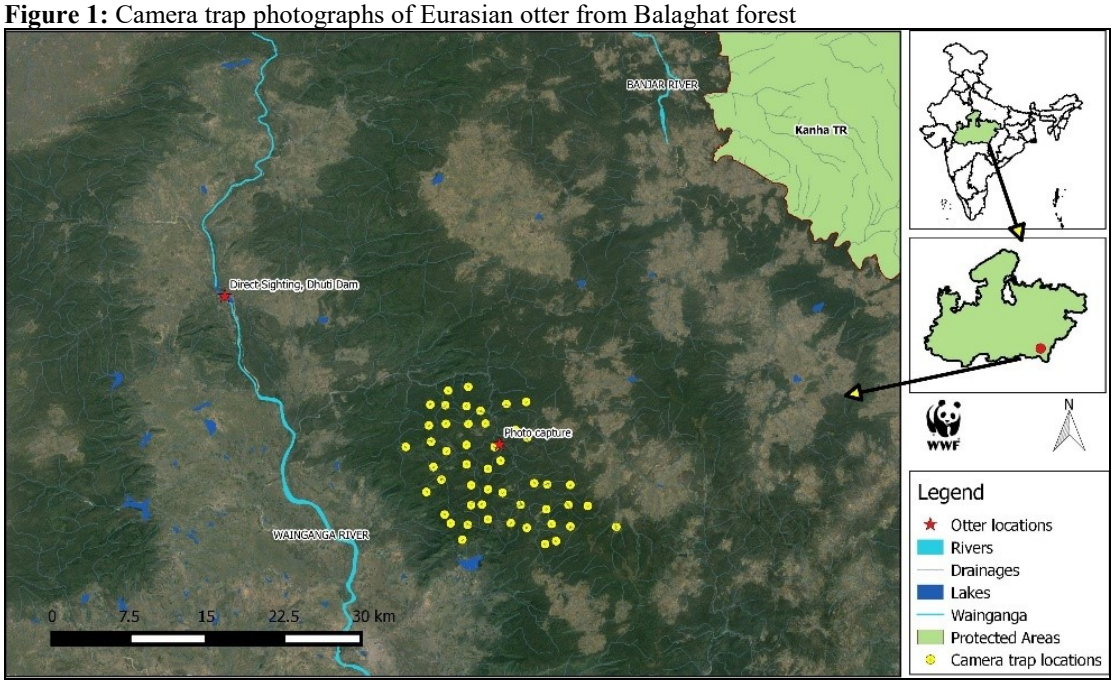

Figure 2. Map showing Eurasian otter photo capture and direct sighting location from Balaghat, Madhya Pradesh, India

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RÉSUMÉ

INDICES SUR LA PRÉSENCE DE LA LOUTRE EURASIENNE (*Lutra lutra L.)* DANS LA FORÊT DE BALAGHAT, MADHYA PRADESH, INDE

La présence de loutres eurasiennes a été observée dans la forêt de Balaghat dans l'état du Madhya Pradesh lors d'une étude menées sur les grands carnivores par utilisation de pièges photographiques. L'espèce montre une large distribution allant de l'Europe à l'Asie du sud-est en passant par le Népal, le Sri Lanka, et Afrique du nord.

Bien que les loutres eurasiennes aient été observées du Nord au Sud de l'Inde, ce sont les toutes premières photos d'elles dans la forêt de Balaghat dans l'état du Madhya Pradesh en Inde Centrale.

RESUMEN

NOTAS SOBRE LA OCURRENCIA DE LA NUTRIA EUROASIÁTICA (*Lutra lutra L.)* EN EL BOSQUE DE BALAGHAT, MADHYA PRADESH, INDIA

Registramos la presencia de la nutria en la zona del bosque de Balaghat, en Madhya Pradesh, mientras conducíamos un estudio de carnívoros con cámaras-trampa. La especie exhibe una amplia distribución en Europa, Nepal, Sri Lanka, Norte de Africa y el Sudeste de Asia. Aunque se han registrado nutrias euroasiáticas en el Norte y el Sur de la India, esta es la primera captura fotográfica de la especie en el Anillo Forestal Balaghat, estado de Madhya Pradesh, India Central.

R E P O R T

DENSITIES OF OTTERS IN THE DRAKENSBERG OF KWAZULU-NATAL, SOUTH-AFRICA

David T. ROWE-ROWE

97 Frances Staniland, Pietermaritzburg, 3201, South Africa
email: dtr.rowe@gmail.com

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Abstract: Cape clawless otters *Aonyx capensis* and spotted-necked otters *Lutra maculicollis* were studied on three rivers in the Drakensberg Park, South Africa. Densities of clawless otters were between 1/2.5 km and 1/0.7 km. For spotted-necked otters densities were between 1/5 km and 1/0.45 km.

Citation: Rowe-Rowe, DT (2016). Densities of Otters in the Drakensberg of Kwazulu-Natal, South Africa. *IUCN Otter Spec. Group Bull*. **33** (2): 64 - 67

Studies on the ecology of otters in the Drakensberg have been performed by Rowe-Rowe (1975), Carugati (1995), D'Inzillo Carranza (1995), and recently by Kubheka et al. (2013). Amongst other information collected by these researchers, are estimates of otter numbers and densities. As figures on otter densities are not readily available to field workers, they are summarised in this report.

The studies were done at four localities on three rivers in the large 240 000-ha Drakensberg protected area, South Africa. The two otters which coexist at all localities are Cape clawless otter *Aonyx capensis* and spotted-necked otter *Lutra maculicollis.*

At Kamberg Nature Reserve the Mooi River starts in the protected area, then flows out of it for 8 km through farmed land, then re-enters the protected area. The lower section is known as the Stillerust area and the upper section is referred to as the Hatchery area.

Table 1: Mooi River (Kamberg Nature Reserves)
Stillerust section (4,2 km of river plus oxbow lakes and vlei (marsh))
Numbers and densities of otters in the Stillerust section

Otter	1972 – 1974 Rowe-Rowe (1992)		1993 – 1994 Carugati (1995)		1993 – 1994 D'Inzillo Carranza (1995); Perrin et al (2000)	
	No.	Density n/km	No.	Density n/km	No.	Density n/km
Clawless	5 - 6	1/0.84 – 0.7 km	6	1/0.7 km	-	-
Spotted-necked	3 - 4	1/1.4 – 1.05 km	4	1/1.05 km	4	1/1.05 km

Table 2: Mooi River (Kamberg Nature Reserves)
"Hatchery" section (5 km of river, six dams, vlei)
Numbers and densities of otters in the "Hatchery" section

Otter	1993 – 1994 Carugati (1995)		1993 – 1994 D'Inzillo Carranza (1995); Perrin *et al* (2000)		2010 Kubheka *et al* (2013)	
	No.	Density n/km	No.	Density n/km	No.	Density n/km
Clawless	3	1/1.7 km	-	-	3 - 5	1/1.7 – 1 km
Spotted-necked	6	1/0.83 km	11	1/0.45 km	8 - 9	1/0.63 – 0.55 km

Table 3: Polela River (Cobam Nature Reserves)
5 km of river
Numbers and densities of otters in the Polela River section

Otter	1993 – 1994 Carugati (1995)	
	No.	Density n/km
Clawless	2 - 3	½.5 – 1.7 km
Spotted-necked	1 - 2	1/5 – 2.5 km

Table 4: Loteni River (Loteni Nature Reserves)
5 km of river.
Numbers and densities of otters in the Loteni River section

Otter	1993 – 1994 Carugati (1995)	
	No.	Density n/km
Clawless	2 - 4	1/2.5 – 1.25 km
Spotted-necked	2	1/2.5 km

Overall, clawless otter densities ranged from 1/2.5 km to 1/0.7 km, being highest along the Stillerust section of the Mooi River in both 1972 – 1974 and 1993 – 1994. This section, comprising river, oxbow lakes, and a large vlei (marsh) was considered to be ideal habitat (Rowe- Rowe 1975, Carugati 1995). The densities of spotted-necked otters ranged from 1/5 km to 1/0.45 km, highest in the "Hatchery" section of the Mooi River. The habitat here comprised 5 km of river, six dams (two of which had been stocked with trout), as well as vlei areas.

When both the Stillerust section and the Hatchery section were surveyed in 2010 (Kubheka et al 2013), estimated numbers of both otter species in the Hatchery section were similar to those of the earlier studies done in 1993 – 1994. At Stillerust, however, so little sign of both species was found, and only one otter was seen, therefore it was not possible to estimate numbers. The marked decline was attributed to chronic deterioration of river health, owing to upstream riparian habitat changes and human population increase on the properties Tendele and Riverside.

The numbers of spotted-necked otters recorded by D'Inzillo Carranza were determined using radio telemetry. The estimates of otter numbers by the other authors reported above were based on otters actually seen, sizes of tracks, and scat diameters at spraint sites. Two researchers (Arden- Clarke 1986; Vervoerd 1987), who studied clawless otters at coastal habitats used the number of holts (dens) to estimate otter numbers. Rowe-Rowe (1992) found that if this formula was applied to the otters at Stillerust the density would be 1/4 km and 1/6 – 11 km for clawless otters and spotted-necked otters respectively. In the light of numbers and densities which have been recorded in the Drakensberg, I suggest that this formula does not apply to freshwater habitats.

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RÉSUMÉ

DENSITÉ DE LOUTRES DANS LE DRAKENSBERG À KWAZULU-NATL EN AFRIQUE DU SUD

Les études sur la loutre à joues blanches *Aonyx capensis* et la loutre a cou tacheté *Lutra maculicollis* ont été menées sur trois rivières du parc Drakensberg en Afrique du sud.
La densité de loutre à joues blanches était comprise entre 1/ 2.5km et 1/0.7km, celle des loutres a cou tacheté comprise entre 1/5km et 1/0.45km.

RESUMEN

DENSIDADES DE NUTRIAS EN EL DRAKENSBERG, KWAZULU-NATAL, SUDÁFRICA

Estudié a la nutria de mejillas blancas *Aonyx capensis* y a la nutria de cuello manchado *Lutra maculicollis* en tres ríos del Parque Drakensberg, Sudáfrica. Las densidades de la nutria de mejillas blancas estuvieron entre 1/2.5 km y 1/0.7 km. Para las nutrias de cuello manchado las densidades estuvieron entre 1/5 km y 1/0.45 km

S H O R T N O T E

CONFIRMED SIGHTING OF *Lutra sumatrana* IN THE ULU MUDA FOREST RESERVE IN KEDAH, MALAYSIA

Fariman SALAHSHOUR

panthera11@yahoo.com

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Abstract: A hairy-nosed otter was observed swimming in the Labua River at Kuala Labua (confluence of Labua and Muda rivers and location of Earth Lodge) in the Ulu Muda Forest Reserve, which is part of a 160k ha area of tropical rainforest in the state of Kedah in northern Malaysia. The sighting might be significant insofar that this is the first confirmed record of the species in the state of Kedah as well as for the habitat type. Other sightings and scientific literature generally associate the species with peat swamp forest. In this instance, the animal was observed in the small, clear, and fairly fast-flowing Labua river. No peat swamp habitat type is known in the immediate area.

Keywords: *Lutra sumatrana*, Ulu Muda, Kedah, Labua River, Earth Lodge

Citation: **Salahshour, F (2016)**. Confirmed Sighting of *Lutra sumatrana* in the Ulu Muda Forest Reserve in Kedah, Malaysia. *IUCN Otter Spec. Group Bull*. **33** (1): 68 - 72

DETAILS OF SIGHTING

Earth Lodge is situated on the eastern bank of the Muda river where the clear waters of the smaller Labua merge with the murky waters of the Muda river. As the Labua converges with the Muda from the northeast, it forms a northwestern and a southeastern bank at this location. On April 8, 2016, the author observed an otter swimming in the Labua river downstream towards the confluence of the two rivers from his position on the Earth Lodge premises on the southeastern bank of the Labua. During this season, the water level had reached a very low point and was between ankle- and shin-deep at the section of river where the otter was observed. The animal was swimming along the northwestern bank of the Labua, intermittently raising its head above the surface but mostly remaining fully submerged, the shallow depth of the river notwithstanding. The distance between author and otter were an estimated 5 m to 6 m, which is the approximate width of the river.

As several sightings of smooth-coated otters had been made during the preceding days, the author did not assign any significance to the sighting then and surmised, based on the smaller size, to have seen a young smooth-coated otter striking

out on its own, hence not in the company of a family group. This first sighting occurred in the morning hours and no photo could be taken. However, the author encountered another otter of the same size and appearance as the first animal some time later at the same location. Based on metadata of the photographs, the second sighting occurred at 8:44 AM. The otter was ambling on the northwestern bank of the Labua in a northeasterly direction (upstream). The author is convinced that this was the same animal he observed earlier, even though there are no photographic records of the first encounter for comparison and verification.

As the animal approached the location directly across on the opposite bank to where the author was positioned, it became aware of his presence and though it showed no sign of immediate alarm, after a short hesitation and furtive assessment of the author, it retreated up the bank and into the thick vegetation rather than continue on along the river bank.

Only during a recent review of the photographs of this otter, assumed to be *Lutrogale perspicillata* up to this point, did the author notice a slight oddity about the animal's nose and on closer examination it became clear that there was no distinct rhinarium, as should be the case with smooth-coated otters, and that the area between the nostrils was covered in hair. After comparisons with images from literature (Shepherd and Loretta, 2012) and internet resources, he concluded that this species could only be *Lutra sumatrana*. To put all doubts aside, friend and conservationist Jonathan Hunter forwarded the image to the OSG and Dr. Hiroshi Sasaki confirmed the identity to be *L. sumatrana*. Hopefully, this encounter will help shed some light on the ecology of *L. sumatrana* and draw attention to the significance of the Ulu Muda Forest Reserve as a viable habitat for the species.

Figure 1. Labua River 300 m upstream of the location of the sighting

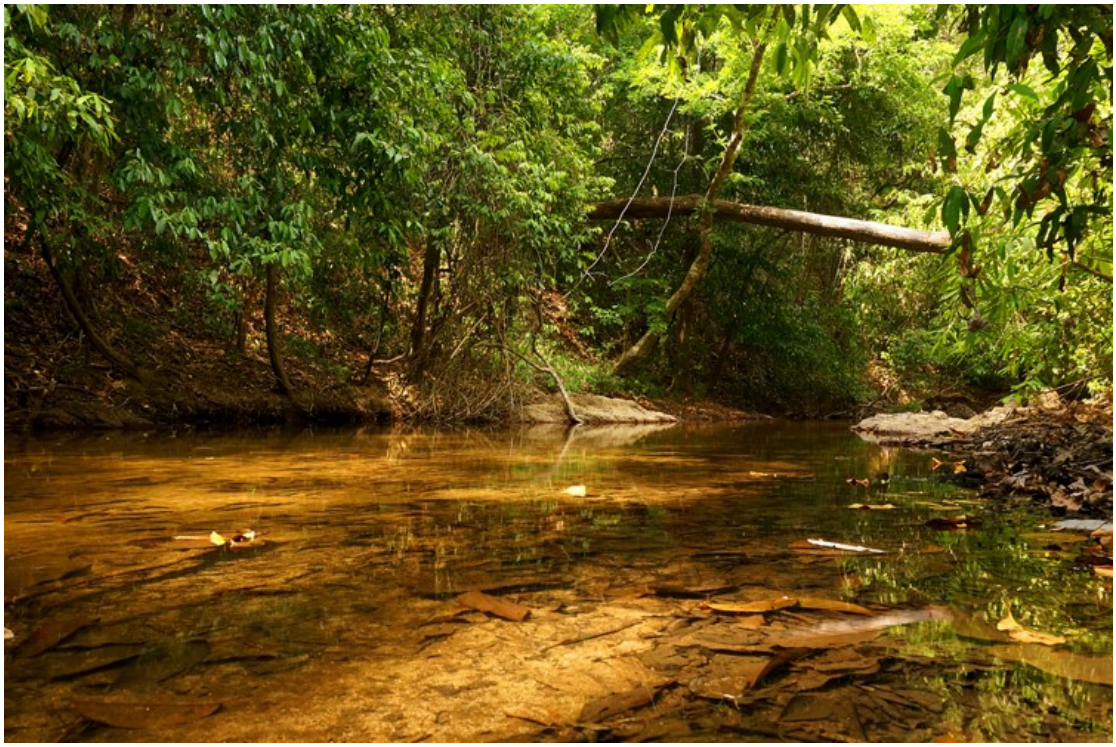

Figure 2. Labua River 700 m upstream of the location of the sighting

Figure 3. *Lutra sumatrana*

Figure 4. *Lutra sumatrana*

Figure 5. *Lutra sumatrana*

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RÉSUMÉ

CONFIRMATION DE L'OBSERVATION DE *Lutra sumatrana* DANS LA RÉSERVE FORESTIÈRE D'ULU MUDA DANS LE KEDAH EN MALAISIE

Une loutre de Sumatra a été observée nageant dans la rivière Labua à Kuala Labua (à la confluence des rivières Labua et Muda située à Earth Lodge). Le cours d'eau est localisé dans la réserve forestière d'Ulu Muda qui fait partie d'une zone de 160.000 ha de forêt tropicale humide de l'état de Kedah en Malaisie. Cette observation peut être considérée comme importante dans la mesure où c'est la première confirmation de la présence de l'espèce dans l'état du Kedah de même que pour ce type d'habitat. D'autres observations et publications scientifiques associent généralement cette espèce à la forêt marécageuse sur sols tourbeux. Dans le cas présent, l'animal a été observé dans le Labua, petite rivière limpide au courant assez rapide. Aucun habitat du type forêt marécageuse sur sols tourbeux n'est connu dans les environs.

RESUMEN

AVISTAJE CONFIRMADO DE *Lutra sumatrana* EN LA RESERVA FORESTAL ULU MUDA EN KEDAH, MALASIA

Observé una nutria de Sumatra, nadando, en el Río Labua en Kuala Labua (confluencia de los ríos Labua y Muda, y lugar donde está el Earth Lodge), en la Reserva Forestal Ulu Muda, que forma parte de un área de 160.000 hectáreas de selva tropical en el estado de Kedah, norte de Malasia. El avistaje puede ser significativo, ya que podría ser el primero confirmado en el área en años recientes, y también lo es por el tipo de hábitat. Otros avistajes y la literatura científica en general asocian a esta especie con el bosque pantanoso de turbera. En este caso, el animal fue observado en el pequeño, transparente y bastante rápido río Labua. No se conoce que haya hábitat de pantano de turbera en el área cercana.

R E P O R T

PHOTOGRAPHIC RECORDS OF EURASIAN OTTER *Lutra lutra* FROM THE CENTRAL INDIAN LANDSCAPE

Aditya S. JOSHI[1*], Vivek M. TUMSARE[1], Anil K. NAGAR[2], Ashok K. MISHRA[2], and Milind P. PARIWAKAM[1]

[1] *Wildlife Conservation Trust, 11th Floor, Mafatlal Center, Nariman Point, Mumbai - 400021, Maharashtra, India.* [*]*e-mail: aditya@wctindia.org.in*

[2]*Satpura Tiger Reserve, Madhya Pradesh Forest Department, Madhya Pradesh, India*

(Received 16th June 2016, accepted 24th October 2016)

Abstract: The Eurasian otter *Lutra lutra* is listed as one of the three otter species found in India, while clear photographic evidence of the species has been wanting even from the reported locations such as from the Himalayan foothills and the southern Western Ghats. We report photographic evidence of presence of *Lutra lutra* from camera-trap images taken in the Satpura Tiger Reserve in the state of Madhya Pradesh. This finding extends the known geographical range of the Eurasian otter to central India.

Keywords: Camera traps, Central India, Eurasian otter, *Lutra lutra,* range extension, Satpura Tiger Reserve

Citation: **Joshi, AS, Tumsare, VM, Nagar, AK, Mishra, AK and Pariwakam, MP (2016).** Photographic Records of Eurasian Otter Lutra lutra from the Central Indian Landscape. *IUCN Otter Spec. Group Bull*. **33** (1): 73 - 78

INTRODUCTION

Three species of otters, namely, the smooth-coated otter *Lutrogale perspicillata* I. Geoffroy Saint-Hilaire, 1826, Asian small-clawed otter *Aonyx cinereus* Illiger, 1815, and the Eurasian otter *Lutra lutra* Linnaeus, 1758 have been reported to occur in the Indian subcontinent (Pocock, 1939). Of these, the smooth-coated otter is the most widely distributed in India, with several well-documented records. However, the Asian small-clawed otter and the Eurasian otter seem to be patchily distributed; found only in the Himalayan foothills in northern India and the southern Western Ghats (Pocock, 1949; Hussain and Choudhury, 1977; Prater, 1980; Foster-Turley and Santiapillai, 1990). Mohapatra et al. (2014) confirmed the presence of the Asian small-clawed otter from the Eastern Ghats (Odisha). Except for the smooth-coated otter, there was no evidence until recently for the other two species from central India (Fig. 1). The presence of the Eurasian Otter in India, however, is not yet known from any confirmed photographic evidence till date. Despite indirect evidence (mainly from tracks) from the Himalayan region, there is no report of the species occurring in central India (Hussain, 1999).

The Eurasian otter *Lutra lutra* has a wide distribution covering Europe, Africa and Asia. The species is listed as Near Threatened as per the IUCN Red List (Roos et al., 2015). Throughout its range this species has likely gone extinct from many regions or has been reduced to small isolated populations. Except for Europe, data on population

status and distribution of Eurasian otters from the rest of its range are lacking (Chanin, 2003).

In India, the Eurasian otter is known to be a species found in cold mountain streams and rivers. In the Himalayas, during summer the species is believed to move upstream and is recorded up to 3663 m above sea level (Pocock, 1939; Prater, 1980). In this paper we report the presence of Eurasian otter from the central Indian landscape based on photographic evidence from camera traps placed within the Satpura Tiger Reserve area in the state of Madhya Pradesh. As per the existing knowledge, this is likely the first ever photographic record of live individuals of the species from India.

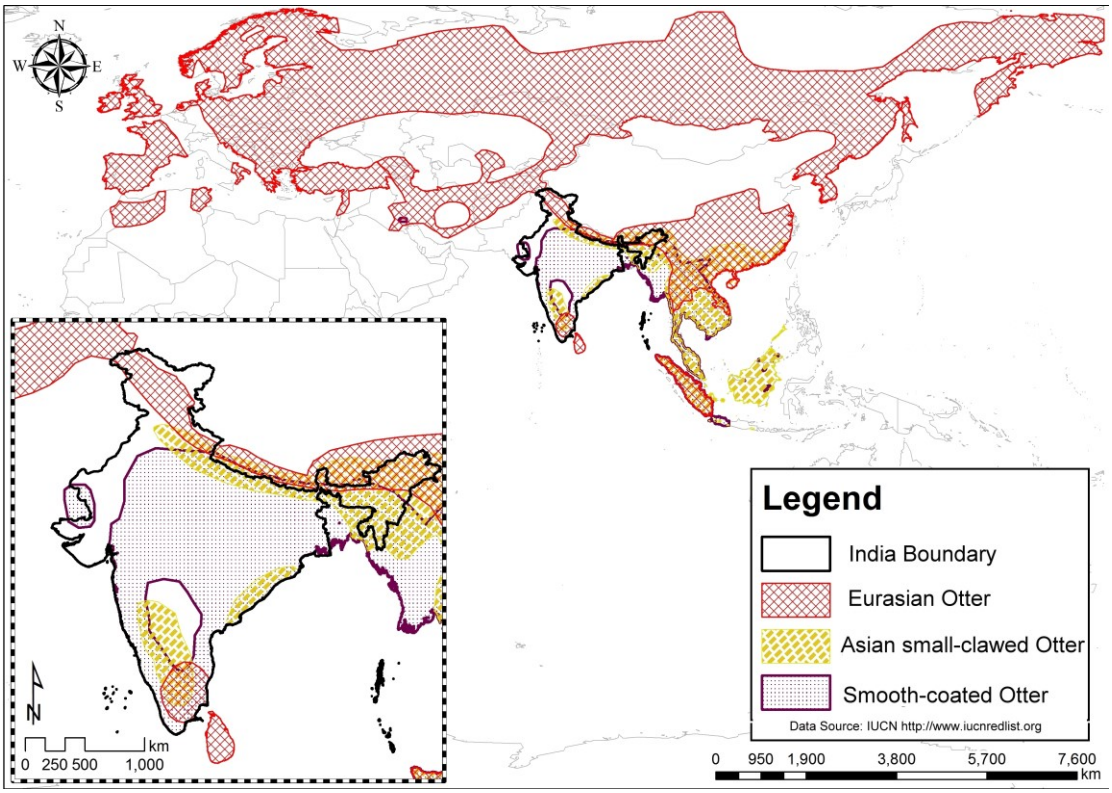

Figure 1. Global distribution of the Eurasian Otter, Smooth-coated Otter, and Asian Small-clawed Otter according to IUCN Red List www.iucnredlist.org. Note that the Eurasian Otter is not shown from the central Indian landscape.

STUDY AREA

The Satpura Tiger Reserve (22°29N, 78°14'E) in the state of Madhya Pradesh is a part of the Satpura hill ranges of central India. Several major rivers originate from the Satpura hill ranges and many of them emerge from the Satpura Tiger Reserve (STR) region. Satpura is one of the most rugged terrains in central India; with steep mountains and deep gorges, and is among the less explored regions in the country for biodiversity. The elevation range of the Satpuda hills is from 250 m to 1354 m, the highest peak being Dhupgarh at 1354 m. The average rainfall in the area is 1979.5 mm/yr (maximum 2122 mm and minimum 1302.2 mm) and temperatures range from 8.9 degrees Celsius in winter to 42.1 degrees Celsius in the summer period (Indian Meteorological Department). The forest type in STR is mostly dry deciduous, with

evergreen and mixed riparian forest stretches along the perennial streams. The study was conducted from November 2015 to January 2016.

METHODS

While camera-trapping for tigers *Panthera tigris tigris* in the Satpura hill ranges, otter footprints and spraints were recorded along rivers/streams in December 2015. Unable to distinguish between species based only on the spraints and footprints, we decided to place camera traps in an attempt to photo-capture otters. Rock boulders with spraints, sandy banks along the streams/rivers and slopes near deep pools in flowing streams were selected for placing the camera traps. The camera traps (Panthera V5 & V6) were left for 25-30 days for logistical reasons; minimising the effort of camera removal, the duration was kept the same as that for tigers. Camera traps were deployed at 21 trapping sites. GPS locations of the traps and sightings were plotted on a map. The otter species photographed were identified based on field guides (Pocock, 1939; Menon, 2003; Hunter, 2011) and through consultation with otter experts in the IUCN Otter Specialist Group (Will Duckworth and Nisarg Prakash).

RESULTS

Two otter species were detected during the sampling period. Smooth-coated otters were photo-captured at three trapping locations along the forest roads which were setup for sampling tigers. Eurasian otters were photo-captured in camera traps deployed along the hill streams. A total of nine captures of Eurasian otters were obtained from 3 trap locations. Smooth coated otters were camera trapped in lowland areas at altitudes ranging from 300 to 480 m while the Eurasian otters were camera trapped at altitudes ranging from 550 to 700 m (Fig. 2). Eurasian otters were clearly distinguished from smooth-coated otters based on their nostril and muzzle shape, bedraggled coat, conical tail, whiskers, and overall stature (Fig. 3).

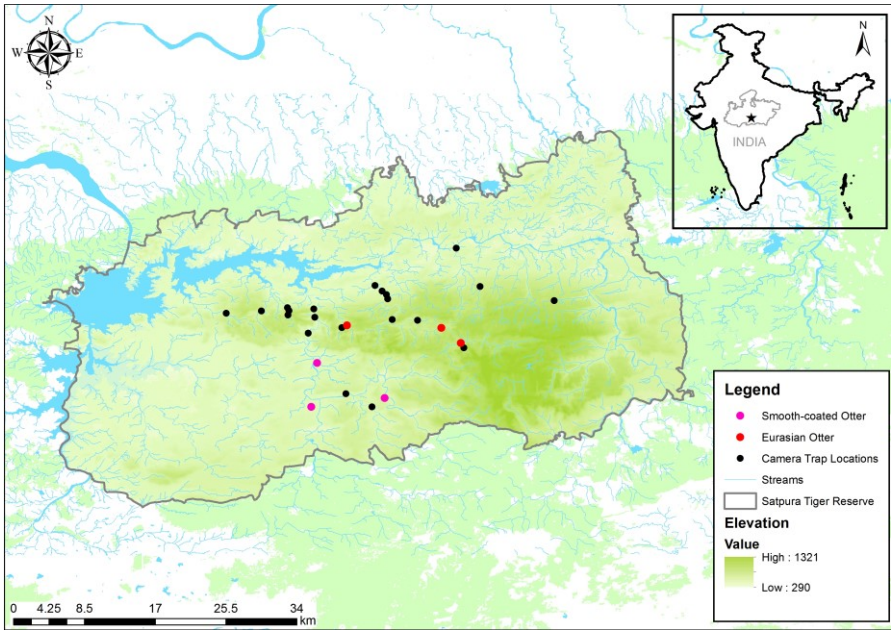

Figure 2. Occurrence locations of Eurasian Otter (red points) and Smooth-coated Otter (pink points) in the Satpura Tiger Reserve. The Eurasian Otter occurred at higher elevations (>550 m) and the Smooth-coated Otter occurred at low-elevation areas (<500 m).

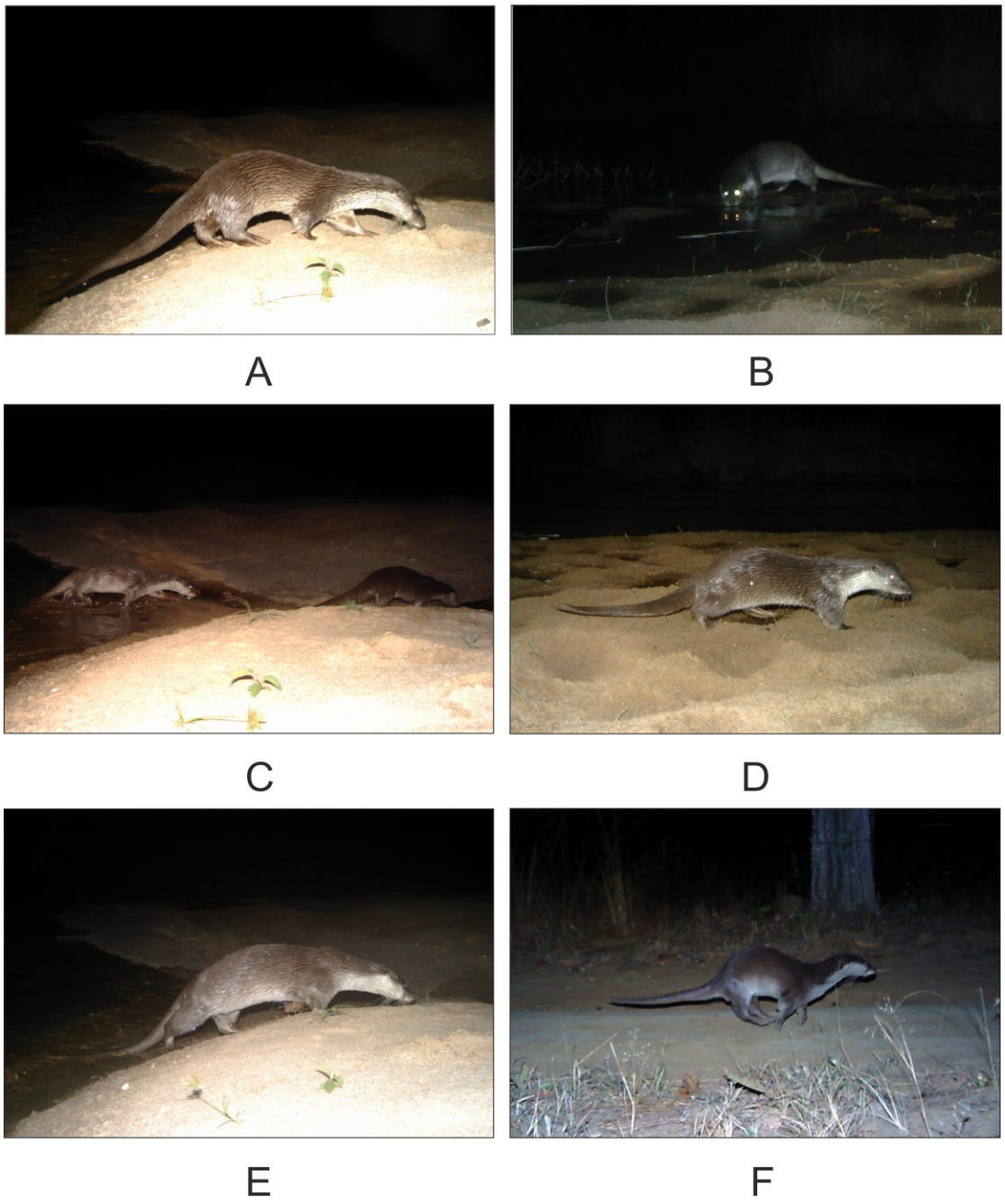

Figure 3. Camera trap photographs of the Eurasian Otter (images A to E) and the Smooth-coated Otter (image F) from the Satpura Tiger Reserve. Note the conical tail, bedraggled coat, wider muzzle and nostrils of the Eurasian Otter, as against the smoother appearance and the stouter musculature of the Smooth-coated Otter.

DISCUSSION

Our photographic record of Eurasian otters from the Satpura Tiger Reserve extends the known geographical range of the Eurasian otter to the central Indian landscape and also provides the first photographic evidence of the species from India till date. We wish to highlight that this is a crucial finding for the region and strongly emphasizes on the need for more systematic efforts to document mammalian

biodiversity in remote regions of central India. Often, camera-trapping coverage for large carnivores (e.g. tigers) might lead to limited coverage of habitats where otters occur (pers. obs.). With greater coverage and more targeted, systematic sampling of riparian habitats in forested hill regions, a better picture of otter distribution can emerge.

Most otter occurrence studies carried out in India have been based skin samples obtained from field (Pocock, 1939) and indirect evidences especially based on detection of spraints and footprints (Conroy et al., 1998; Perinchery et al., 2011, Nawab and Hussain, 2012; Prakash et al., 2012). However, species that are difficult to distinguish based on indirect evidences need validation with certainty (Conroy et al., 1998). It is clear that the currently known geographical distribution of otters, especially in the Central Indian landscape and the drier regions of the peninsula, is due to the lack of adequate sampling coverage. Our new evidence shows that there is a high likelihood of other river systems supporting otter populations in the central Indian landscape. Further genetic and morphological studies are also needed to ascertain the sub-species status of the Eurasian otter population in the central Indian region. Currently, the south Indian subspecies *Lutra lutra nair* (Prater, 1980) and the northern range limit for the species needs to be ascertained, or the possibility of a separate central Indian subspecies needs to be investigated.

Acknowledgements - We are thankful to the Madhya Pradesh Forest Department for providing necessary permits for carrying this research. We thank S. Khan, N.S. Alawa, and B. Rajput for sharing valuable information on streams of STR and supporting the fieldwork. We are grateful to Panthera, USAID and HT Parekh Foundation for supporting this research, and to Wildlife Conservation Trust for institutional support. We thank Vishal Bansod, Advait Keole, Aniket Sayam, Subbaiah K., Ankur Kali, Rakesh Ahuja and Rajesh Bhendarkar for helping with the camera trapping exercise. We are grateful to Nachiket Kelkar, Nisarg Prakash, Will Duckworth, and Robert Timmins for helping with the species identification and insights on the status of otters in the CIL.

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RÉSUMÉ

ENREGISTREMENTS PHOTOGRAPHIQUES DE LOUTRE D'EUROPE *Lutra lutra* PROVENANT DU CENTRE DE L'INDE

La loutre européenne *Lutra lutra* est répertoriée comme l'une des trois espèces de loutres trouvée en Inde, même si des preuves photographiques claires de cette espèce ont été nécessaires pour des emplacements listés tels que les contreforts de l'Himalaya et le sud des Ghats occidentaux. Nous avons donc rapporté des preuves photographiques de la présence de *Lutra lutra* grâce aux images prises par des caméras cachées dans la réserve de tigres du Parc national de Satpura dans l'état de Madhya Pradesh. Cette découverte étend la zone géographique connue de la loutre européenne en Inde centrale.

RESUMEN

REGISTROS FOTOGRÁFICOS DE LA NUTRIA EURASIÁTICA *Lutra lutra*, DEL PAISAJE DE INDIA CENTRAL

La nutria eurasiática *Lutra lutra* está listada como una de las tres especies de nutria que se encuentran en la India, pero al mismo tiempo no ha habido clara evidencia fotográfica de esta especie inclusive en las localidades reportadas -tales como el pie de los Himalayas, y los Ghats sudoccidentales. Informamos de evidencias fotográficas de la presencia de *Lutra lutra* a partir de imágenes de cámaras-trampa tomadas en la Reserva de Tigres Satpura, en el estado de Madhya Pradesh. Este hallazgo extiende el rango geográfico conocido de la nutria eurasiática, a India Central.

REPORT

FIRST SYSTEMATIC SURVEY FOR OTTER *(Lutra lutra)* IN LADAKH, INDIAN TRANS HIMALAYAS

Pushpinder Singh JAMWAL[1*], Jigmit TAKPA[2], Pankaj CHANDAN[1], Melissa SAVAGE[3]

[1]*Western Himalayas Landscape, WWF-India*
[2]*Department of Wildlife Protection, Jammu and Kashmir, India*
[3]*University of California, Los Angeles, USA*
* e-mail pushpindersjamwal@gmail.com (*corresponding author)




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ABSTRACT: We report the findings of the first survey for Eurasian otter (*Lutra lutra)* from the Upper Indus River and several of its tributaries in Leh and Kargil Districts, India. The survey was conducted between 25th August to 30th October, 2015. We report the distribution of otter sign, including camera trap images, scats, tracks, and latrines, and the habitat characteristics along 50 km of riverbank. We observed indirect sign of otter presence on two of the four rivers surveyed, but otter abundance appears to be low in the area. Human disturbance, including proximity to settlements, grazing livestock, and particularly feral dogs, appears to deter otter presence.

Key words: Eurasian otter, *Lutra lutra*, Western Himalaya landscape, Indus River, Dras River

INTRODUCTION

The presence of otters in the Upper Indus River Valley of Ladakh, India, has only been reported anecdotally to date. Ladakh is a region in the northernmost Indian State of Jammu and Kashmir, on the western edge of the Tibetan Plateau. The great trough of the Upper Indus River Valley runs between the Zanskar Mountains, north of the Great Himalaya Range, and south of the Ladakh Mountains, a part of the Karakoram Range. The Indus originates in the Chinese portion of the Tibetan Plateau and flows west through Ladakh, continuing in a great arc to the south into Pakistan, where it provides the largest share of irrigation waters for that country. It is already a large river in the Ladakh valley, fed by glaciers, fluctuating significantly with the season of meltwater, and nearly freezing over during the deep Ladakhi winter. Tributaries to the Indus are large rivers in themselves, some more than 30 m wide.

The Ladakh Valley is a high-elevation, trans-himalayan desert in the rain shadow of the Himalayas, with sparse precipitation, ~10 cm annually, coming mostly as snow in winter. Summers are short and can be hot, with temperatures ranging from 3° to 35° C, while winters are long and bitterly cold, with temperatures that drop to -

35° C or lower. Natural vegetation is sparse, except along waterways.

Anecdotal records of Pfister (2004) and Shawl et al. (2008) report the occurrence of the Eurasian otter in Ladakh, but no systematic surveys had as yet been conducted to confirm their distribution in the region. Shawl et al. (2008) state that the otter in Ladakh may be found along the Indus River and its tributaries, the lower Zanskar and Rumtse Rivers, and in the Suru and Dras River valleys in the Kargil area, up to 3,500 m asl. Conversations with both otter scientists and local people suggested that otters historically occupied the Upper Indus, but possibly had been extirpated.

Locally known as *chusham* in Ladakh and *chustam* in Kargil, the Eurasian otter is said to be nocturnal and may migrate to lower elevations in winter (Shawl et. al., 2008). Locals readily recognize a description of the animal, but few reported seeing an otter in recent years. As a consequence, the otter has not been a species of concern for management agencies, and therefore not offered the same conservation attention afforded to other charismatic fauna, such as the Snow Leopard (*Panthera uncia*). Otter populations are declining throughout Asia and the Himalayan region, subject to human pressure on water resources, fragmentation of habitat, and the illegal pelt trade (Foster-Turley et al., 1990; Yoxon, 2007; Kafle, 2009; de Silva, 2011). We had two objectives: 1) to document the distribution and density of otter sign - tracks, scats, and latrines, and 2) to examine the association of vegetation, bankside strata and human disturbances with otter sign.

STUDY AREA

Survey stretches were selected based on anecdotal otter observations in the literature (Pfister, 2004; Shawl et al., 2008). Four river stretches were chosen to reflect these reports, including, (1) the Indus River (from the towns of Leh to Upshi); (2) the Suru River (tributary to the Indus River) near the town of Kargil, (3) the Dras River (above the confluence with the Suru River) and (4) the Zanskar River (above the confluence with the Indus River). The town of Leh is located at 3,524 m asl, and the downstream town of Kargil at 2,676 m asl. (Figure 1).

METHODOLOGY

A total of 50 plots were sampled: 20 plots along the mainstem Indus River, 5 plots along Suru, 10 plots along the Dras River, and 15 plots along Zanskar River. Each plot ran along the river bank for 100 m and 10 m in from the river edge for a 1,000 m^2 plot. Plots were placed 900 m apart on a transect on one bank of the river. Sampling was conducted in September, when river flows are dropping, leaving mud and sand banks exposed to record otter sign. As the survey proceeded, it became apparent that otter sign was relatively scant, so if terrain allowed, a complete transect along the bank was covered. This was possible on the Indus, Suru and Dras Rivers, but not on the Zanskar River.

Within each plot, we searched for otter sign. A plot was considered 'positive' for otter sign if tracks, scats, or latrines were found. Scat was identified by the presence of fish bones and scales and a fishy odor. Latrines, displaying multiple scat and tracks, were usually located on large boulders near the water's edge. Tracks were identified by a round impression of five toes and faint webbing marks; only positively identified otter tracks were recorded.

Otters are sensitive to habitat characteristics, preferring sites with vegetation or large boulders for protected resting sites, sandy beaches or vegetation for rolling and drying, and large flat rocks near the waterline on which they consume their prey. We sampled for vegetation cover (classified as 0-5%, >5-25%, >25-50%, >50-75%, and

>75-100%) and bank substrate (classified by diameter as < 1 cm (sand and mud), 1-10 cm (small stones), >10 cm - .5 m (large stones), >.5 m (boulders). Mean vegetation cover and mean substrate composition were calculated by averaging the mid-point of each percent cover category. Habitat disturbance (characterized by abundance of dog and cow tracks, trash, and proximity to houses) was recorded as none, light, moderate, or severe, and expressed as a porportion (total percentages may not equal 100% because of use of mid-points of values in calculations).

RESULTS

Otter scat, latrines, and tracks were recorded at two of the four survey stretches, the mainstream Indus and Dras Rivers and later otter camera trap images were captured at one of the four survey stretches (Fig. 1).

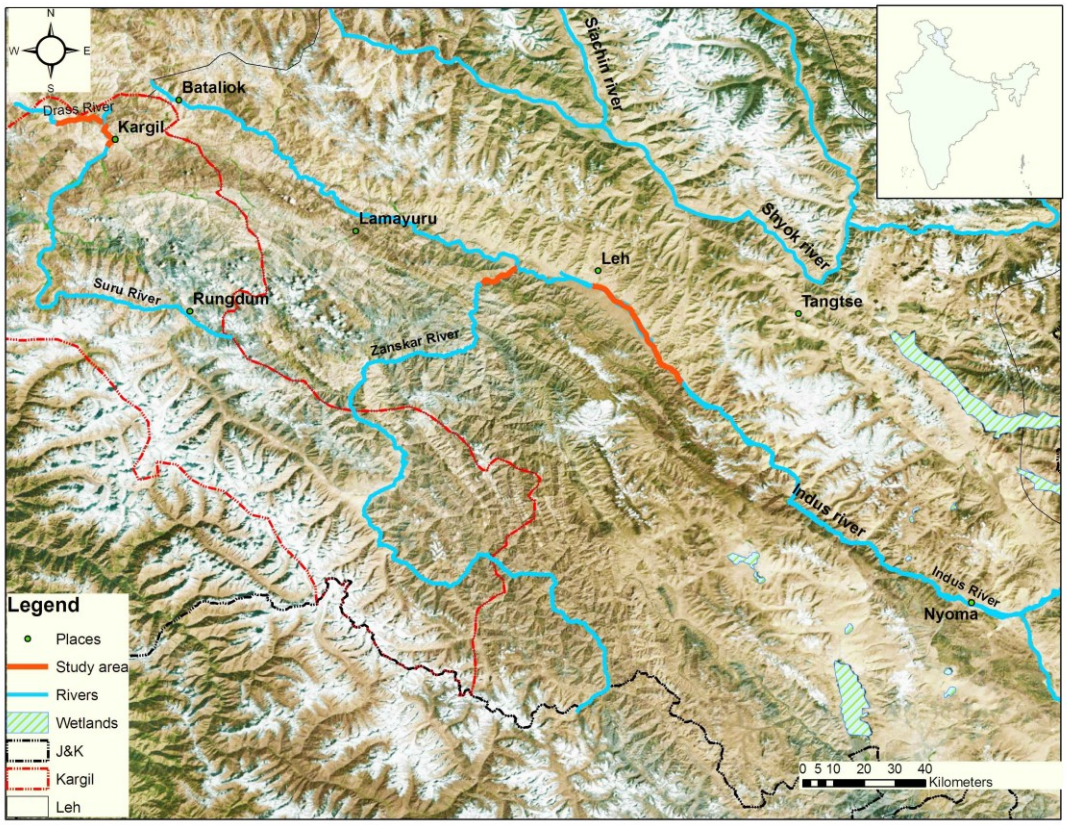

Figure 1. Map of surveyed river stretches in Ladakh, India

Indus River site: The Indus River flows east-west through the centre of the Ladakh valley, past a series of small villages, where it frequently splits into multiple channels and is diverted by canals for irrigating crops and orchards (Fig. 2). Clumpy, often impenetrable thickets of seabuckthorn (*Hippophae* spp.) are common on or near banks, as are domesticated Lombardy poplars (*Populus* spp.) and willow trees (*Salix* spp.). These vegetation communities, together with sandy and cobbly beaches, can provide good intermittent habitat for otter resting and denning sites. Mean vegetation cover varied considerably along the site, with 55% bare, 7% light, 7% moderate, 10% mostly, 14% heavy vegetation cover. Mean substrate at the site was: 32% sand and mud, 22% small stones, 17% large stones, and 15% boulders. Human impact was: 15% none, 60% light, 15% moderate, and 2% severe.

Figure 2. Upper Indus River near the town of Leh, Ladakh.

Dras River site: The Dras River was surveyed from its confluence with the Suru River, near the town of Kargil, upstream for 10 km. Bankside terrain was primarily steep slopes, but the river's edge primarily consisted of jumbles of large boulders and small sandy beaches. Mean vegetation cover was: 88% nearly bare, 4% light, 3% moderate, 3% mostly, and 3% heavy vegetation cover. Mean substrate at the site was: 8% silt and mud, 8% small stones, 14% large stones, and 75% boulders. Human impact was quantified at 70 % none and 30% light.

Zanskar and Suru River sites: No otter sign was found at the Zanskar or Suru study sites.

The Zanskar runs through a deep narrow gorge within the Zanskar Range to join the Indus River below Leh. The site was surveyed for 15 km upriver from the confluence with the Indus River. The most common waterline is formed by sheer rock and enormous boulders that front directly onto the river, providing little otter habitat. There is virtually no vegetation near the river bank along this reach of river, and the river runs narrow and fast, with numerous rapids. Sandy coves are scattered intermittantly along the river, but these showed no tracks or scat of otters. Along the Zanskar River, mean vegetation cover was: 84% nearly bare, 3% light, 3% moderate, 5% mostly, 3% heavy vegetation cover. Mean substrate at the site was: 22% sand and mud, 25% small stones, 20% large stones, and 34% boulders. Human impact was: 87% none and 13% light.

The Suru River was surveyed for 5 km downstream from the town of Kargil. The narrow banksides were a mix of large and small boulders and rarely, small sand beaches. No otter sign was found at the Suru site. This may be attributed to the proximity of a busy town, located on both sides of the river. Mean vegetation cover consisted of 66% nearly bare, 12% light, 15% moderate, 3% mostly, and 20% heavy vegetation cover. Mean substrate at the site was: 39% sand and mud, 7% small stones, 36% large stones, 15% boulders. Human impact on the river bank was: 70% none and 30% light.

With so few documented otter signs, we did not seek statistical differences among habitat features of sites. There was no obvious association between otter sign and habitat characteristics. The Indus site (otters present), actually had relatively more human impacts (17% moderate or severe) because of the proximity to more towns and villages, than sites without otters (100% none or light at both the Zanskar and Suru sites (no otters).

The Dras site (otters present) was 88% nearly bare, with only 3% heavy cover, while the Zanskar site (no otters) was similarly 84% bare, also with 3% heavy vegetation. The Suru site (no otters), by contrast was only 66% nearly bare, with a higher cover (20% heavy cover). Only the Indus site (otters present) showed what would be expected for better otter habitat, with 14% heavy cover and only 55% nearly bare. There is some association in the substrate component of habitat. Boulders provide good resting sites while natural crevices can form denning sites, especially where vegetation is scarce, and the Dras site (otters present) did have 75% boulders, compared to the Zanskar site (no otters) (34% boulders), the Suru site (no otters) (15% bolders), or even the Indus site (otters) (15% boulders).

DISCUSSION

We believed the following sign had a high probability of being *L. lutra* sign: at least 8 scat (plus another 4 possible), 3 latrines, and 3 tracks. All of these were from the Indus and Dras sites. Scats were identified by color (tarry), smell, (fishy and fragrant), size (smaller, thinner and darker than dog scat), location (on single rocks 0.5m to 1 m from the river edge), and the presence of fish bones. Our estimate of otter tracks was highly conservative because of the abundance of feral dog tracks.

Otters are cryptic species and in much of their distribution ranges they are often nocturnal. From indirect sign, we documented the presence of *L. lutra* in the upper stretches of the Indus near the town of Leh, and along the Dras River near the town of Kargil. However, otter sign was notably scarce, however, probably reflecting a low otter population throughout the watershed. It may also reflect a migration pattern to lower elevations as colder weather sets in. By late September, night-time temperatures were well below freezing.

Several months after our field sampling, a local citizen photographed an otter in the Indus River, and then camera trap images confirming the presence of otters in the watershed (Fig. 3 and Fig. 4).

Figure 3. Otter swimming in the Indus River in the Ladakh Valley

Figure 4. Rear view of Eurasian otter at Indus river, Ladakh

Our results are conservative and preliminary. Challenges of the terrain - sheer cliffs, multiple river channels, deep mud, flood control walls, shrub thickets, and perhaps most of all, the existence of many mid-stream islands with highly suitable otter habitat - unsampled by our foot survey - suggest that many otter sign in the study areas were missed by our survey. Analysis of scat DNA and further in-depth studies will sketch a more informative portrait of otter populations in Ladakh.

While recommendations for otter conservation often cite very challenging threats, such as the construction of hydroelectric power plants or conflicts with local fishing people, this study suggests that one of the clearest threats to otter presence on the Upper Indus is the abundance of feral dogs. Packs of dogs are a threat to otters (Anoop and Hussain, 2004; Kruuk, 2006), and otters tend to avoid them. Along the Indus, for example, otter sign became more abundant the farther the survey went from the town of Leh. In winter especially, many Ladakhi feral dogs form aggressive packs because of food scarcity. Reducing the abundance of feral dogs is an achievable goal for a conservation program, and would, we believe, significantly improve the environment for otters.

Overall, our study indicates that there exists a small population of otters in the Ladakh Valley, good habitat, and the potential for a recovery to greater abundances. The confirmation of otters in this part of the Indus River is the first step in developing a conservation strategy for otters in the Ladakh Valley.

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RÉSUMÉ

PREMIERE ENQUETE SYSTEMATIQUE DES LOUTRES (*Lutra lutra*) AU LADAKH, INDE TRANSHIMALAYENNE

Nous rapportons ici les résultats de la première enquête menée sur la loutre européenne (*Lutra lutra*) au niveau de la partie haute du fleuve Indus et plusieurs de ses affluents des régions de Leh et de Kargil en Inde. L'enquête fut conduite du 25 Août au 30 Octobre 2016. Nous rapportons donc ici la distribution d'indicateur de présence de loutre incluant des fèces, des empreintes, des latrines et des terriers sur 50 km de berges. Nous avons pu observer des signes indirects de la présence de loutre sur deux des quatre rivières surveillées, mais les loutres semblent être peu nombreuses dans cette région. Les perturbations causées par l'homme incluant la proximité des habitats, les zones de pâturage, et particulièrement les chiens féroces semblent dissuader les loutres.

RESUMEN

PRIMER RELEVAMIENTO SISTEMÁTICO DE NUTRIAS *(Lutra lutra)* EN LADAKH, TRANS HIMALAYAS INDIOS

Informamos los hallazgos del primer relevamiento de nutria eurasiática (*Lutra lutra*) del Río Indus Superior, y varios de sus tributarios, en los Distritos Leh y Kargil, India. El relevamiento fue conducido entre el 25 de Agosto y el 30 de Octubre de 2016. Informamos la distribución de los signos de nutria, incluyendo fecas, huellas, y letrinas, y las características del hábitat a lo largo de 50 km de ribera del río. Observamos signos indirectos de la presencia de nutrias en dos de los cuatro ríos relevados, pero la abundancia de nutrias parece ser baja en el área. La presencia de nutrias parece estar afectada por disturbio humano, incluyendo proximidad a asentamientos, pastoreo por ganado, y especialmente perros asilvestrados.

R E P O R T

HOME ALONE: RECORDS OF ABANDONMENT OF STILL-DEPENDENT GIANT OTTER (*Pteronura brasiliensis*) AND NEOTROPICAL OTTER (*Lontra longicaudis*) INDIVIDUALS IN BRAZILIAN AMAZON

Natalia Camps PIMENTA[1], Adrian Paul Ashton BARNETT[1], Stella Maris LAZZARINI[2], Daniella Carvalho RIBEIRO[2], Claudiane dos Santos RAMALHEIRA[3], Fernando Cesar WEBER ROSAS[3]

[1]Amazon Mammals Research Group, Department of Ecology, National Institute of Amazonian Research, Manaus, Brazil. e-mail: natalia.camps@gmail.com; Telephone: 55 (92) 3643-3225
[2]Department of Environment, Eletrobras Amazonas GT, Manaus, Brazil
[3]Aquatic Mammals Laboratory, National Institute of Amazonian Research (INPA), Manaus, Brazil

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Abstract: Despite the increase of Lutrinae studies, the knowledge of some behaviors remains limited, especially those that are rarely seen. This study presents three cases of cub abandonment by *Pteronura brasiliensis*, and one for *Lontra longicaudis*. The three cases of giant otter abandonment occurred in nutrient poor habitats. The neotropical otter case may be related to cub illness. The current reports, and any future reports they encourage, could be important when developing conservation plans for these species, since natural deaths may have implications for population dynamics. Such reports could also contribute to an understanding of the circumstances surrounding abandonment behavior.

Keywords: behavior, cooperative breeding, endangered species, Lutrinae, parental care.

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All mammalian infants require special care to survive during the initial stages of life (Thompson et al., 2010). This scenario is no different for otters. For giant otter (*Pteronura brasiliensis*), a social species characterized by the presence of one reproductive pair and non-reproductive individuals, all adult individuals in the group are responsible for helping in territory defense and for shared care of the young (Carter and Rosas, 1997). However, as non-reproductive adult are not obligate assistants, giant otter appears to occupy an intermediate position between the cooperative and non-cooperative breeding species (Rosas et al., 2009).

Usually, but not always, young cubs remain in the den with one or more adults - breeders or non-breeders - as companions or babysitters - while the rest of the group forages and patrols the group territory (Duplaix, 1980; Carter and Rosas, 1997; Staib, 2005; Rosas et al., 2009). The role of companions is to protect the cubs against potential predators, dehydration, drowning and hypothermia, and generally help raise the offspring of the reproductive pair.
The situation is somewhat different for the neotropical otter (*Lontra longicaudis*). While giant otters are social and monogamous, the neotropical otter is most often solitary and seems to have a polygamous mating system where males, which have larger territories than females, superimpose their territories on those of several females. However, according to Larivière (1999), the male remains only one day with the female, and the parental care is carried out solely by the mother.

Investment by parents in young is often very extensive in terms of time, energy, and curtailment of overall reproductive effort (Pontier et al., 1993; Charnov and Ernest, 2006). Abandoning such expensive investments should be rare, and occur only under extreme circumstances, or occur as a result of pure accident (Trivers, 1972). Consequently, in otters, the absence of adults from dens with cubs is generally observed only when there is no imminent danger (Rosas et al., 2009). Often such absences appear to have no negative consequences. However, occasionally newborn individuals are genuinely abandoned, and this can lead to severe consequences for the individual involved, as well as repercussions for the local population. Natural deaths may play a significant role in population dynamics when a species is endangered (Duplaix et al., 2008), and so should be considered in future management plans (Rosas and de Mattos, 2003).

To our knowledge this is the first detailed report of offspring abandonment for either of these species. A report by Staib and Schenk (1994) mentioned that abandonment might occur, but gave no concrete details. McTurk and Spelman (2005) mentioned ‘orphaned’ giant otter cubs, but did not specify how they gained this status, while the solitary cub mentioned by Lima and Marmontel (2011) had survived poaching, not abandonment. In the only other publications known to us that mentions mortality in *P. brasiliensis* cubs, death was the result of either cannibalism or territorial conflict, but not abandonment (Mourão and Carvalho, 2001; Leuchtenberger et al., 2015).

Abandonment of young can be an adaptive strategy when continued current investment compromises overall long-term fitness (Trivers, 1972), and has been reported for a variety of larger mammals, including those with cooperative care (e.g. hunting dogs – Malcolm and Marten, 1982; lions – Eloff, 1980; Packer and Pusey, 1983; meercats - Doolan and MacDonald, 1997; Klug and Bonsall, 2007 for general review). Abandonment of cubs has also been reported in other otter species, either in response to low food availability (Kruuk et al., 1991), cub illness (Simpson et al., 2008), or den disturbance (Jeffries, 1987; Hauer et al., 2002). However, it has not been reported for any species of otter in the Neotropics. Here, we report four instances of abandonment of young in otters from the Neotropics; three involving the giant otter, and one the neotropical otter.

The first incident occurred in the Uatumã Biological Reserve (see Figure 1), upstream of the Balbina dam in Amazonas State, Brazil (IBAMA, 1997). On 3rd January, 1996 a solitary newborn giant otter cub was found by fishermen. The individual was on a muddy beach (details in Table 1, Figure 2A), used by local fishermen to berth boats when landing fish (01°55' 15.4" S; 59° 29' 58.5" W). No adult otters were seen in the vicintity. No known den was nearby. According to the fishermen, the animal was relocated to a more visible location in hope of being rescued by any member of the group. However, the cub remained alone, vocalizing and appearing to be in pain. After 4 hours, the animal was taken to CPPMQA (Centro de Preservação e Pesquisa de Mamíferos e Quelônios Aquáticos) of Eletrobras Amazonas GT at Balbina village to receive neonatal care.

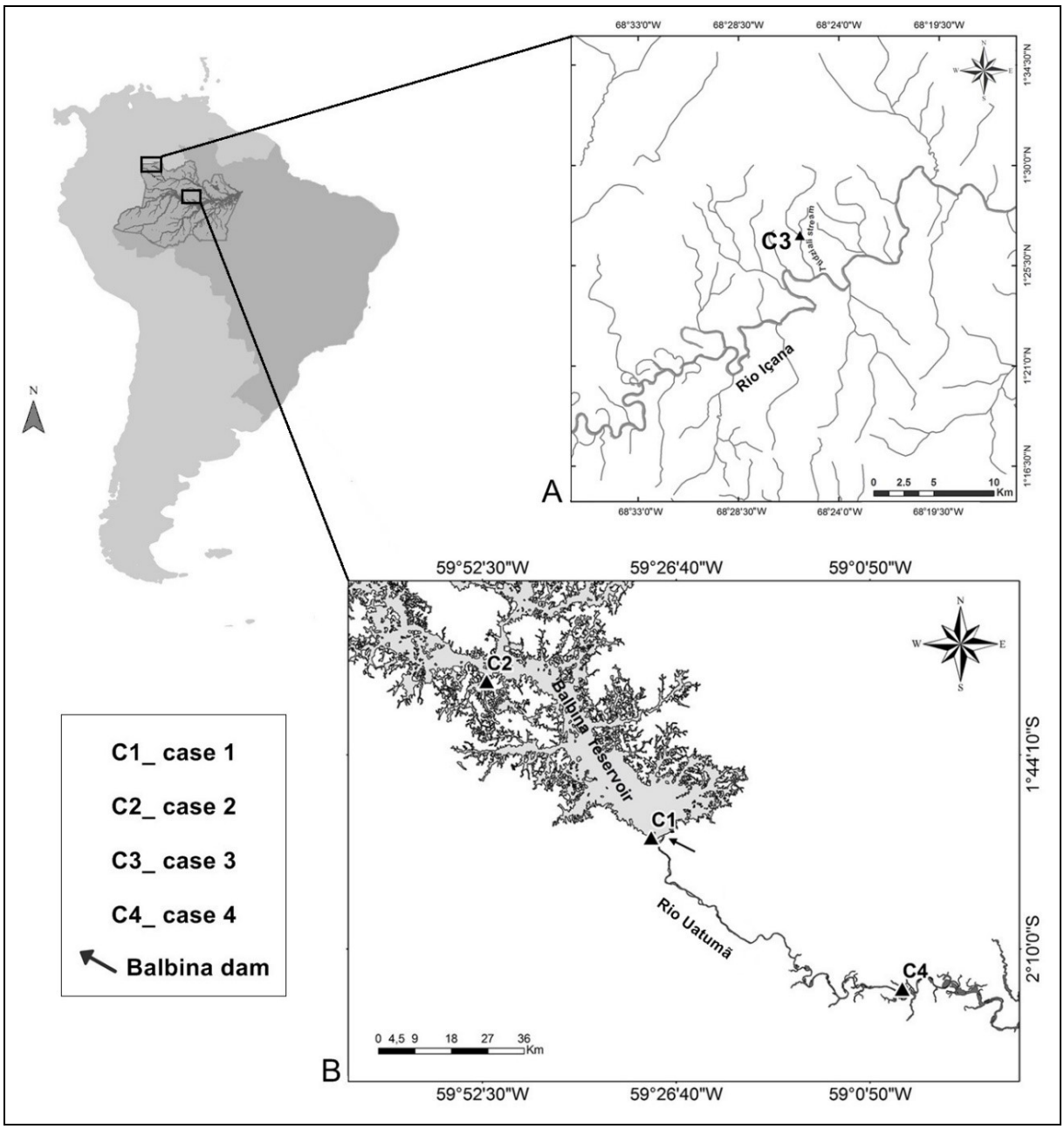

Figure 1. Study areas of Rio Içana (a) and Rio Uatumã (b). C1, C2 and C3 indicates the location of the *P. brasiliensis* newborn cubs reported in case 1, 2 and 3, respectively, and C4 indicates the location of the *L. longicaudis* cub reported in case 4

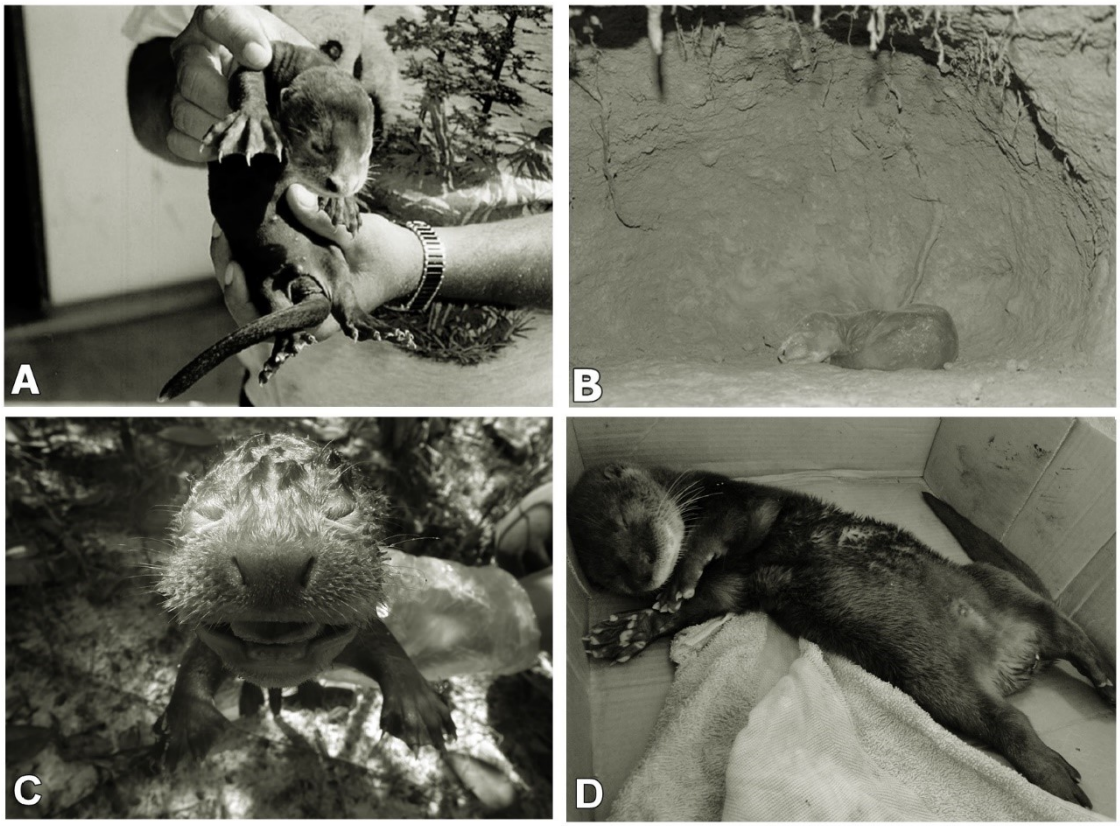

Figure 2. Newborn giant otter cub rescued on a muddy beach on Balbina hydroelectric reservoir (a), second newborn giant otter cub found on Balbina hydroelectric reservoir in situ within the den (b), third newborn giant otter cub with unopened eyes found at Tdziali stream (c), neotropical otter cub found abandoned downstream of the Balbina dam with signs of blindness and pneumonia (d)

The animal was infested with fleas and, based on the loss of epidermal elasticity and low capillary perfusion time, had a moderate degree of dehydration (8 - 9%). The animal had difficulty urinating and defecating, only achieving this when stimulated in ways that mimicked the mother's natural hygienic care behavior. On January 8th the cub began to show abdominal distension. It showed signs of pain, was no longer able to urinate and rejected offered food. It died the same day. A necropsy revealed a distended bladder, occupying one third of the abdominal cavity, which probably resulted from a form of uremia linked to pneumonia. The pneumonia recorded in the necropsy was probably due to the animal's abandonment.

The second case reported here was also recorded in the Balbina hydroelectric reservoir (see Figure 1) where several studies have been carried out in order to determine the impact of hydroelectric lakes on giant otter populations (Rosas et al,. 2007; Cabral et al., 2010; Palmeirim et al., 2014; Rosas et al., 2015). As part of a radio telemetry project, at 02:30 on February 15th, 2014 a funnel-net trap was fixed on an active giant otter den with the aim of catching an otter for radio transmitter implantation (see Silveira et al., 2011 for tagging giant otters for telemetry studies). However, at 08:00 no giant otter had emerged from the den, and the only sound we could hear was the squeaks of a newborn cub (see Duplaix, 1980; Mumm and Knörnschild, 2014 for giant otter vocal repertoire). We concealed ourselves for a further three hours, during which time not a single adult was observed near the den. We then decided to open a trapdoor to investigate its interior, and using a flashlight, we saw a newborn cub completely alone inside the den (details in Table 1, Figure

2B). To avoid our presence causing undue stress, we then fully closed the trapdoor, leaving the cub within, and without having been touched by human hands, in the hope that the rest of the group would return to the cub. It is important to note that while the presence of humans in front of a giant otter den may cause the adults and sub adults to leave, they always return to the den once humans have gone. Such situations have been recorded at least five times in Balbina reservoir: in each case the cubs were moved to another den, but never abandoned them (Rosas et al., 2009; C.S. Ramalheira, personal observation).

Two days later on February 17th, we returned to the den to monitor developments, and to our surprise the newborn was still there, completely alone and dehydrated. We then realized that the cub had been left alone and took it to the Centro de Preservação e Pesquisa de Mamíferos e Quelônios Aquáticos (CPPMQA) at Balbina village. However, it did not survive long, dying on February 25th, 2014. Necropsy revealed pneumonia. However, we do not know whether this was the primary cause of mortality, or resulted from aspiration, thermal shock or other causes.

The third record occurred on the middle Rio Içana (São Gabriel da Cachoeira municipality, Amazonas State, Brazil), Rio Negro basin (see Figure 1), where lakes and streams were visited between October and November 2015 during field research on how landscape characteristics affect otter distribution (Pimenta, 2016). At 10:30 on October 28th 2015, while sampling the Ttdiziali Stream (01°44’75" N; 068°42'96” W), we observed the body of a newborn giant otter cub trapped in the roots of a flooded tree trunk (details in Table 1, Figure 2C). It showed no signs of having received aggression, nor did it have any visible abnormalities. The animal had died recently, as decomposition was not advanced, and no scavenger bites were apparent, but it already showed symptoms of *rigor mortis* (which usually peaks about twelve hours after death, so the animal may have died around 10 p.m. the day before).

Due to logistic limitations, it was not possible to perform a necropsy nor could the animal, or its tissues, be collected. However, observation of the immediately surrounding area leads us to propose that the cause of death was drowning. We found a flooded den some 100m from the body. It was surrounded with giant otter pawprints, indicating recent use. It is considered relevant that at dawn previous night as our discovery of the drowned cub, there had been great storm causing a rapid and substantial rise in river level, which was almost certainly responsible for the observed den flooding.

Table 1. Number of reported cases, date (month, day, year), sex, weight (g), total length (cm), estimated age (according to Bozzetti et al. 2015), and status of the individuals abandoned

Case	Date	Species	Sex	Weight	Total Length	Estimated age	Stage	Observation
1	01/03/1996	*P. brasiliensis*	male	620	46	2 weeks	newborn	eyes unopened
2	02/15/2014	*P. brasiliensis*	male	1.050	52	3 weeks	newborn	eyes unopened
3	10/02/2015	*P. brasiliensis*	male	---	45	2 weeks	newborn	eyes unopened
4	11/17/2010	*L. longicaudis*	male	1.700	75	---	cub	eyes opened

According to Rosas et al. (2009), newborn cubs remain in the den during the day with a babysitter around 50% of the time. The babysitter is usually a single adult from the group, but not a parent (alloparental care). However, for the other 50% of the time newborn animals are left alone in the den during the day. It is possible that, in this

third case, the cub had been left alone just for a moment and fell into the water by itself, as reported elsewhere by Rosas et al. (2008). Nevertheless, the newborn seems to be abandoned in the den during a storm which occurred overnight, a time when the group is generally together and also when nocturnal predators are active. The absence of adults during the night suggests that the cubs had not been momentarily left alone, but has been genuinely abandoned by the group.

The fourth record reported here is of a *Lontra longicaudis* cub (details in Table 1, Figure 2D). It was found by agents from the Uatumã Sustainable Development Reserve conservation team (see Figure 1), downstream of the Balbina dam in the northeastern Amazonas State, Brazil (IDESAM, 2008). On the morning of 17th November 2010, the animal was seen alone and vocalizing throughout the day on the shore of Lake Calabar (02º 15'218" S; 058º 56'30.6" W). The individual was monitored in situ by agents. After one day and one night of waiting, without success, for the return of adults the cub was taken to CPPMQA. It arrived on the morning of the 19th with signs of blindness, discoordination and pneumonia, and started to receive appropriate treatment for recovery.

After one week of treatment it no longer showed symptoms of pneumonia. However, on the morning of 2th January 2011 the animal began to appear lethargic, and was found dead at 14:00 of the same day. A necropsy indicated the cause of death had been congestive pneumonia and cerebral lesions caused by hydrocephaly. The data from the necropsy of this individual, which indicated the animal had hydrocephaly, raises the possibility that in this specific case the animal was left behind due to abnormalities it possessed (which would have prevented it reaching adulthood).

According to Duplaix (1980), giant otter cubs do not leave the den until they are three weeks old (by which time their eyes are open). At one month, with the eyes now opened, they are able to swim, and with 6 weeks cubs regularly follow their parents out of the den and play around the den's entrance with supervision from parents or sub-adult siblings, but do not begin hunting and travelling with the group until they are 3-4 months old (Carter and Rosas, 1997).

In this context, it is notable that all giant otters abandonment records reported here were newborn cubs, which certainly would not have survived without parental/alloparental care. In 15 years of constant monitoring giant otters on Balbina Lake, not a single incident has been recorded of juveniles or individuals from the pre-dispersal age cohorts being abandoned. This scenario has also been found for the European otter (Poledník et al., 2011), and fits with predictions of optimal parental investment theory (Trivers, 1972; Low, 1978; Lycett et al., 1998; Chalfoun and Martin, 2010), and also with the notion that young will be most vulnerable to accidents (Rosas et al., 2009).

It is possible that some of the cases reported here represent a disordered behavioral response by the otters caused by anthropic presence (Lima and Marmontel, 2011). Nevertheless, offspring abandonment has been shown as a natural behavior in many mammal species and tends to occur due to the presence of anomalies, congenital diseases or a larger number of cubs in a litter than can be supported under current conditions. Doing so conserves energy that can then be allocated to the care of

other cubs, or to allocate energy for a future pregnancy that might bring greater reproductive success (see Ross et al., 1959; Low, 1978; Eloff, 1980; Tait, 1980; Elowe and Dodge, 1989; Laurenson, 1994; Maniscalco et al., 2008; White, 2008 for mammals; and Burger, 1982 for a case in birds).

Giant otters' reproductive peak usually occurs at the receding water season (Duplaix, 1980; Laidler, 1984; Evangelista and Rosas, 2011; Rosas et al., 2007), probably as an adaptive behavior to waters dynamic in Amazon, which would facilitate the capture of fish at the end of gestation and the onset lactation to restore energetic and nutritional demands of adult females postpartum (Rosas et al., 2007). In this context, we suggest that those cubs of *P. brasiliensis* found in the Balbina reservoir (case 1 and 2), born during a period which, based on data from the last 10 years (Bozzetti et al., 2015) is outside the species regional birth peak, could have been abandoned by the group as a way to save energy in a period of limited food resources. Similarly, living in a place with of lack resources due to nutrient poverty such as the upper Rio Negro, it is possible that the cub found at Içana (case 3) was left behind in an emergency situation so as to favor the healthier cubs of the litter, since providing milk or a large offspring may require an intense energetic demand that is difficult to supply in such a challenging environment.

The hydrocephaly detected in the *L. longicaudis* cub (case 4) supports the hypothesis of leaving cubs behind due to illness (see Simpson et al. 2008 for a parallel case in European otter). As for the cases which necropsy revealed pneumonia, this may have been caused by low immune capacity due to nutritional deficiency and hypothermia, which draws attention to the costly investment required by adults to ensure otter cub care and successfully raise offspring. The fact that all individuals that were left behind were male also raises the issue of the role of females in mammal populations. In cases of cub abandonment through lack of resources to support a large offspring, it is possible that there would be a bias in abandonments toward males, since females are responsible for generating and nursing the cubs, so playing a key role in population persistence (Cameron, 2004; West et al., 2005).

The cases reported here of abandonment of still-dependent *P. brasiliensis* and *L. longicaudis* cubs clearly demonstrate that this behavior occurs in at least two species of the sub-family Lutrinae, in addition to those cases already recorded for the better-studied European otter (Kruuk et al., 1991; Poledník et al., 2011). More attention should be given to studies in the areas of distribution of both species so that we can accumulate evidence that will help us to understand the circumstances in which this behavior is manifested and its effects on population dynamics of both species, especially when the stress-sensitivity of otter is considered and the potential this has for promoting cub abandonment (Mumm et al., 2014).

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RESUMÉ

SEUL A LA MAISON: ENREGISTREMENTS D'ABANDON D'INDIVIDUS TOUJOURS DEPENDENTS CHEZ LES LOUTRES GEANTES (*Pteronura brasiliensis*) ET LES LOUTRES A LONGUE QUEUE (*Lontra longicaudis*) EN AMAZONIE BRESILIENNE

En dépit de l'augmentation des études menées sur les loutres, la compréhension de certain comportement reste difficile, particulièrement ceux qui sont rarement observés. Cette étude présente trois cas d'abandon de petits par *Pteronura brasiliensis,* et un cas pour *Lontra longicaudis.* Les trois cas d'abandon observés pour la loutre géante ont eu lieu dans des habitats pauvres en nourriture. Le cas d'abandon pour la loutre à longue queue semble être lié à un mauvais état de santé du petit. Les rapports actuels, ainsi que les futurs rapports qui sont encouragés, peuvent être important quant au développement de plans de conservation pour les trois espèces de loutres puisque les morts naturelles peuvent avoir des implications dans la dynamique des populations. De tels rapports pourraient également contribuer à la compréhension des circonstances entourant le comportement d'abandon.

RESUMEN

EN CASA SOLO: REGISTROS DE ABANDONO DE INDIVIDUOS AÚN DEPENDIENTES DE NUTRIAS GIGANTES (*Pteronura brasiliensis*) Y NUTRIAS NEOTROPICALES (*Lontra longicaudis*), EN EL AMAZONAS BRASILERO

A pesar del incremento en estudios sobre Lutrinae, el conocimiento sobre algunos comportamientos, especialmente aquellos raramente vistos, sigue siendo limitado. Este estudio presenta tres casos de abandono de crías por *Pteronura brasiliensis*, y uno por *Lontra longicaudis*. Los tres casos de abandono de nutria gigante ocurrieron en hábitats pobres en nutrientes. El caso de nutria neotropical puede estar relacionado con enfermedad de la cría. Estos reportes, y cualquier reporte futuro que pudiera surgir motivado por este trabajo, podrían ser importantes al desarrollar planes de conservación para estas especies, ya que las muertes naturales pueden tener implicancias para la dinámica poblacional. Tales reportes también podrían contribuir a entender las circunstancias que rodean al comportamiento de abandono.

S H O R T N O T E

CAMERA SIGHTING OF CONGO CLAWLESS OTTER IN THE MIDST OF A RAPID DEVELOPMENT ON MAINLAND EQUATORIAL GUINEA

Kristin E. BRZESKI[1,2], Jared D. WOLFE[1,3,4], Cayetano EBANA EBANA[5], Jacob C. COOPER[1,6,7], and Luke L. POWELL[1,8,9]

[1]*Biodiversity Initiative, 133 Washington St., Belmont, MA 02478, USA. http://biodiversityinitiative.org/*
[2]*Department of Ecology and Evolutionary Biology, 106A Guyot Hall, Princeton University, New Jersey 08544, USA. kristin.brzeski@gmail.com; +1(262)-844-5946 (Corresponding Author)*
[3]*United States Forest Service, 1700 Bayview Drive, Arcata, California 95521, USA*
[4]*Department of Wildlife, Humboldt State University, 1 Harpst Street, Arcata, CA 95521*
[5]*National Institute for Forestry Development and Protected Area Management (INDEFOR-AP), Bata, Equatorial Guinea*
[6]*Life Sciences Section, Integrative Research Center, The Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, Illinois 60605, USA*
[7]*Committee on Evolutionary Biology, The University of Chicago, Culver Hall 402, Chicago, Illinois 60637, USA*
[8]*Migratory Bird Center, Smithsonian Conservation Biology Institute, National Zoological Park, P.O. Box 37012, Washington, D.C. 20013–7012, USA*
[9]*Current address: Institute of Biodiversity, Animal Health and Comparative Medicine, University of Glasgow, Glasgow, G12 8QQ, Scotland.*
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Abstract: Mainland Equatorial Guinea is undergoing rapid infrastructure development driven by the discovery of large oil reserves within the country's maritime political boundaries. The country recently began implementing *Horizonte 2020*, a national development project that includes a vast highway network and creation of a new capital city. Road construction has quickly increased access to previously remote forest regions, resulting in intensified bushmeat hunting and logging. The status of sensitive wildlife, such as river otters, is poorly known but populations are likely susceptible to demographic declines due to rapid development and habitat loss. In January 2016, the Biodiversity Initiative, a non-governmental organization conducting wildlife surveys on mainland Equatorial Guinea, captured an image of a Congo clawless otter (*Aonyx congicus*) in primary forest. This detection represents the first attempt in recent years to assess otters in Equatorial Guinea, and combined with future work, will serve as a benchmark for assessing Congo clawless otter vulnerability to development in Equatorial Guinea.
Keywords: *Aonyx congicus*, Congo clawless otter, camera-trap, Equatorial Guinea

INTRODUCTION

The Republic of Equatorial Guinea is an incredibly biodiverse country located in the Congo Basin, hosting the fourth highest species richness of primates in Africa (Chapman et al., 1999). Equatorial Guinea consists of a mainland section known as Río Muni and two islands – Bioko and Annobón. The mainland of Equatorial Guinea still has relatively large tracts of primary forest which provide habitat to species of conservation concern such as endangered western lowland gorilla (*Gorilla gorilla gorilla*), endangered central chimpanzee (*Pan troglodytes troglodytes*), and forest elephant (*Loxodonta cyclotis*) (Murai et al., 2013; IUCN 2015). The presence of large,

sensitive megafauna, indicates that much of the forested mainland of Equatorial Guinea hosts intact ecosystems. Although intact ecosystems may still exist on Río Muni, little is known regarding the status or distribution of otters throughout the country.

There are two river otter species on mainland Equatorial Guinea: spotted-necked otters (*Hydrictis maculicollis*) and Congo clawless otters (*Aonyx congicus*). The island of Bioko may have hosted otters in the past, but more likely the Equatoguinean island was never colonized by otters and early explorer reports were erroneous (Hoffman et al., 2015). Spotted-necked and Congo clawless otters were both recently listed as near-threatened on the IUCN Redlist due to habitat loss and development which has made previously remote regions more accessible to human use (Jacques et al., 2015; Reed-Smith et al., 2015). Loss of habitat and increased access to remote areas are the primary threats to wildlife in mainland Equatorial Guinea, where offshore oil reserves have fueled precipitous economic growth, leading to increased development within the historically undeveloped mainland. The government's most ambitious project is the ongoing construction of a new capital city, Oyalá, in the heart of the mainland, resulting in the loss of primary forest (Sackur, 2013; Zvomuya, 2014). Ongoing development and increased human resource extraction is leveraging huge pressure on Equatoguinean wildlife and contributing to the ongoing "bushmeat crisis" in Central Africa (Barnes, 2002).

Although otters are not a common bushmeat species, both spotted-necked and Congo clawless otters have been detected at bushmeat markets in Equatorial Guinea and neighboring countries (Fa and Yuste, 2001; Fa et al., 2004). We are at the risk of otters being extirpated from portions of Río Muni before knowing anything about their distributions, ecology, or habitat requirements. This is especially true for Congo clawless otters, of which very little is known (Jacques et al., 2002, 2009).

The Biodiversity Initiative, an NGO that has been working in Equatorial Guinea since 2013, developed in response to the furious pace of development in the country, and for the desire to understand more about the ecology of Central African wildlife and ultimately to conserve it. During our 2016 field season, we deployed camera-traps in primary and secondary lowland rain forest near the new capital city, which is also where a new flagship university is being built: the Afro-American University of Central Africa (AAUCA). Our objectives were to establish baseline data on species distributions before development of the new capital and university is completed.

METHODS AND DETECTION RESULTS

Our study site was located next to the AAUCA campus, within the new capital city of Oyalá at 1.604229º, 10.857476º (Fig. 1). The surrounding forest was a matrix of secondary forest of varying ages and quality, and large patches of primary forest. Although there was evidence of hunting in both primary and the secondary forests, signs of human use greatly decreased in primary forests. We deployed eight Bushnell 12MP Trophy Cam HD Essential Low Glow trail cameras in primary habitat. We left the camera trap deployed for a minimum of 10 camera nights and baited each camera station with sardine cans.

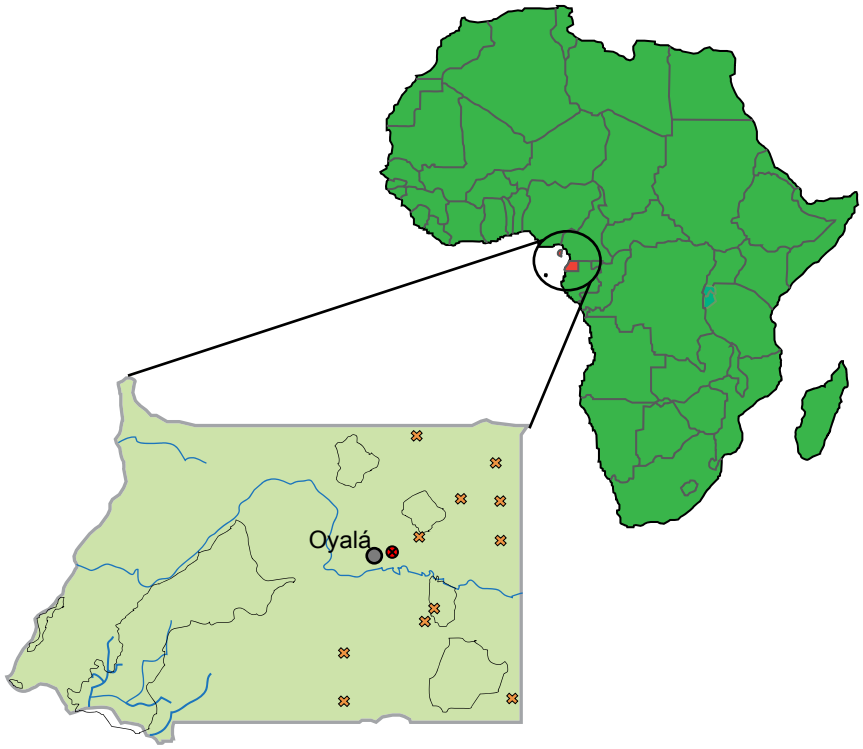

Figure 1. Map of mainland Equatorial Guinea. Protected areas are outlined in black; the study site and city of Oyalá, where construction of the new university is occurring, is marked; our camera trap capture of a Congo clawless otter is marked by the red circle; orange Xs mark otter tracks detected in a 2011 survey by Murai et al., 2013.

We detected one adult Congo clawless otter at a camera adjacent to a low-flowing stream (Fig. 2). Detection was on January 1, 2016, 07:00; this is the dry season in Río Muni and water levels were low. There were three images, with a clear full body shot, which revealed evidence that the otter was potentially gravid or nursing given the sagginess of its abdominal region. The camera trap was located at 1.613850º, 10.878850º, with an elevation of 653m.

DISCUSSION

Little is known about Congo clawless otter in Equatorial Guinea. Otter tracks were detected in transect surveys conducted in Equatorial Guinea in 2011 (Murai et al., 2013), and combined with our detection, it demonstrates otters still exist in the heart of Río Muni despite large scale development in the region (Fig. 1). Interestingly, there are no otter detections on the west side of the country, despite large estuaries persisting near the coast. Future work will focus on setting cameras up more extensively along rivers at our Oyalá study plot and in secondary forests to assess if disturbance reduces otter detections. Given we had cameras deployed for a relatively short amount of time, it is promising we detected a rare otter, even if it was only one detection event. Ideally we are observing a resilient Congo clawless otter population, and not the last remnants of a disappearing population due to disturbance. Additional monitoring and active surveys for otter sign will elucidate this further.

Figure 2. Camera trap images of a single Congo clawless otter (*Aonyx congicus*) on mainland Equatorial Guinea, near the new capital city of Oyalá. Upper right panel lower panel show a distended abdomen on the otter, possible evidence of breeding.

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RÉSUMÉ

OBSERVATION PAR CAMERA DE LOUTRES DU CONGO AU MILIEU DE LA GUINEE EQUATORIALE CONTINENTALE SOUMMISE A UN RAPIDE DEVELOPPEMENT

La Guinée équatoriale continentale est soumise à un rapide développement d'infrastructures piloté par la découverte d'importantes réserves de pétrole dans les eaux territoriales du pays. Le pays a récemment commencé à mettre en œuvre *Horizonte 2020*, un projet national de développement qui inclue un vaste réseau d'autoroute et la création d'une nouvelle capitale. La construction de routes a rapidement augmenté l'accès au région forestière jusqu'à présent reculées, entrainant une intensification de la chasse d'animaux sauvages et de l'exploitation forestière.

L'état de la faune sauvage, tel que les loutres de rivière, est faiblement connu à ce jour mais ces populations sont fortement enclines à subir un déclin démographique dû à ce développement rapide et à la perte de leur habitat.

En Janvier 2016, l'Initiative Biodiversité, une organisation non gouvernementale conduisant une enquête de la faune de la Guinée équatoriale continentale, a photographié une loutre du Congo (*Aonyx congicus*) dans la forêt primaire. Cette preuve représente la première tentative de ces dernières années pour évaluer la population de loutre du Congo, qui combinée avec des travaux futurs, servira de repère pour le suivi de la vulnérabilité de ces loutres du Congo vis à vis du développement de la Guinée équatoriale.

RESUMEN

REGISTRO CON CÁMARA-TRAMPA, DE LA NUTRIA SIN GARRAS DEL CONGO, EN MEDIO DE UN RÁPIDO DESARROLLO EN GUINEA ECUATORIAL

Guinea Ecuatorial (parte continental) está teniendo un rápido desarrollo de infraestructura, motivado por el descubrimiento de grandes reservas de petróleo dentro de los límites marítimos del país. El país recientemente empezó a implementar *Horizonte 2020*, un proyecto nacional de desarrollo que incluye una vasta red de autopistas y la creación de una nueva ciudad capital. La construcción de caminos ha incrementado rápidamente el acceso a regiones selváticas previamente remotas, resultando en la intensificación de la caza de carne silvestre y la tala. El estatus de la fauna vulnerable, como las nutrias de río, es pobremente conocido, pero las

poblaciones son probablemente susceptibles a declinaciones demográficas debido al rápido desarrollo y la pérdida de hábitat. En Enero de 2016, la Iniciativa de Biodiversidad, una organización no-gubernamental que conduce relevamientos de vida silvestre en Guinea Ecuatorial continental, capturó una imagen de una nutria sin garras del Congo (*Aonyx congicus*) en bosques primarios. Esta detección representa el primer intento en años recientes, de evaluar a las nutrias en Guinea Ecuatorial, y combinado con trabajos futuros, va a servir como un hito para evaluar la vulnerabilidad de la nutria sin garras del Congo, respecto al desarrollo en Guinea Ecuatorial.

P O E M

CLAWLESS OTTERS

It had been a long day in the field.
I dumped my pack
then sat down on the slope overlooking an oxbow lake
to enjoy the last of the winter sun
before it disappeared behind the Drakensberg.

They emerged from the reeds on the opposite shore,
an adult female, two half-grown young,
and a huge male,
sliding into the water one after the other
like a giant chocolate-brown python.

Each immediately began diving for food,
disappearing and surfacing
like bubbles in a boiling pot;
treading water while they ate crabs,
feeding them into their mouths
with blunt-fingered fore-feet,
white-cheeked heads tilted back,
clutching to buff chests any pieces that fell;
then pausing briefly,
long wet whiskers glistening with back-lit droplets,
before arch-humping their backs, seal like,
and diving again.

The adults were the first to leave the lake,
rolling on the grassy bank to dry themselves,
then lying idly, grooming,
and finally resting, replete …. at peace.
But only until the two young ones came ashore,
started play-fighting,
wrestling each other,
rolling, tumbling, and clambering over their parents.

What happened thereafter I'll never know,
for it became too dark to see.
I was cold and tired,
but exceptionally happy.
Part of the otters' secret life had been exposed to me,
while they were unaware of my presence,
the presence of a member of an alien species,
the species that constitutes their worst enemy.

I shouldered my pack,
and plodded wearily up the slope,
thinking of Thomas Gray's churchyard:
leaving the lake to darkness,
and the otters.

Dave Rowe

From "Green water, grey sand, and high places" by Dave Rowe (2005).
dtr.rowe@gmail.com

OSG MEMBER NEWS

Since the last issue, we have welcomed 2 new members to the OSG: you can read more about them on the Members-Only pages.

Kristin Brzeski, Equatorial Guinea: I am a conservation biologist using genomic methods to evaluate range expansion, toxin exposure, and genetic diversity in wildlife communities. With the Biodiversity Initiative in Equatorial Guinea in Central Africa, we are working to clarify the distribution and status of Aonyx congicus otters in Equatorial Guinea, developing and evaluating monitoring methods (i.e. non-invasive genetics), and adding to basic research on little know otter species.

Grazielle Soresini, Brazil: I'm a vet and PhD Student in Ecology and Conservation, working with health assessment of giant otters in the Southern Pantanal, Brazil. I'm interested in the wildlife conservation of this fascinating animal.