R E P O R T

FIRST PHOTOGRAPHIC EVIDENCE OF THE EURASIAN OTTER, *Lutra lutra*, IN AN INLAND SALINE LAKE OF THE TIBETAN PLATEAU, CHINA

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Abstract: The Eurasian otter *Lutra lutra* is a widespread carnivore of aquatic ecosystems native to Eurasia and Palaearctic Africa, while knowledge about its ecology and distribution in the Tibetan Plateau, particularly within the inland drainage systems is still limited. Recent camera-trap records verify its occurrence in a salt-lake basin, the Siling Co in the Tibet Autonomous Region, China. It is the first time this species has been photographed in this unique high-elevational habitat (4,572 meters above sea level). Conservation decision makers should immediately improve local management for this species in the region. In this unique habitat, the otter's local ecology and evolutionary history warrant follow-up studies.
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INTRODUCTION

The Eurasian otter, *Lutra lutra*, is one of the most widely distributed Palaearctic mammals, ranging across Europe, North Africa, and Asia (Conroy et al., 1998). It survives in various habitats including fresh water of streams (Lanszki and Sallai, 2006), lakes (Jancke and Giere, 2011), swamps (Melisch et al., 1998), coastal salt marshes (Lovett et al., 1997), and lagoons (Gormally and Fairley, 1982). The Eurasian otter, however, is listed as a Near Threatened species on the IUCN Red List of Threatened Species due to multiple reasons including the population declines, its sensitivity to sudden changes in threats, and lack of information in many parts of its range (Roos et al., 2015).

In China, the Eurasian otter occurs mainly along the southeast coast, and in the central provinces, northeast forest, and the Tibetan Plateau (Li and Chan, 2017; Zhang et al., 2018). The latter is considered to be an otter-rich region, where strong evidence supports otter distribution along the Yarlung Zangbo (also known as the Brahmaputra), Nujiang (Salween), and Lancang (Mekong) rivers (Zhang et al., 2018). Contrary to the increasing trend of otter reports in those drainage basins, the interior region of Tibetan plateau, that contains a large inland river network, has received limited research attention. Scientific proof of otter distribution there is rare up to date (Gao, 1987; Liu and Yin, 1993; Zhang et al., 2018).

In April 2017, during an intensive camera trapping effort for the snow leopard (*Panthera uncia*) in the interior Tibet, a video footage of the Eurasian otter was unintentionally captured by an infrared camera, which was located at 4,572 meters above sea level, on the rocky shore of the southwestern rim of an inland salt lake, the Siling Co (also Selincuo; Figure 1, Figure 2, Table 1). Other sympatric carnivores, as potential competitors that could cause mutual interference with otters, were present at

the same camera station, namely snow leopard, Tibetan fox (*Vulpes ferrilata*), red fox (*Vulpes vulpes*), and beech marten (*Martes foina*).

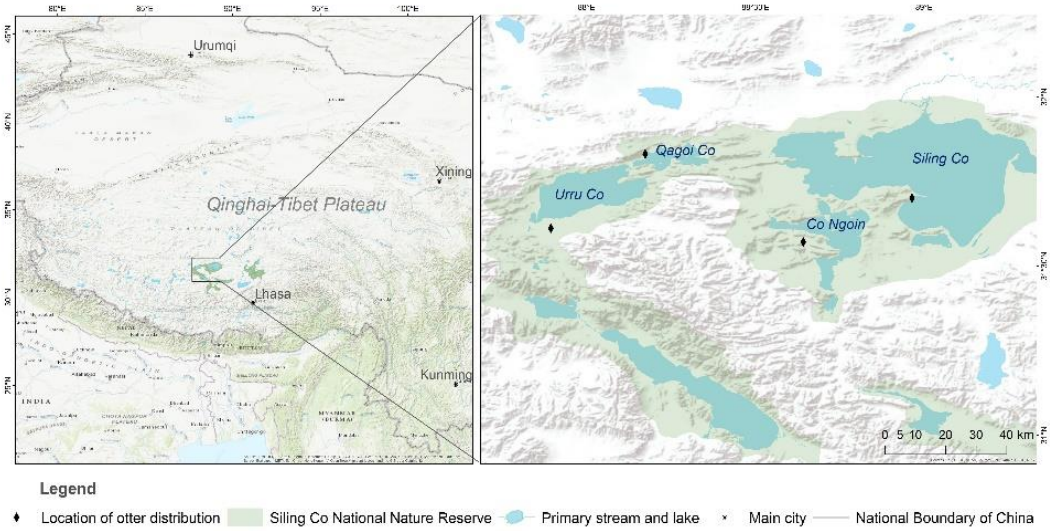

Figure 1. Study area: Locations of records of the Eurasian otters in the Siling Co National Nature Reserve

Subsequently, quick surveys were conducted in the adjacent region. Spraints were found along the shore areas of three inter-connected lakes within the Siling drainage system, namely the Co Ngoin, Urru Co and Qagoi Co (Figure 1, Table 1). We also interviewed eight pastoralists from four local villages for their sighting reports of otters. Sighting records were considered valid only where the interviewees described clearly the morphological characteristics of the Eurasian otter (no other otter species could plausibly occur in this area, but other genera of Mustelidae are potential confusion species) and the asserted sightings took place between 2016 and 2019.

Table 1. Coordinates, altitudes, and evidence types of otter occurrence records, associated with the lake names and their reported salinity (Yan et al., 2018)

Lake	Latitude/°	Longitude/°	Altitude/meter	Salinity/g·L^{-1}	Evidence
Siling Co	31.7005	88.9644	4572	6.9	camera trap, sighting
Co Ngoin	31.5707	88.6421	4574	0.2	spraints
Urru Co	31.6113	87.8942	4567	NA	spraints, sighting
Qagoi Co	31.8308	88.1735	4601	0.2	spraints

Figure 2. Images of the Eurasian otters recorded by Siling Co and the landscape of the lake

According to our knowledge to date, our findings provide the first verifiable evidence of the Eurasian otter's distribution in a closed drainage with saline water, among the highest altitudinal presence records of the species across its known global range (Liu and Yin, 1993; Smith and Xie, 2010; Editorial Team for the Report on Otter Investigation and Conservation of China, 2019). Geoscience studies have suggested that the Siling Co basin separated from other drainage systems at a minimum distance of 150km (i.e. the Nam Co lake) since about 30ka B.P., which implies that the local otter population may have evolved independently at least during Holocene and achieved adaptive biological characteristics to survive in low oxygen and saline environment (Zhao et al., 2011; Crait et al., 2012). Therefore, this population's bio-physiology, ecology and evolutionary history warrant deep study in an interdisciplinary manner, to contribute new insights to the species and the ecosystems it within.

At present, the connected lakes and streams of the Siling Co basin system, along with the waterfront landscape together form the Siling Co National Nature Reserve that covers a total area of more than 20,000 square kilometers (Figure 1 left). Due to the enhanced law enforcement effort by government and the locally dominant Buddhist religion that against killing wildlife, poaching of otters has been rare during the past decade in the region (personal communication). Despite this, the local otter population is still exposed to various challenges, particularly induced by the escalating influence of local economic development (Cui and Graf, 2009). For instance, local communities start to build dikes on the rivers feeding into the Urru Co so as to redirect the flows away from their pasturelands to make room for livestock. The Tibetan government is making efforts to boost tourism for the region (Xiang, 2018). Accessibility to local otter

habitats has been greatly improved through the enhanced road network, potentially leading to increased anthropogenic disturbance, or poaching by outsiders. In addition, no in-place management scheme has intentionally considered otters, although this local otter population may be found to form a unique conservation unit of the species. Thus, we strongly recommend Tibetan policy makers to, first, support systematic baseline surveys within the Siling Co basin to identify key habitats for otters; second, improve the local conservation management plan in consideration of ecological needs of the species; and third, quickly enhance both patrolling and monitoring efforts within known otter habitats.

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REFERENCES

Conroy, J., Melisch, R., Chanin, P. (1998). The distribution and status of the Eurasian Otter (*Lutra lutra*) in Asia - a preliminary review. *IUCN Otter Spec. Group Bull.,* **15:** 15-30.

Crait, J.R., Prange, H.D., Marshall, N.A., Harlow, H.J., Cotton, C.J., Ben-David, M. (2012). High-altitude diving in river otters: coping with combined hypoxic stresses. *J. Exp. Biol.,* **215:** 256-263.

Cui, X., Graf, H.-F. (2009). Recent land cover changes on the Tibetan Plateau: a review. *Climatic Change,* **94:** 47-61.

Gao, Y. (1987). Fauna Sinica: Mammalia, vol. 8, Science Press, Beijing.

Gormally, M.J., Fairley, J.S. (1982). Food of otters *Lutra lutra* in a freshwater lough and an adjacent brackish lough in the West of Ireland. *J. Zool.,* **197:** 313-321.

Editorial Team for the Report on Otter Investigation and Conservation of China. (2019). A report on otter Investigation and Conservation in China [in Chinese]. http://www.shanshui.org/wp-content/uploads/2020/02/20200224074256676.pdf

Jancke, S., Giere, P. (2011). Patterns of otter *Lutra lutra* road mortality in a landscape abundant in lakes. *Eur. J. Wildl. Res.,* **57:** 373-381.

Lanszki, J., Szallai, Z. (2006). Comparison of the feeding habits of Eurasian otters on a fast flowing river and its backwater habitats. *Mamm. Biol.,* **71:** 336-346.

Li, F., Chan, B.P.L. (2017). Past and present: the status and distribution of otters (Carnivora: Lutrinae) in China. *Oryx,* **52:** 619-626.

Liu, W.L., Yin, B.G. (1993). Precious wildlife of Tibet and conservation, China Forestry Press, Beijing.

Lovett, L., Kruuk, H., Lambin, X. (1997). Factors influencing use of freshwater pools by otters, *Lutra lutra,* in a marine environment. *J. Zool.,* **243:** 825-831.

Melisch, R., Young, L., Sadovy, Y. (1998). Eurasian otter (*Lutra lutra*) still present in Hong Kong. *IUCN Otter Spec. Group. Bull,* **15:** 44-46.

Roos, A., Loy, A., de Silva, P., Hajkova, P., Zemanová, B. (2015). *Lutra lutra*. pp. e.T12419A21935287. The IUCN Red List of Threatened Species.

Smith, A.T., Xie, Y. (2010). *A Guide to the Mammals of China,* Princeton University Press.

Xiang, B. (2018). *China Focus: Tourism booming at World's Third Pole.* http://www.xinhuanet.com/english, Lhasa.

Yan, L., Sun, M., Yao, X., Gong, N., Li, X., Qi, M. (2018). Lake water in the Tibet Plateau: quality change and current status evaluation. *Acta Scientiae Circumstantiae,* **38:** 900-910.

Zhang, L., Wang, Q., Yang, L., Li, F., Chan, B.P.L., Xiao, Z., Li, S., Song, D., Piao, Z., Fan, P. (2018). The neglected otters in China: Distribution change in the past 400 years and current conservation status. *Biol. Conserv.,* **228:** 259-267.

Zhao, X., Zhao, Y., Zheng, M., Ma, Z., Cao, J., Li, M. (2011). Late Quaternary Lake Development and Denivellation of Bankog Co as well as Lake Evolution of Southeastern North Tibetan Plateau during the Last Great Lake Period. *Acta Geoscientica Sinica,* **32:** 13-26.

RÉSUMÉ

PREMIÈRE PHOTOGRAPHIE EVIDENTE DE LA LOUTRE EURASIENNE, *Lutra lutra,* DANS UN LAC SALÉ INTERIEUR SUR LE PLATEAU TIBÉTAIN EN CHINE

La loutre eurasienne *Lutra lutra* est un carnivore répandu des écosystèmes aquatiques originaire d'Eurasie à l'Afrique paléarctique. Cependant, les connaissances sur son écologie et sa répartition sur le plateau tibétain, en particulier dans les systèmes de drainage intérieurs, sont encore limitées. Des enregistrements récents à l'aide de pièges photographiques ont permis de confirmer sa présence dans un bassin d'eau salée, le Siling Co dans la région autonome du Tibet, en Chine. C'est la première fois que cette espèce est photographiée dans cet habitat unique de haute altitude (4.572 mètres d'altitude). Les décideurs en conservation devraient immédiatement améliorer la gestion locale de cette espèce dans la région. Dans cet habitat unique, l'écologie locale et l'histoire évolutive de la loutre justifient des études et un suivi.

RESUMEN

PRIMERA EVIDENCIA FOTOGRÁFICA DE NUTRIA EURASIÁTICA, *Lutra lutra,* EN UN LAGO SALINO INTERIOR DE LA MESETA TIBETANA, CHINA

La nutria eurasiática *Lutra lutra* es un carnívoro de amplia distribución en ecosistemas acuáticos de Eurasia y Africa Paleártica; y el conocimiento de su ecología y distribución en la Meseta Tibetana, particularmente en los sistemas de drenaje interiores, es aún limitado. Registros recientes con cámaras-trampa verifican su ocurrencia en la cuenca de un lago salado, el Siling Co, en la Región Autónoma de Tibet, China. Es la primera vez que esta especie ha sido fotografiada en este hábitat único de gran altitud (4.572 metros sobre el nivel del mar). Los tomadores de decisiones de conservación deberían mejorar inmediatamente el manejo para esta especie en la región. En éste hábitat único, la ecología local y la historia evolutiva de la nutria ameritan estudios de seguimiento.