

REPORT

FORGOTTEN BUT NOT GONE: REDISCOVERY OF EURASIAN OTTER *Lutra lutra* IN LANTAU, HONG KONG

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Abstract: Since its rediscovery in the 1980s in Hong Kong, the Eurasian Otter (*Lutra lutra*) has only been recorded sporadically and mostly confined to the Inner Deep Bay area in northwestern New Territories. Here, we present a spraint record collected from an islet of the Brothers Marine Park in northern Lantau waters in February 2024, which has been subsequently confirmed by molecular analysis. Our discovery represents the first verifiable evidence of otter presence in Lantau waters and largely extends its current known range in Hong Kong, bringing new hope for this locally critically endangered species. This finding highlights the urgent need for a more extensive search of suitable habitats in a broader area in order to assess the current distribution and status of the otters in Lantau and wider Hong Kong.

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INTRODUCTION

The Eurasian Otter (*Lutra lutra*) is a globally Near Threatened species that is widely distributed across the Palearctic and Oriental regions, from western Europe and North Africa to the North Pacific and Southeast Asia (Loy et al., 2022). During the past decades, the European population has been recovering to some degree from historical declines caused by water pollution and habitat degradation, but it is still threatened in most of Asia and accurate population data are lacking for many countries (Loy, 2018; Basnet et al., 2020).

In China, the species has undergone a severe reduction in range and abundance since the 1950s–1980s due to sustained nationwide hunting, habitat loss, water pollution and prey reduction (Han and Shi, 2019; Li and Chan, 2018; Zhang et al., 2018). Within the Hong Kong Special Administrative Region (hereafter Hong Kong), it was once widespread along the coastal lowlands but the numbers started to decline in the 1930s (Hui and Chan, 2024). Despite being legally protected since 1936 in Hong Kong, the otters have nonetheless faced increasing anthropogenic pressures and were once thought to be extinct because of rapid urban development and uncontrolled human disturbance (Marshall and Phillips, 1965; Lance, 1976). Since its rediscovery from Mai Po Nature Reserve in the 1980s, this elusive species has only been reported sporadically and confirmed records have mostly been confined to northwestern New Territories with

the core habitats in the Inner Deep Bay Area (Hui and Chan, 2024). It has therefore been considered of regional conservation concern (Fellowes et al., 2002). A recent DNA-based otter population survey between 2018–2019 only identified seven individuals across its core habitats, indicating that it is now undoubtedly one of the rarest mammals in Hong Kong (McMillan et al., 2022).

In this study, we report the recent discovery of Eurasian Otter in Lantau waters based on a spraint collected and discuss its conservation implications.

MATERIALS AND METHODS

Study Area

Situated at the estuary of Pearl River in southern China, Lantau Island is the largest among the 263 outlying islands in Hong Kong, covering a land area of 147 km². The terrain is mostly rugged with the highest peak up to 934 m and supports a diverse range of habitats from mangroves to montane forest and grassland. There are several smaller islets and islands surrounding Lantau Island, such as Chek Lap Kok, Ma Wan, Peng Chau, Cheung Chau, Soko Islands and the Brothers Islands (Fig. 1). It is relatively less developed than other parts of the city, the human population is approximately 0.2 million with over half of them living around Tung Chung on the northern coast (Sustainable Lantau Office, 2023).

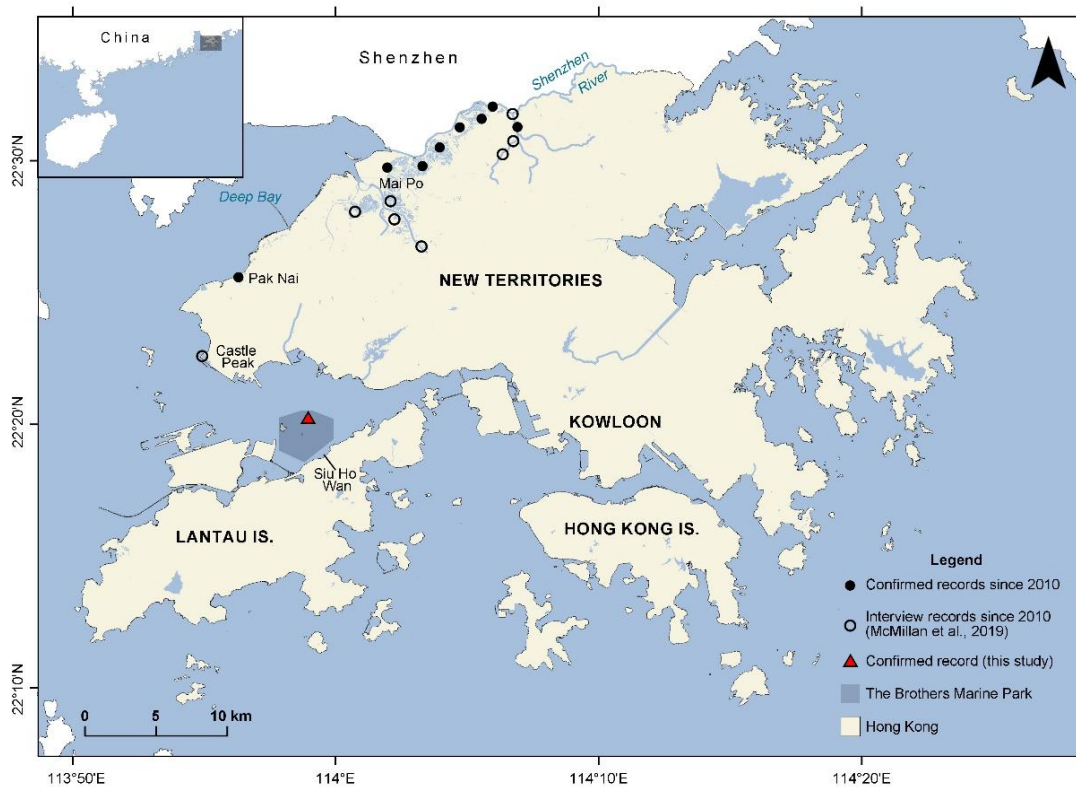


Figure 1. Map of the current distribution of the Eurasian Otter (*Lutra lutra*) in Hong Kong based on McMillan et al. (2019, 2022), Hui and Chan (2024) and KFBG unpublished data. Confirmed records refer to “hard fact” data including photos, spraint and anal jelly records; interview records refer to the observations of the locals collected through local ecological knowledge surveys.

The Brothers Marine Park was established in 2016 to protect the globally Vulnerable Indo-Pacific Humpback Dolphin (*Sousa chinensis*) in northeast Lantau waters. It comprises three islets - Tsz Kan Chau (Reef Island), West Brother Island (Tai Mo To) and East Brother Island (Siu Mo To) with the southern boundary extending to the shoreline of Siu Ho Wan of Lantau Island and has a total sea area of approximately

9.7 km² (Fig. 1). Since two of the islands were levelled in the 1990s for aviation safety and reclamation materials, original vegetation was largely removed and now only scattered small trees and shrubs exist.

Sign Surveys

An otter field survey was conducted in the Brothers Marine Park on 22 February 2024. Two experienced otter surveyors (JHY and YFPL) walked along the shore and searched for otter signs (e.g., tracks, spraints and anal jelly). A faecal sample was collected and preserved in a 5 ml sterile vial containing InhibitEX buffer (QIAGEN, Germany) and subsequently stored at -20°C until analysis.

Genetic Analysis

Genomic DNA was extracted using QIAamp Fast DNA Stool Mini Kit (QIAGEN, Germany), following the manufacturer's protocol with modifications of Coudrat et al. (2022) and McMillan et al. (2022) and the final elution was repeated once to obtain a total 400 µl of DNA sample. An otter-specific primer pair Lutcyt-F (5'-CCACAATCCTCAACAACCTCGC-3') and Lutcyt-R (5'-CTCCGTTTGGGTGTATGTATCG-3') was used to amplify a 227 bp fragment spanning partial mtDNA cytochrome b region (Cytb) (Park et al., 2011). Polymerase chain reaction (PCR) was performed in a total volume of 25 µl reaction containing 3 µl of faecal DNA, 12.5 µl of Thermo Scientific™ PCR Master Mix (2X), 7.5 µl nuclease-free water and 1 µl of each primer. PCR was performed at 1 min at 95°C; 35 cycles of three steps (15 sec at 95°C, 15 sec at 55°C, 15 sec at 72°C), and a final extending step of 72°C for 3 min. PCR product of the sample was sent to BGI Bio-Solutions Hong Kong Co., Limited for Sanger sequencing by ABI 3730xl DNA Analyzer and using the forward primer Lutcyt-F. Sequences obtained were edited in Geneious Prime 2022.0.1 software (Kearse et al., 2012) and compared with GenBank sequences for species identification using BLAST. Apart from two sequences of *Lutra lutra* from Hong Kong and Sichuan (GenBank accession no. OR655422 and LC049952 respectively), additional sequences representing other 10 species of Lutrinae from GenBank were included in the phylogenetic analyses. Bayesian inference (BI) was performed using Geneious Prime 2022.0.1 software developed by Kearse et al. (2012) and MrBayes 3.2.6 software by Ronquist et al. (2012) with the HKY85+G+I model recommended by the Akaike Information Criterion as implemented in jModelTest 2.1.2 by Darriba et al. (2012). We also calculated the uncorrected pairwise genetic distances (*p*-distance) using Geneious Prime 2022.0.1 software.

RESULTS

A single dried faecal sample was collected from East Brother Island during the survey, which was laid on a bamboo branch left on the coast approximately 10 m away from the sea (Fig. 2). The fragment of the partial Cytb was successfully amplified from the sample, and the nucleotide BLAST (BLASTN) search showed the sequence generated share 99% sequence identity with a confirmed *Lutra lutra* sequence from Hong Kong (GenBank no. OR655422), and this sample was also grouped with the *Lutra lutra* sequences analysed with high support (BP 90) in the phylogenetic analysis (Fig. 3).



Figure 2. The dried spraint collected on 22 February 2024 (A); the East Brother Island and the coast of Siu Ho Wan in northern Lantau, Hong Kong (B).

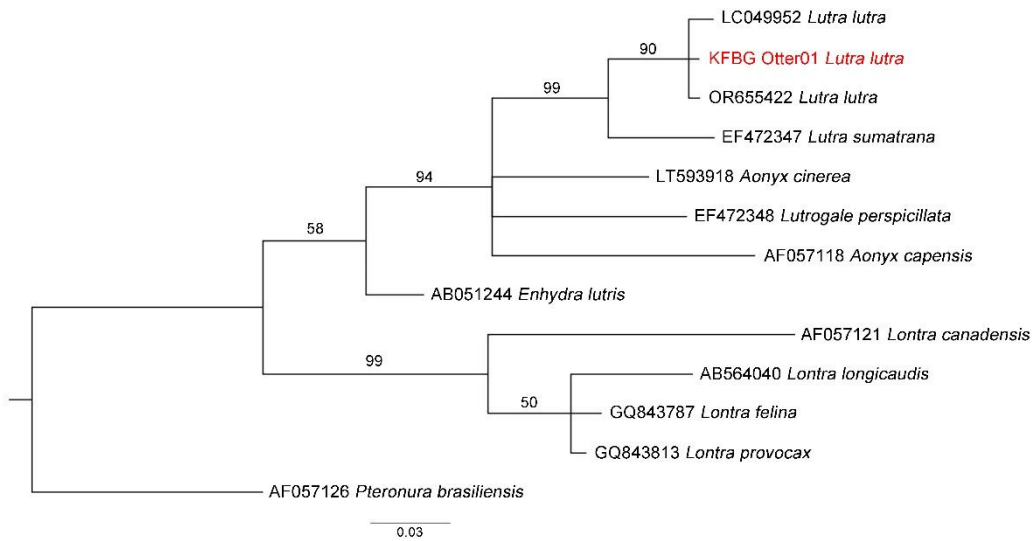


Figure 3. Phylogenetic relationships among the newly collected sample (KFBG Otter01) and other otter species shown in the BI tree result using partial Cytb.

DISCUSSION

Historically, otters had been documented around Lantau since, at least, the 1930s and thought to be extirpated around the 1960s (Hui and Chan, 2024). Our new finding represents the first verifiable evidence of otters in Lantau waters and largely extends its current known range in Hong Kong, with a range expansion up to approximately 10 km in straight line distance and >15 km when measured along coasts (Fig. 1). Such a distance is well within the known travel range of Eurasian Otter (see Kruuk and Moorhouse, 1991); however, it remains unclear whether this discovery represents a recent natural recolonisation of the existing known otter population from northwestern New Territories. We also cannot rule out the possibility that this elusive species has never been extirpated in Lantau waters and a remnant subpopulation managed to survive in this busy coastal area. In fact, our interview survey with local fishers and anglers also resulted in some otter sightings from northern Lantau within the past two decades (e.g., Siu Ho Wan) (KFBG, unpublished data), suggesting that the continued presence of otters in northern Lantau might have been long overlooked.

Eurasian Otters rely on freshwater for drinking and washing, an essential behaviour for coastal-dwelling otters to maintain the insulating properties of their fur (Kruuk and Balharry, 1990). However, there is no freshwater stream or pond on the

islets of the Brothers Marine Park, while the closest freshwater sources are located approximately 2 km away on the northern coast of Lantau Island (see Fig. 1). Therefore, we believe that if a residential otter population exists in this area, they would live along the northern coast of Lantau Island where more suitable habitats (e.g., mangroves, estuary and river), shelters and freshwater sources are available, and utilise the offshore islets as part of their hunting and resting grounds.

CONSERVATION IMPLICATIONS

In this study, we present the first verifiable evidence of Eurasian Otter in Lantau waters, supporting the possibility that they may inhabit a wider area in Hong Kong and bringing new hope for this locally extremely rare species. The importance of marine habitats to local otters has long been neglected, our new discovery underlines the urgent need for a more extensive search of suitable habitats beyond the current known range in northwestern New Territories in order to assess the distribution and status of the otters in Lantau and wider Hong Kong.

The Hong Kong government has recently proposed various housing and economic developments in northern Lantau under the “Development in the North, Conservation for the South” principle (Development Bureau and Civil Engineering and Development Department, 2017). It is essential to evaluate the impact of all upcoming coastal construction projects on the otters, and other species of conservation concern using this area, and maintain the integrity and connectivity of the potential otter habitats and freshwater streams which are vital for their survival.

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RÉSUMÉ: OUBLIÉE MAIS PAS DISPARUE : REDÉCOUVERTE DE LA LOUTRE EURASIENNE *Lutra lutra* SUR LANTAU, À HONG KONG

Depuis sa redécouverte dans les années 1980 à Hong Kong, la loutre eurasiennne (*Lutra lutra*) n'a été observée que sporadiquement et principalement confinée à la région de « l'Inner Deep Bay », dans le nord-ouest des «New Territories». Nous présentons ici une épreinte prélevée en février 2024 sur un îlot du « Brothers Marin Park » dans les eaux du nord de l'île de Lantau. Celle-ci a par la suite été validée par une analyse moléculaire. Notre découverte représente la première preuve tangible de la présence de la loutre dans les eaux de Lantau et étend largement son aire de répartition actuelle connue à Hong Kong, apportant un nouvel espoir pour cette espèce localement en danger critique d'extinction. Cette découverte souligne le besoin urgent d'une recherche plus approfondie d'habitats appropriés dans une zone plus large afin d'évaluer la répartition et le statut actuels des loutres à Lantau et sur l'ensemble du territoire de Hong Kong.

RESUMEN: OLVIDADA PERO NO AUSENTE: REDESCUBRIMIENTO DE LA NUTRIA EURASIÁTICA LUTRA LUTRA EN LANTAU, HONG KONG

Since its rediscovery in the 1980s in Hong Kong, the Eurasian Otter (*Lutra lutra*) has only been recorded sporadically and mostly confined to northwestern New Territories. Here, we present a spraint record collected from an islet of the Brothers Marine Park in northern Lantau waters in February 2024, which has been subsequently confirmed by molecular analysis. Our discovery represents the first verifiable evidence of otter presence in Lantau waters and largely extends its current known range in Hong Kong, bringing new hope for this locally critically endangered species. This finding highlights the urgent need for a more extensive search of suitable habitats in a broader area in order to assess the current distribution and status of the otters in Lantau and wider Hong Kong.

嶼海遺珠：歐亞水獺 (*Lutra lutra*) 重現香港大嶼山水域

摘要：在香港，歐亞水獺 (*Lutra lutra*) 過去曾被認為已經在本地滅絕，直至上世紀80年代才被研究人員在米埔自然保護區重新發現。過去數十年，歐亞水獺在香港的記錄依然非常之少，而且大部分都局限於新界西北部的內前海灣濕地範圍內。本研究報道2024年2月份於大嶼山北部水域的大小磨刀海岸公園所發現並經分子鑒定確認的歐亞水獺糞便。本次發現為歐亞水獺在大嶼山水域出沒提供了確切證據，並遠遠擴大了歐亞水獺在香港目前已知的現存分布範圍，為這一本地極度瀕危物種的保育帶來新希望。調查成果亦顯示未來仍需要加強和擴大野外考察的力度和範圍，覆蓋更多水獺潛在的分布區域和生境，以全面評估大嶼山區域乃至全港水獺的分布現狀。