

OTTER

the Journal of the International Otter Survival Fund



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The International Otter Survival Fund (IOSF) was inspired by observing otters in their true natural environment in the Hebrides. Because the otter lives on land and in the water and is at the peak of the food chain it is an ambassador species to a first class environment. IOSF was set up in 1993 to protect and help the 13 species of otter worldwide, through a combination of compassion and science. It supports projects to protect otters, which will also ensure that we have a healthy environment for all species, including our own.

OTTER is the annual scientific publication of the IOSF.

The publication aims to cover a broad spectrum of papers, reports and short contributions concerning all aspects of otter biology, behaviour, ecology and conservation. It will also contain information on the work of IOSF and reports on our activities.

Submission of manuscripts

OTTER is a peer-reviewed journal and authors are asked to refer to the Guidelines for Contributors before submitting a paper. These Guidelines may be found at the back of each Journal or can be sent as a pdf upon request. Papers should be submitted through enquiries@otter.org.

Publication

A limited number of copies of the Journal will be printed and these will be available for sale on the Otter Shop (www.ottershop.co.uk). It will also be made available on the IOSF website (www.otter.org)

Back Issues

Issue 1 (Proceedings of the First Otter Toxicology Conference, Published 2002) is now out of print.

Issue 2 (Proceedings of the European Otter Conference “Return of the Otter in Europe – Where and How?”, held on the Isle of Skye in 2003, Published 2007) is available on a CD at the Otter Shop (www.ottershop.co.uk).

Issue 3 (2017) available as a pdf or hard copy from the Otter Shop (www.ottershop.co.uk).

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ASIAN OTTER CONSERVATION NETWORK REPORT

PROF. PADMA DE SILVA

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In April 2017 there was a meeting between myself and Grace and Paul Yoxon of IOSF to discuss how we can develop otter work in Asia. There are many very positive people and we want to actively encourage them to become more involved. So it was agreed that Regional Co-ordinators should be appointed whose roles would be:

- To encourage more interaction between people in their region
- To identify priorities in their region
- To develop more education material appropriate for their region and throughout Asia
- To co-ordinate research work so that information is shared and there is minimal repetition of work

We are delighted that the following people have agreed to be IOSF Regional Co-ordinators:



Aadrean, Indonesia –Southeast Asia

Aadrean has been studying otters in Indonesia since his Bachelor's degree in 2008 and he attended the Indonesian workshop in 2013. He has just completed his PhD at the Graduate School of Natural Science and Technology, Kanazawa University, Japan, and is a Lecturer in the Biology department at Andalas University, Indonesia. He is very concerned about the illegal trade in otters.



Jyoti Bhandari, Nepal –South Asia

Jyoti Bhandari is Assistant Professor at Tribhuvan University, Institute of Forestry, Pokhara, Nepal and co-ordinator of the Nepal Otter Network. Since 2006 she has been working on the conservation and awareness of otters in Nepal.



Ling-Ling Lee, Taiwan –East Asia

Ling-Ling Lee is a professor of the National Taiwan University with a research interest in mammal ecology and has been working on conservation research of Eurasian otters in Kinmen island of Taiwan.



Omar Al-Sheikhly, Iraq –Middle East

Omar is an assistant teacher in the department of Biology in Baghdad University and has been working on otter conservation in Iraq since 2005. He has participated in many field expeditions especially in the Iraqi marshes, where the rare endemic subspecies of smooth-coated otter *Lutrogale perspicillata maxwelli* exists. We are delighted with the progress they have already achieved in each region with more practical survey work and education being carried out. Each co-ordinator has now submitted a report to me which is included below.



Padma de Silva

IOSF Asian co-ordinator and Chair of the Asian Otter Conservation Network.

SUMMARY OF OTTER RESEARCH AND CONSERVATION ACTIVITIES IN SOUTHEAST ASIA

AADREAN

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There are four species of otters inhabiting the Southeast Asia region: Eurasian otter, hairy-nosed otter, smooth-coated otter, and small-clawed otter. Otters can be found in almost all of Southeast Asia but until recently few research and conservation activities were performed in this region.

Several activities have been conducted in Cambodia, Malaysia, Singapore, and Indonesia. In Cambodia and Malaysia, especially in Sabah, the hairy-nosed otter became the focus of research and conservation projects. In Indonesia, ecological studies on small-clawed otters, data collection on the distribution of otters, wetland restoration and other awareness programmes were carried out.

There is good news from Singapore. The smooth-coated otter has received much public attention and appears as a mascot, as the species seems able to live together with Singaporean people in city wetlands.

In other countries, however, there is no improvement in legal action yet, and trade in otters as pets is increasing in the Southeast Asia region. Below are lists showing more detail of the projects and publications.

Research and conservation projects

Indonesia: Andalas University conducted projects on the ecology of small-clawed otters in a human landscape, conflict of otter and fishponds in West Sumatra, and collecting information on presence of otters from the public in Indonesia using

citizen science. A new website for otters in the Bahasa language was launched: www.berang-berang.com. Wetland restoration in Kalimantan and Sumatra have been initiated by Wetland International Indonesia.

Cambodia: A conservation and research project on the hairy-nosed otter in Tonle Sap Lake is organised by Conservation International Cambodia.

Malaysia: Several studies and education awareness programmes on otters in Sabah Borneo are being conducted by some researchers. TRAFFIC is monitoring trade on otters as pets and medicine.

Singapore: Otter Watch is monitoring the smooth-coated otters that inhabit Singapore city.

Scientific publications in English

Aadreaan and Usio, N. (2017). Small-clawed otters (*Aonyx cinereus*) in Indonesian rice fields: latrine site characteristics and visitation frequency, *Ecological Research* 32, 899–908. <https://doi.org/10.1007/s11284-017-1496-6>

Barbanera, F., Moretti, B., Guerrini, M., Al-Sheikhly, O.F. and Forcina, G. (2016). Investigation of ancient DNA to enhance natural history museum collections: misidentification of smooth-coated otter (*Lutrogale perspicillata*) specimens across multiple museums. *Belgian Journal of Zoology*, 146, 2.

Gomez, L., Leupen, B.T.C., Theng, M., Fernandez, K. and Savage, M. (2016). Illegal otter trade: an analysis of seizures in selected Asian countries (1980–2015). *TRAFFIC. Petaling Jaya, Selangor, Malaysia*.

Ishigami, J., Ambu, L. N., Tuuga, A. and Tsubouchi, T. (2017). The second recent record of hairy-nosed otter (*Lutra sumatrana*) in Sabah, Malaysia, *IUCN Otter Spec. Group Bull*, 34, 2,67-72.

Kamjing, A., Ngoprasert, D., Steinmetz, R., Chutipong, W., Savini, T. and Gale, G.A. (2017). Determinants of smooth-coated otter occupancy in a rapidly urbanizing coastal landscape in Southeast Asia, *Mammalian Biology*, 87, 168-175.

Moretti, B., Al-Sheikhly, O.F., Guerrini, M., Theng, M., Gupta, B.K., Haba, M.K. and Barbanera, F. (2017). Phylogeography of the smooth-coated otter (*Lutrogale perspicillata*): distinct evolutionary lineages and hybridization with the Asian small-clawed otter (*Aonyx cinereus*), *Scientific Reports*, 7.

Salahshour, F. (2016). Confirmed sighting of *Lutra sumatrana* in the Ulu Muda Forest Reserve in Kedah, Malaysia, *IUCN Otter Spec. Group Bull*, 33, 2,68-72.

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Theng, M. and Sivasothi, N. (2016). The smooth-coated otter *Lutrogale perspicillata* (Mammalia: Mustelidae) in Singapore: establishment and expansion in natural and semi-urban environments, *IUCN Otter Spec. Group Bull*, 33, 1, 37-49.

Theng, M., Sivasothi, N. and Tan, H.H. (2016). Diet of the smooth-coated otter *Lutrogale perspicillata* (Geoffroy, 1826) at natural and modified sites in Singapore. *Raffl. Bull. Zool.* 64:290-301. https://lkcnhm.nus.edu.sg/nus/images/data/raffles_bulletin_of_zoology/vol64/64rbz290-301.pdf.

Willcox, D., Visal, S. and Mahood, S.P. (2016). The conservation status of otters in Prek Toal Core Area, Tonle Sap Lake, Cambodia, *IUCN Otter Spec. Group Bull*, 33, 1,18-31.

SUMMARY OF OTTER RESEARCH AND CONSERVATION ACTIVITIES IN SOUTH ASIA

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Nepal: With financial support from the Rufford Small Grant Project, I am personally conducting a project entitled “Conservation status survey and awareness of smooth-coated otters in Babai River of Bardia National Park, Nepal.” This project aims to investigate the habitat and distribution of smooth-coated otters, prepare a habitat map, and create public awareness for the species conservation in this area. In addition, I am also helping some undergraduate students to write proposals related to otter research in Nepal.

Another otter researcher, Mr Rajesh Jha, is working on the population status and distribution of otters in Shuklaphanta Wildlife Reserve, and an otter awareness programme for the community in the Buffer Zone of the reserve. This is a part of his Master’s thesis.

Mr Sanjan Thapa published an educational poster about otters in the Nepali language, which contains information on the different species of otter.

India: Sunita Khatiwara, a young researcher from Sikkim, has conducted a project entitled “An initial survey and conservation awareness program for otters in Sikkim, India”, which was funded by Wildlife Reserves Singapore. She has completed the first survey for otters in Sikkim and found evidence of otter signs on both the Teesta and Rangeet Rivers.

Jena et al., 2016 published their work on otters entitled “Notes on the occurrence of the Eurasian otter (*Lutra lutra L.*) in the forest of Balaghat, Madhya Pradesh, India.” In this research they recorded Eurasian otter presence in Balaghat forest range of Madhya Pradesh while conducting camera trapping study for large carnivores.

The Wild Otters group is a team of highly motivated professionals working effectively to make a positive change in wildlife conservation in Goa. This team was started in September 2014 and they work to understand and address conservation needs through research, documentation, community engagement and education. They are the largest working group on otter research and conservation in India: see <http://wildotters.com/>

Afghanistan: Ostrowski (2016) published a review article entitled “The Eurasian otter *Lutra lutra* in Afghanistan: a review of the sparse available information.” In this research Ostrowski mentioned that the status of the Eurasian otter in Afghanistan is particularly poorly documented, reflecting in part the effects of the country’s turbulent history of recent decades on mammal surveys. He concluded and recommended that since 2010 the Eurasian otter is on the list of Protected Wildlife Species in Afghanistan. Clarification of the species’ current distribution, population trend and threats is necessary before applying appropriate conservation measures.

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Ostrowski, S. (2016). The Eurasian otter *Lutra lutra* in Afghanistan: A review of the sparse available information, *IUCN Otter Spec. Group Bull.*, 33, 1, 50-53.

SUMMARY OF OTTER RESEARCH AND CONSERVATION ACTIVITIES IN EAST ASIA

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Field surveys have confirmed several new records of the presence of Eurasian otter (*Lutra lutra*) in the East Asia region.

China: A camera-trapping survey and molecular study of faecal samples confirmed the presence of Eurasian otters on Hengqin island of Zhuhai city in Guangdong Province (Li et al. 2017). However, interviews and transect surveys revealed a drastic decline of otter populations and local extirpation of otters on several neighbouring islands. Future development and rapid urbanization of Hengqin Island may further impact the otter population. Researchers who conducted the surveys recommended that critical habitats of otters on Hengqin Island need to be strictly protected to ensure continual survival of the species.

Images of otters have been recorded by camera traps at Zadoi county and Jiegu town of Yushu Tibetan autonomous prefecture, Qinghai Province, which are located at the headwaters of the Yangtze and Lancang (Mekong) rivers. Based on the analysis of images and video recorded, at least three otter families and two adult male otters are living in the areas. (<http://www.chinadaily.com.cn/a/201801/23/WS5a66c72aa3106e7dcc136063.html>). Protection of otter habitats in this area will benefit not only otters and many other wildlife species, but also human well-being because the ecosystems here are considered “Asia’s water tower.”

Korea: A female otter was found dead after being hit by a vehicle on Jeju Island in January 2018. (<http://www.jibs.co.kr/news/replay/viewNewsReplayDetail/2018011115241500782>). The last record of otter presence on this island was nearly 400 years ago. Further investigation is needed to find out the source of this and otters on the island.

Several incidences of mismanagement of Eurasian otters have been reported in the East Asia region

Japan: First, the issue of otter cafés in Japan was brought to the attention of otter specialists recently (see article by S. MacMillan, in this issue). In certain otter cafés, visitors not only get to see live otters (usually the Asian small-clawed otters) and other exotic animals, but they may also be able to play with the otter after a short training (<https://english.kyodonews.net/news/2017/09/b411b15edf77-otter-story-draft.html>). Although otters are a protected species, the cafés claimed that the animals were legally bred and purchased in Japan, which needs to be verified by the authorities. Even if this was true, keeping, displaying and handling of these wild animals in such a setting is very controversial.

Otter researchers from Japan suggested that the popularity of otters in the Japanese society may have been triggered by the news of otters found in Tsushima Island, Japan last year. Some news emphasised the cuteness of otters and that there were people keeping otters in their house.

Taiwan: Second, at least two Eurasian otters were suspected of being wounded due to a dog attack in Kinmen, Taiwan, and the animals eventually died. Such incidence reminded the local authority to strengthen management of domestic as well as stray dogs as they may not only cause physical harm to otters but also transmit canine diseases such as rabies, canine distemper, canine parvovirus and infectious canine hepatitis (Rey 2016).

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OTTER RESEARCH AND CONSERVATION ACTIVITIES IN THE MIDDLE EAST REGION

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Two otter species are distributed in the geographical range of many of the Middle Eastern countries: the Eurasian otter *Lutra lutra* and smooth-coated otter *Lutrogale perspicillata*. Their status is listed below:

Iran, Islamic Republic: *L. lutra*: is possibly present in most of the perennial streams in Iran. It was recorded from Esfahan, Kerman, Tehran, Golestan, Gilan, Azarbaijan, Fars, Mazandaran, and Lorestan. All records, with one exception, are from the western half of Iran and it has been recorded in many suitable habitats in Iran. *L.perspicillata*: is questionably listed for Iran by **Etemad (1985)**; as *Lutra perspicillata*), and it is possibly present in South-WesternIran on the Iranian part of Hawizeh Marsh (Al-Azem Marsh) (**Al-Sheikhly O.F. pers. comm. 2016**).

Iraq: Two species are present – *L. lutra* and *L.perspicillata*. *L. lutra*: is uncommon in lakes and rivers all over Iraq and *L. perspicillata* is confined to the marshlands of southern Iraq, with one record only from northern Iraq.

Israel/West Bank: *L. lutra*: used to be fairly common, being recorded from the shores of Lake Tiberias, Lake Huleh and the mouth of the upper reaches of the Jordan. Recent reports suggested that the species was extinct from Israel's southern coastal plains and only restricted to the En Nimfit Natural reserves on the northern coastal plain. During the 1980s, otters were recorded as still thriving along the upper part of River Jordan where they were common. The species was recorded from Dan, Beteha Vally, Tirat Zevi, Bet She'an Vally, and near Akko on the northern coastal plain. It seems to have a stable population in the Golan Heights.

Jordan: *L.lutra* is restricted to the permanent waterways and rivers Jordan, Yarmouk, and Zarqa; however, little is known about the species distribution. It was observed in the upper reaches of the River Jordan and the Yarmuk River.

Lebanon: *L.lutra* is very rare and it was reported only once at Ammik Swamp. The most recent records are from Anjar in 2007 and it was also known to breed in the Bekaa wetlands and in the Chouf reserve.

Syria: *L.lutra* is indeed present in the countries bordering Syria, particularly those along the River Euphrates, but there is no physical evidence of otter presence in Syria. The published records should be considered anecdotal. It would seem that otters are still present along the River Euphrates, though population numbers have dropped considerably over the last 40 years. The principal cause of this drop would appear to be an irrigation scheme at Deir el Zor and river management during and following the construction of the Tabaqa dam.

Turkey: The status of *L.lutra*: is still not fully known. Over the past 50 years Turkey has

lost 75% of its wetlands, mainly through agricultural development and it is concluded that this loss of habitat has had a highly significant impact on the population of the Eurasian otter. The National Otter Database (NFDB), an initial step to protect the otter in Turkey, was taken by the Authority for the Protection of Specially Protected Areas (APSA) in the late 1990s, when it began, together with a local NGO, to promote the otter as a flagship species of the Specially Protected Areas. For more information about Eurasian otter distribution in Turkey, please see: <http://www.akyaka.org/otter/index.htm>

Regional Activities 2017

Research

Iraq: One sighting report was published in *OTTER, the Journal of the International Otter Survival Fund* in 2017. **Al-Sheikhly et al. (2017)** obtained the first photographic record of smooth-coated otter in the wild which was obtained from Al-Edheam Marsh at the northern edge of Hawizeh Marsh in southern Iraq. Other first photographic records for Iraq were of the Eurasian otter which were obtained in the Al-Hammar Marsh and at the Mosul Dam in southern and northern Iraq, respectively. Both Iraqi otter species are facing a major decline due to illegal hunting/trapping, habitat loss, and fragmentation, thus strong conservation efforts are required to protect their populations in Iraq. In conclusion, the photographic record of the endemic smooth-coated otter (*L. perspicillata maxwelli*) will support the Mesopotamian Marshlands to persist and endure as a UNESCO's World Heritage Site.

Iran, Islamic Republic: One article was published in 2017 in the *IUCN-SSC Otter Specialist Group Bulletin*. **Naderi et al. (2017)** surveyed for Eurasian otters in the Anzali wetland in 2015 by searching for tracks and spraints, and also by using rafts, camera traps and interviews with fish farmers. Otter distribution was found to be not uniform and there are also obvious temporal changes of presence. It is more frequent in quiet and less polluted areas with enough food availability. Open water bodies are not used away from the banks, and edges with weedy vegetation, particularly reeds, are not attractive to this species. These nocturnal animals were observed solitary or in groups of up to three individuals. Signs of otter pups, as an indicator of reproduction, were recorded in August and September. However, environmental degradation, eutrophication and other pollutants in the Anzali wetland threatens the otter population; but it seems that the most important negative factor is casualties caused by conflicts with fisheries and aquacultural activities. The presence of otters was reported by 67% of the fish pond owners around the Anzali wetland. The Eurasian otter population in some regions of the Anzali wetland is very fragile and it seems it is a "threatened" species there. Knowledgeable management of recovery of different habitats and decreasing conflicts with humans is crucial for conservation of this important species in the Anzali wetland.

Education

Iraq: An educational leaflet in Arabic produced by the Iraqi Green Climate Organization (IGCO), a non-governmental organization, concerning wildlife and biodiversity surveys in Iraq in cooperation with the International Otter Survival Fund (IOSF) and Iraqi Ministry of Health and Environment (IMoHEn), was distributed among hunters, fishermen, and Marsh Arabs. The leaflet was dispatched during the field expedition performed by IGCO and IMoHEn to survey both otter populations in the Iraqi Marshes (UNESCO World Heritage Site). The objective is to spread knowledge in order to reduce the illegal hunting impact of both species in Iraq.

Observations of otters in the wild: 2017

Iraq: A rare observation of a juvenile Iraqi smooth-coated otter reported from Al-Edheam Marsh, in the northern part of Hawizeh Marsh in southern Iraq in April 2017 (Al-Sheikhly et al., 2017).

Iran, Islamic Republic: No recent observation

Israel/West Bank: No recent observation

Jordan: No recent observation

Lebanon: No recent observation

Syria: No recent observation

Turkey: The Doğan News agency reported that an injured otter, a species on the most protected list in Turkey, was found injured in the Munzur National Park in the eastern province of Tunceli on 16 March 2017 and taken in for treatment. Locals found the injured otter at the side of the Munzur River in the province's Ovacık district and informed officials from the Directorate General for Nature Conservation and National Parks. Officials delivered the otter to a veterinary for a medical examination, with experts concluding that it had received wounds to its hind legs after being attacked by wild animals. Officials also stated that they would release it to its natural habitat after it had recovered. The branch manager of the Directorate General, Ali Haydar Gürsönmez, said the otter's treatment was being conducted diligently. The Munzur River area is home to a variety of endemic flora and fauna (see www.hurriyetdailynews.com/rare-injured-otter-receives-treatment-in-turkeys-tunceli-110935).

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- Ziaie, H. and Gutleb,B. (1997).** New comments on otters in Iran, *IUCN Otter Specialist Group Bull.*, 14, 2,91-92.
- ERRATUM.** We apologise that in the *OTTER, Journal of the International Otter Survival Fund* Volume 3, an author's name was not spelled correctly. The name should have read Jyoti Bhandari not Bandhari, "Developing the Nepal Otter Network". Apologies to Jyoti.

AFRICAN OTTER NETWORK (AON)

YEARLY REPORT – MARCH 2018



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AON has made some significant progress this past year. Currently the network consists of 27 people from 10 countries. As of the end of March 2018, Dr Mordecai Ogada will be assuming the position of Executive Director. Dr Ogada brings with him extensive experience in dealing with otters and human/carnivore conflict, as well as a vision that coincides with our goal of emphasizing wetland conservation and management for the good of wildlife and human communities alike: an approach we call Living Wetlands. The management of wetlands in Africa has mostly been biased towards management of individual resources like water and fish, which are often mandates pursued in isolation by different institutions. There is need for African conservation practitioners to seek a more holistic approach to managing the entire ecosystem that brings together the different aspects of sustainable human use, habitat quality, prey availability, etc. Over the next 12 months, AON will continue its work to build a presence and distribution database for Africa's otters, prioritize research goals, expand its network of range-country conservation partners and focus its efforts on further developing the Living Wetlands approach.

Some significant accomplishments for 2017 were:

- Margherita Bandini is doing an excellent job with the AON website (now located at africanotternetwork.org) and Facebook page ([@africanotternetwork@facebook](https://www.facebook.com/africanotternetwork)) which is a significant step towards spreading awareness of African otters across the globe.
- Carol Bennetto is continuing her work with range-country partners developing education outreach materials which now include a variety of games, an ecosystem poster and flyers on our Power Of One campaign among others.
- James Leonard, an AON supporter living on Rubondo Island National Park in the Tanzanian portion of Lake Victoria, is monitoring the spotted-necked otter and has provided us with wonderful photos and videos allowing us to keep track of an important population of this species.
- William Mgomo is still working closely with fishermen, villagers, school children, and fish pond owners in southern Tanzania and the Lake Nyasa shoreline. This work is supported by funds from the Columbus Zoo and Aquarium and the donation of field equipment by Idea Wild. His work has already given us insight into attitudes towards the otters and traditional uses, and has allowed us to begin testing mitigation efforts at local, privately owned fish ponds.
- Prioritization of research and conservation goals which have been incorporated in the future IUCN/SSC Otter Specialist Group Global Conservation Plan.

JAN REED-SMITH

CONSERVATION OF ENDANGERED OTTERS AND THEIR HABITATS IN LAOS THROUGH EDUCATION AND REDUCING ILLEGAL TRADE

WORKSHOP REPORT

Dates: 2–6 April 2018

Venue: Nam Thoun 2 Watershed Management & Protection Authority, Oudomsouk village, Nakai District, Khammoune Province, LAOS PDR



The workshop in Laos marks our fifth in Asia having already held successful workshops in Cambodia, Indonesia, Bangladesh and China.

Otters are a top predator using both the terrestrial and aquatic environments and their loss has a profound impact on local food webs, biodiversity, and habitat relationships. They need good water quality which is essential for all species, including our own, and so they are excellent environmental indicators.

Otters are one of Asia’s most overlooked medium-sized mammals and yet they are at the forefront of the illegal wildlife trade together with tigers and leopards – for every tiger skin found there are at least 10 otter skins and one haul in Lhasa found 778 otter skins. Laos, Myanmar, and China are a major hub for this illegal trade. In some parts of Asia, otters (particularly Asian small-clawed otters) are taken from the wild for the pet trade and many of these are kept in terrible conditions and die. This trade for both fur and pets is seriously threatening the survival of otters and in some areas, they have become locally extinct.

In Asia there are very few scientists working on otters and their habitats. IOSF is therefore working to provide a series of training workshops to train more people in otter field techniques, public awareness programmes, law enforcement and general conservation issues.

36 people attended the recent workshop and most came from Laos, with six trainers from Sumatra (Indonesia), Taiwan, Sri Lanka, The Netherlands and the United Kingdom.

On the first day Paul Yoxon began by looking at the 13 species of otter in the world, and the problems they face in the wild. Of these 13 species, 12 are declining due to habitat loss, pollution, and the illegal trade.



© Jung-Tai Chao

This was followed by a presentation by Ling-Ling Lee on why otters are so important to a wetland ecosystem and how the otter can be used as an ambassador to conserve wetland areas and their biodiversity. Focusing on Asian otters, she looked at the identification of the species in the field, their ecology and status. There are four species in the area of Laos, Myanmar and China:

- Eurasian otter (*Lutra lutra*), classified in the Red List as “Near Threatened”
- Smooth-coated otter (*Lutrogale perspicillata*), classified in the Red List as “Vulnerable”
- Asian small-clawed otter (*Aonyx cinereus*), classified in the Red List as “Vulnerable”
- Hairy-nosed otter (*Lutra sumatrana*), classified in the Red List as “Endangered”. This species has now been found in neighbouring countries to Laos (Thailand, Myanmar, Vietnam and Cambodia) and so it is likely that they have also been present in Laos. Indeed they may still be present, although this has not yet been confirmed.

Padma de Silva, Chair of the IOSF Asian Otter Conservation Network, summarised the status of otters throughout Asia. We then turned our focus to the otters in Laos where very little work has been done over the years, and the information we have was outlined by Aadrean.

In 2016 Project Anoulak produced a report on their preliminary camera trap survey in Nakai Nam Theun National Protected Area. In it they stated: “In Lao PDR, two IUCN-listed Vulnerable species, *Aonyx cinereus* (Asian small-clawed) and *Lutrogale perspicillata* (smooth-coated) occur, and *Lutra lutra* (Eurasian) may also still occur, only historically recorded.” As part of the project, they interviewed local villagers who confirmed that there were two species:

- “one with feet like dogs, small and dark, mostly seen in groups of 3–5 individuals” – Asian small clawed otters
- “one with feet like duck, large, mostly seen in pairs” – Smooth-coated otters

There were no reports of possible Eurasian otters.

In addition IOSF had been sent some information by the Wildlife Conservation Society who had records from the Nam Et Phou Louey National Park but they had no idea of the species.

Clearly it is fundamentally important to do baseline surveys in this country as unless we have this data, we cannot prepare and implement a practical conservation plan for the future.

The afternoon session concentrated more on the human impact on otters. It began with a presentation by Jamie Bouhuys on the illegal otter trade in Laos for skins and body parts associated with medicines and how more work and information is needed in this field. There was also a practical session on how to identify the different species from the skins.

In the next session Grace Yoxon looked at how to care for confiscated otters. Padma de Silva outlined additional threats to otters through conflict with fishing communities and possible mitigation measures. The General Department of Forestry is responsible for conservation in the country and Senglat Philasa, Head of Wildlife Management Division, General Department of Forestry, spoke about these aspects from a Lao perspective.



Identifying footprints from plaster casts
© Jung-Tai Chao

and other secondary signs like footprints to identify different species of otter in the field. The participants then took part in an informal quiz to test them on their knowledge so far and the results were very encouraging.

The second day began with field techniques, starting with the identification and analysis of spraint (faeces). Paul Yoxon showed how this can help to identify what the otter has been eating, but it does have limitations as only hard-bodied prey will be identified. Spraint surveys are often used to give information on otter populations but there is no correlation between otter spraints and otter numbers. It merely gives you an idea of distribution. The final part of the morning was on the use of camera traps



Otter habitat at Nakai © IOSF



Spraint and footprints of Eurasian otters © Jung-Tai Chao

In the afternoon we went into the field to put the morning's sessions into practice and took an hour boat journey in Nakai Nam Theun, to an area where otters are known to be present. This was led by Chanthalaphone Nanthavong of the Anoulak Project. We identified signs of Asian small-clawed and to our surprise we also found Eurasian otter spraint and tracks. We believe this is the first time it has been recorded here and it does confirm the presence of the species in Laos.

The final morning was a discussion on what needs to be done for otter conservation in Laos and the participants were divided into four groups to discuss the following questions:

1. What is the biggest threat to otters in Laos?
2. For the conservation of otters in Laos, please put the following into order of priority:
 - a) Social surveys
 - b) Field surveys
 - c) Illegal trade
 - d) Education
3. How are you going to achieve this?
4. How are you going to apply the knowledge and skills learnt from this workshop?
5. Can you recommend any other people or organisations to attend such a workshop?
6. Would it be useful to have a Network and/or Facebook group? Do you want to be a part of it?



© Jung-Tai Chao

The biggest threats were identified as habitat loss (including dam construction, deforestation), human conflict, illegal trade, hunting, human population, climate change.

It was agreed that local communities need to be involved as real conservation is not possible without their support. Social media can be a valuable tool to generate awareness and more information on records of otters which can then be investigated further.



© Jung-Tai Chao

For any future training it would be good to involve more university students to encourage them in otter studies. Members of the Army should also be included as they are involved in border enforcement and also village leaders.

It was unanimously agreed to set up a Laos Otter Network which will be linked to the IOSF Asian Otter Conservation Network. Mr Chitpasong Senthamavong, Wildlife Management Division, was

nominated to be the co-ordinator for the Network. Priorities for future work were identified as:

- Field surveys to obtain more data on distribution and species;
- Social surveys to assess human/otter conflict and gather more information on distribution of otters;
- Illegal trade to look further at the scale of the problem in terms of furs, body parts and pets;
- Education and public awareness.

The final act of the day was to present the participants with certificates.



© Jung-Tai Chao

Following the actual meeting, Paul and Grace Yoxon of IOSF met with Mr Asoka Rasphone, Director of the Ministry of Foreign Affairs, to discuss further steps. He told them that the Lao government wants to set up a rehabilitation facility in Laos to care for otters and other wildlife which has been rescued from illegal trade. We have therefore put them in contact with Phnom Tamao Wildlife Rescue Centre in neighbouring Cambodia,

and they are very keen to help with this project. So Mr Asoka will be arranging a visit to Cambodia to see the centre and how it is run.

Yet again, the workshop has proved to be a great success. It may have taken nearly two years to organise and get all the stakeholders in place but eventually it has taken place, and the result can only be positive for otters in Laos.

IOSF always feels that it is vital that these events are not just talking shops but that they result in REAL action. This is not a conference but a training workshop, equipping people to go on to achieve otter conservation in their own country, where they know the culture and best practices for dealing with communities.

It was encouraging therefore, when one participant said at the closing session: “This is not the end ... this is the beginning.”

Dr Paul Yoxon
Head of Operations. IOSF



© Chitpasong Senthammavong

List of Participants

(PAFO is Province of Agriculture and Forestry Office;

DAFO is District of Agriculture and Forestry Office)

Aadrean, South-East Asia Co-ordinator (IOSF)
Jamie Bouhuys, Independent illegal trade researcher
Soulaphone Boutchalern, Deputy of Management National Park Division, DAFO of Nakai
Souliyo Channiyavong, Technical Staff, DAFO of Nakai
Jung-Tai Chao, Senior Scientist (retired), Taiwan Forestry Research Institution
Bounta Kaopaseuth, Technical Staff, General Department of Forestry
Soulilat Keovilay, Technical Staff, DAFO of Nakai
Chanthavy Khamkhong, Deputy of Forestry Unit, PAFO of Savannakhet
Kiengkai Khoonsrivong, IOSF Consultant
Mr Kood, General Department of Forestry
Ling-Ling Lee, Eastern Asia Co-ordinator (IOSF)
Chanthalaphone Nanthavong, Co-ordinator, Anoulak Project, Nakai District
Bountop Phasaysombath, Lecturer, University of Lao PDR
Senglat Philasa, Head of Wildlife Management Division, General Department of Forestry
Fongsamouth Phommakan, Deputy Officer, DAFO of Nakai
Daovone Savangkeo, Technical Staff, PAFO Savannakhet
Thepsouvan Saykosy, Technical Staff, DAFO of Nakai
Phoulodsany Sayyasan, Technical Staff, General Department of Forestry
Khanthaly Sayyavongsa, Deputy of Forestry Section, PAFO of Khammuan
Khao Sengmany, Deputy Forestry Unit, PAFO of Bolikhamxay
Vanna Sengsy, PAFO of Khammuan
Chitpasong Senthammavong, Wildlife Management Division, General Department of Forestry
Padma de Silva, Professor, Asian Co-ordinator IOSF
Latsamy Simmanivong, Head of Forestry Patrol Division. PAFO of Khammuan
Vilakone Sivilay, Technical Staff, DAFO of Nakai
Phetsathone Soulaythong, Technical Staff, Ministry of Agriculture and Forestry
Mr Soulvian, General Department of Forestry
Bounthan Sounyvong, Staff of Wildlife Management Division, General Department of Forestry
Sangthong Southammakot, Deputy General Department of Forestry
Thongsavath Sybuakham, Deputy of Forestry Unit, PAFO of Borlikhamxay
Kaophone Temsouvan, Head of Forestry Unit, DAFO of Nakai
Sonesay Vongvilay, Deputy of Forestry Protection Unit, PAFO of Khammuan
Viengkham Xayyaphone, Deputy PAFO of Khammuan, PAFO of Khammuan
Oumalay Xayyavong, Head Division of Forestry, General Department of Forestry
Grace Yoxon, Director, International Otter Survival Fund (IOSF)
Paul Yoxon, Head of Operations (IOSF)

Thanks

We are grateful to Mr Asoka Rasphone, Director of the Ministry of Foreign Affairs, for his help and support from the beginning in order to make this workshop a reality.

Thanks to all the trainers who provided their time free of charge.

We would also like to thank our sponsors: Action for the Wild, The Anderson-Rogers Foundation Inc, The Rufford Foundation

ACTION FOR THE WILD
Charity No. 1105621



And finally thanks to all the participants for their enthusiasm for otter conservation.

IOSF WORLD OTTER DAY 2017



In 2017 IOSF **WORLD OTTER DAY** took place on 31 May. The aim of this event is to keep the world's attention on otters, raising awareness of their importance in the environment and the threats they face, such as pollution and the illegal wildlife trade. Also, to raise funds to support even more conservation projects worldwide.



IOSF Information poster available to download from IOSF website

People involved were from many countries including Italy, Germany, Netherlands, Tanzania, Uganda, Benin, Ethiopia, China, Nepal, Sri Lanka, Japan, USA, Chile, Australia and the UK. Posters translated into 17 languages, and other resources, were available to download from the IOSF website.

Three grants of £100 were offered by IOSF towards the cost of an event/project for **WORLD OTTER DAY**, one being sponsored by Anna Dorian of Vibrant Reiki, who was an environmental educator for many years. They were awarded to projects in Benin, Nepal and the UK. A fourth grant, sponsored by the African Otter Network, went to a second project in Benin, to create an information panel in French and Arabic to be sited on the Benin/Niger border.

WORLD OTTER DAY was supported by a broad spectrum of people from school children through to academics, including individuals, zoos, schools, libraries, universities, and institutions. Social media has proved to be a great asset in raising awareness and spreading the word. In fact, the IOSF hashtag #worldotterday trended on Twitter on the actual day.

The following demonstrate a cross-section of the variety of ways in which supporters of **WORLD OTTER DAY** got involved:

In Japan, the Tokiwa Zoo at Yamaguchi Prefecture, presented information about the aims of **WORLD OTTER DAY** at their otter exhibit, utilising the resources available from IOSF. The zoo breeds Asian small-clawed otter (*Aonyx cinereus*) and keeper Kimura



Otter awareness on WORLD OTTER DAY at the Tokiwa Zoo, Yamaguchi Prefecture, Japan. ©Tokiwa Zoo

Yoshitaka introduced visitors to the otters and talked about conservation work and the importance of otters as environmental indicators.

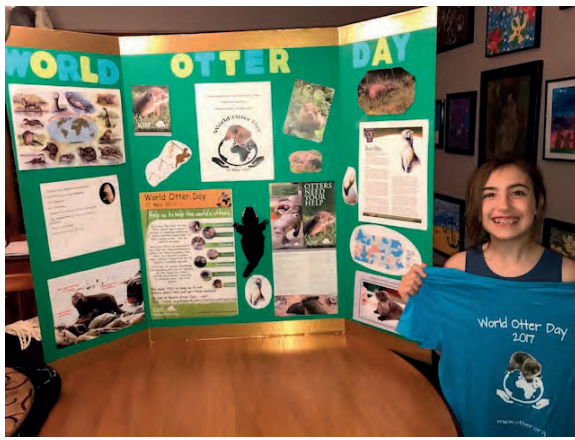
Amis de l’Afrique Francophone-Bénin (AMAF-BENIN) in Benin, organised an information campaign for the benefit of local communities of Sô-Ava, which is located on Lake Nokoué. Posters, based on the available IOSF resources, were used to demonstrate to the



Children from Sô-Ava Centre public primary school learning about otters © AMAF-BENIN

communities the ecological and economic importance of the otter species that use the lake; known locally as “otter white” (*Aonyx capensis*) and “spotted otter” (*Hydrictis maculicollis*), the need for their conservation, and the pressures they suffer from human activities.

Over 300 children and 21 teachers from the Sô-Ava Centre public primary school were involved and learned of the advantages that conservation of the otter and its habitat can create both locally and country-wide.



Nancy, alongside her WORLD OTTER DAY board, with her WORLD OTTER DAY t-shirt. © Jef Jensen

This project was awarded one of the **WORLD OTTER DAY** grants.

Several events took place in the United States of America. These included 9-year-old Nancy Jensen of Pennsylvania, who prepared an information board about otters for her 4th Grade class.

In Nepal, Balram Awasthi, a Teaching Assistant at Tribhuvan University, Kanchanpur organised a celebration of **WORLD OTTER DAY** with 3 events and the following objectives:

- To celebrate **WORLD OTTER DAY** on 31 May 2017.
- To spread otter conservation awareness message to the academics and students as well as general public.
- To spread awareness about the species ecology and biodiversity importance.



Rally between Siddhanath Science Campus and Mahendranagar city. © Balram Awasthi

The students taking part carried placards using the IOSF resources and also conveyed otter conservation messages.

The first event was a rally which involved a 5 km march to and from Siddhanath Science Campus to Mahendranagar city.

Two hundred participants (including “faculties, staffs and bachelor level student and 18

local media person”) were involved in the second event. An interactive programme at the Siddhanath Science Campus was organised, where a short talk was given about the otters in Nepal, their current status and conservation threats. There followed a video film about otters and a discussion.



*Otter puppet play for **WORLD OTTER DAY** at Exploris Aquarium, Northern Ireland.
© Exploris Aquarium*

The third event was to publicise the **WORLD OTTER DAY** and this programme through social media and the local media.

This event was awarded a **WORLD OTTER DAY** grant.

The Exploris Aquarium in Northern Ireland supported **WORLD OTTER DAY** during their Otter MAYhem days near the end of May. This included trails through the aquarium with quizzes and competitions, leading to the otter exhibit, Asian short-clawed otter (*Aonyx*

cinereus). Here lots of otter related facts were displayed and their social media had a live stream from inside the otters’ holt. Otter puppet crafting was also available, and this puppet (as in the photo) is now included on the resource page of IOSF website.

Two primary schools on the Isle of Skye took part in ‘Walk4Wildlife’ and raised over £500. And on the Isle of Mull, the Mull Otter Group held indoor sessions about otters and **WORLD OTTER DAY** and completed two otter watching walks on the day, while Mull Magic donated fees from one of their Otter Detective Walks.



© Struan Primary School



© Raasay Primary School

*Children of Struan and Raasay primary schools, Isle of Skye, supporting **WORLD OTTER DAY**.*

The children of Reay Primary School, London, enjoyed a fun session about otters and learned about the different species, the threats that otters face, their ecological importance and how we can help. The event was organised and performed by Amy Corcoran and Erin Tschiderer and culminated in the children creating a collaborative temporary mural.

This event was awarded a **WORLD OTTER DAY** grant.

A Grand Raffle was organised and publicised, via social media, to raise funds for **WORLD OTTER DAY**. The main prize was a splendid wooden otter sculpture by Mike Wood, generously donated by an IOSF supporter. This event raised almost £800.



Reay Primary School event – WORLD OTTER DAY banner created on the day and the children from Reay Primary School who took part © Amy Corcoran/Reay Primary School

The last Wednesday of May has been designated the date for this event each year. For more information contact enquiries@otter.org

OTTER OSCARS 2017

2017 saw the second year of the IOSF Otter Oscar Awards and a high number of submissions were received across a broad spectrum of otter-related work such as research, art, and school projects. On 1 December 2017 the successful winners were announced and an award for each of the seven categories was received by the following:



Children: Years 2 and 3 of Cookham Rise Primary School, England

After learning about otters in class the children held their very own Otter Awareness Day raising £300 for the otters.



Young People (12–18): Budjarn Lambeth, Australia

Despite not having any wild otters in Australia, Budjarn has a real passion for them. He has dedicated his time to promoting otter awareness and raising funds for IOSF, especially the Illegal Fur Trade Fund.



Community Achievement: Christina Ward, Guyana

Christina started a community-based conservation initiative in Guyana that supports and educates local communities about giant otters and empowers them to carry out research, protect the waterways, and hopefully begin ecotourism to sustain healthy and viable environment and populations.



Group or Organisation: River Otter Ecology Project, USA

The Project was set up in 2012 to monitor the return of North American River Otters to the San Francisco Bay Area. It carries out public awareness and encourages people to report otter sightings to learn more about distribution.



Research: Dr Nicola Oakes, South Africa

Nicola completed her PhD on the conservation ecology of Cape Clawless Otters in 2017, discovering new information and methodology. At the same time she created awareness in the broader community.



Photography/Artwork: Dave Webb, England

This photograph was taken while monitoring otters in Devon.



Special Award: Vic Simpson, England

Since 1988 Vic has carried out ground-breaking and inspirational work on the Eurasian otter and trained others to do so. He has carried out over 700 otter post mortems and trained staff from Cardiff University to carry on this work. His work over the past decades has ensured that conservation efforts towards otters have the correct scientific knowledge to be successful.

Congratulations to all winners of the Otter Oscars 2017.

The opening date for nominations for the 2018 award will be on **WORLD OTTER DAY**, 30 May 2018.

TOO CUTE! THE RISE OF OTTER CAFES IN JAPAN

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Abstract

Animal-themed cafes are becoming increasingly popular in Japan, both with locals and international tourists. Recently otters have been added to the suite of exotic species available in these cafes. Otter populations are declining worldwide due to habitat loss, water pollution, reduction in prey biomass, and poaching. The advent of otter cafes has the potential to further impact otter populations as they can stimulate the otter pet trade and illegal wildlife trade. However, there is very little baseline information available from which to consider their contribution. Therefore, a rapid-review of animal-themed cafes through an internet search and visits to three cafes was undertaken to acquire preliminary information regarding the status of otter cafes in Japan. Eight cafes, which kept 22 otters between them, were identified. As interactions with otters in cafes can depict them as “pet appropriate”, the cafes have the potential to motivate the otter pet trade. In addition, a recent spike in seized, live otters en route to Japan, corresponds with the timing of the opening of the otter cafes. Therefore, further investigation is required to determine the effect of otter cafes on otter populations, particularly their influence on the pet trade and illegal wildlife trade.

Keywords: *illegal wildlife trade, Japan, otter cafe, pet trade*

Introduction

Since the opening of the first cat cafe in Osaka in 2004 (Plourde, 2014), animal-themed cafes in Japan have diversified with increasingly unusual species, including exotic birds (particularly owls), reptiles, and mammals (such as meerkat, fennec fox, and capybara). Otters are one of the latest “cute” species to appear in these cafes, with the emergence of a number of articles and blogs over the last year highlighting the opportunity to interact with them in cafes (Mower, 2017; Scott, 2017; Allen & Sasaki, 2017).

Otter populations are declining worldwide due to habitat loss, water pollution, reduction in prey biomass, and poaching (de Silva et al., 2015; Roos et al., 2015; Wright et al., 2015). The advent of otter cafes has the potential to further impact otter populations as they can stimulate the otter pet trade and illegal wildlife trade. However, it is currently difficult to ascertain the scale of the contribution of the cafes, as there is very little baseline information to draw upon. Typically, research into the wildlife trade and pet trade can be difficult, particularly in Asia, given the scarcity of trade information, resulting from the secretive nature of the wildlife trade and incompleteness of seizure data (Gomez et al., 2016). There is also the added issue of inconsistent legal protection used to regulate trade across relevant countries and challenges associated with weak law enforcement (Gomez et al., 2016). In the case of Japan, the domestic trade of CITES Appendix I species is controlled under the Law for the Conservation of Endangered Species of Wild Fauna and Flora; however, the same control does not apply to Appendix II species, such as the Asian small-clawed otter (*Aonyx cinereus*), which could influence the effectiveness of enforcement and protection.

Together, the lack of baseline information, the scarcity of trade information, and

inadequacies in legislation and enforcement can limit our understanding of the impacts on species from wildlife trade, especially emerging “new” issues such as otter cafes. The purpose of this short communication is therefore to undertake a rapid-review of animal-themed cafes to provide preliminary baseline information regarding the number of otter cafes in Japan, the number of otters kept and their origin.

Approach

An internet search was conducted (for the term “otter café” and “カワウソ カフェ”) to identify animal-themed cafes with otters in Japan. Where otter cafes were identified the number of otters kept and date of cafe opening/otters added to the cafe, was ascertained. Three otter cafes in Tokyo were also visited in September and October 2017, to collect data on the number of otters kept in the cafe and staff were asked about the otters’ origin.

Results and Discussion

Through the internet search, eight animal-themed cafes were identified across Japan that advertise otters (**Table 1**). The emergence of otter cafes and inclusion of otters in animal-themed cafes is a recent phenomenon, with seven of the eight cafes opening/adding otters in 2017 and one opening in 2016 (**Table 1**). The Asian small-clawed otter was the only otter species recorded in the cafes. The cafes typically kept one to six otters,

Table 1. Number of otters in cafes in Japan and their year of opening/otters added

Cafe ID	Number of Otters ¹	Year of Opening/Otter Added ¹
Cafe 1	2	2017
Cafe 2	4	2017
Cafe 3	3	2017
Cafe 4	2	2017
Cafe 5	2	2017
Cafe 6	1	2016
Cafe 7	2	2017
Cafe 8	6	2017

¹ Based on observations from visits to cafes or information available from internet search



Figure 1. Dangling ribbon-toys at Asian small-clawed otters in clear, Perspex container. A juvenile otter displayed in a small pet cage can also be seen in the background

and in total the eight cafes identified kept 22 otters between them. Two of the three otter cafes visited kept one juvenile otter each (both about four months old), and juvenile otters also appeared to be kept in some of the other otter cafes, based on the images presented on their websites.

Many of the cafes could be described as a small, indoor petting zoo, with human-otter interaction via either indirect contact (e.g. dangling toys at the otter/s in a pen) (**Figure 1**), or direct contact through physical



Figure 2. Bottle feeding four-month-old otter

handling of and/or feeding the otter/s (**Figure 2**).

As the presence of exotic animals in exhibitions and pet stores can give the false impression that those animals are “pet appropriate” (**Kieswetter, 2017**), the presence of otters in cafes, and in particular the opportunity to interact with them, has the potential to motivate the otter pet trade. The effect of the cafes in this respect could be far-reaching given they are visited by both local people and international tourists, with one cafe stating that half of their customers are from overseas (**Allen and Sasaki, 2017**).

Of the three cafes visited, staff stated that the otters were from Japan, with one of the cafes stating that “the otters had been legally bred and purchased in Japan”. However, specific details were not provided and hence the origin of the otters could not be confirmed. Two of the eight cafe websites reviewed advertised a range of species for sale with one cafe specifically making reference to the sale of otters. An additional cafe which didn’t keep otters, but advertised the sale of them was also identified during the internet search. One of the cafes indicated that the otters for sale were sourced from Indonesia. Furthermore, a blog referencing the anticipated arrival of an albino Asian short-clawed otter at one of the cafes also suggested that the animal’s origin was a breeder in Indonesia (**Moshi Nippon, 2017**). As wild otters in Indonesia are also hunted to supply the pet trade (**Gomez et al., 2016**), and no apparent evidence of otter breeding facilities could be identified, further investigation into the otters’ origin is required.

A report providing an overview of the Asian illegal otter trade shows the trade of live otters to be relatively recent, with seizure data recorded from the 2000s onwards, compared to seizures of dead individuals (skins, carcasses and body parts), which extended back to the 1980s (**Gomez et al., 2016**). And while the number of live otter seizures was relatively small (**Gomez et al., 2016**) and predominantly supplied domestic trade (**Gomez & Bouhuys, 2017**), an increase in live otter trade and popularity of otters in the pet trade has been observed.

In 2013, evidence of illegal, international trade of live otters was observed (**Gomez & Bouhuys, 2017; “Eleven live otters”, 2013**) when a total of 11 otters reportedly headed

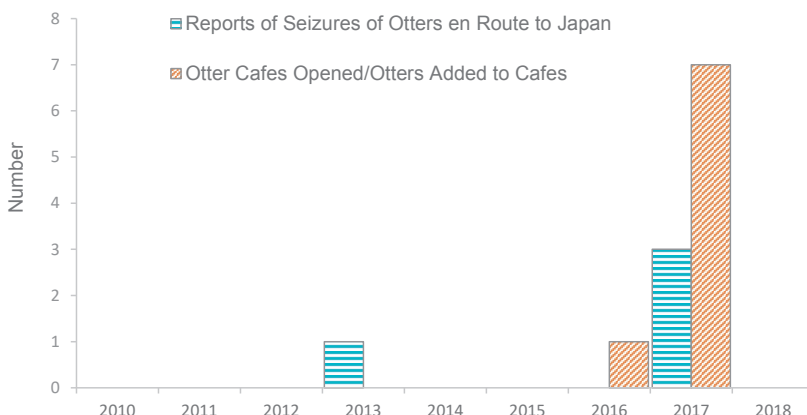


Figure 3. Timing of seizures of otters allegedly en route to Japan, and the timing of cafe openings or otters being added to established animal-themed cafes

for the exotic pet market in Japan were seized in Thailand (**Shepherd & Tansom, 2013**). Later, 2017 saw a spate of seizures, including three separate seizures totalling 32 live otters allegedly en route from Thailand to Japan (**Figure 3**), reported in the media (“**Japanese man caught**”, 2017; “**Foreigner charged**”, 2017; **Kyodo, 2017**).

This spike in seizures demonstrates an increase in the known international trade of live otters to Japan, potentially destined for the pet trade. The apparent increased interest in otters in Japan, may be explained by the 2017 sighting of a wild otter on Tsushima Island, Nagasaki Prefecture (**University of the Ryukyus, 2017**), which was the first sighting of an otter in the wild in Japan in 38 years. The majority of the otter cafes identified during the rapid-review also opened or added otters to established animal-themed cafes, during 2017 (**Figure 3**). There is therefore a need to understand the role of otter cafes in contributing toward this increased interest, and the broad-reaching impacts of otter cafes on otter conservation.

Conclusions

The information provided here, while preliminary in nature, highlights the existence of issues associated with otter cafes in Japan. The rapid-review provides the first step in flagging and understanding these issues and provides recommendations accordingly.

First, given the potential for otter cafes to stimulate the illegal otter trade, further investigation is required to determine the origin of the otters in the cafes, including the source country and whether they are wild or captive bred. The transparency of the otters’ origin could be facilitated by an animal registration system. If not in place already, consideration could be given to extending the existing registration system currently adopted for the transfer of individuals of internationally endangered species of wild fauna or flora, to also include the possession of vulnerable species in animal-themed cafes. Registering individuals of these species, should include the provision of details confirming their origin thereby helping to prevent their illegal trade. Furthermore, the vulnerability of the Asian small-clawed otter in Japan is in part associated with its CITES Appendix II listing, which influences the control of its domestic trade in Japan. Recommendations made by **Gomez et al. (2016)** to assess the potential for the up-listing of three Asian otter species, which includes Asian small-clawed otter, from CITES Appendix II to Appendix I would improve the inadequacies of legal protection of this species in Japan and reduce such exploitation

Second, as the presence of otters in cafes can influence public attitudes towards keeping otters as pets, the cafes have the potential to stimulate the otter pet trade. The findings of the rapid-review indicate an increasing interest in otters in Japan. Given the recent emergence of otter cafes and the corresponding increase in seizures of live otters en route to Japan, further research into the influence of otter cafes on the pet trade and any connections to the observed increase in illegal, international otter trade is also required. Lastly, many exotic species were identified in the cafes during this review in which their presence, like otters, has the potential to have an effect on wild populations. Therefore, further research into animal-themed cafes and their overall impact on the exotic species they keep is required to inform policy and regulation in regard to species conservation.

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ARE EURASIAN OTTERS “FLOODING BACK”?

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There has been a lot in the media about otter numbers increasing rapidly in England and Wales, and now it is claimed they are in every county (**BBC England 2011**). This report included a reference to a survey on the River Ribble in Lancashire, which showed a 44% increase since 2008! This was taken from the website of the Environment Agency (EA) and was clearly wrong – what they meant was that there had been a 44% increase in the occurrence of otter spraint since 2008. This was subsequently corrected on the EA website, but the damage was done as the false numbers were already spreading through the media.

It is true that there has been an increase in the number of signs but what exactly does this mean?

Otter surveys are almost always based on secondary signs in the form of spraint, but this really only gives information on the distribution of otter spraint and it can give no idea of otter numbers, or even if the animal is resident (**Yoxon & Yoxon, 2014**). The otter could merely have been passing through trying to establish a home range and it could pass through several 10km squares on its way, leaving spraint as it goes.

Otters have vast home ranges and in freshwater systems a male can have a home range of about 50km of waterway. In a radio tracking exercise in Perthshire in the 1980s (**Green et al., 1984**) a male otter travelled a distance of 41km in a single night. So it is perfectly feasible that he may actually have sprainted in four 10km grid squares giving four positive records. This would therefore suggest that there were four otters rather than one.

The most reliable way to be certain of how many animals there are is by DNA and some small-scale studies have been carried out using this method (e.g. **Hung et al., 2004; Prigioni et al., 2006; Vergara et al., 2014**). However, without this we do not know if spraint is becoming more widespread because there are more individual otters

or because the animals now have to travel further to find food and holt sites, so that the home ranges are expanding rather than being a large increase in the actual number of animals.



Figure 1. Location map of Loch na Dal, Isle of Skye

IOSF has been monitoring otters on the southern shore of Loch na Dal, Isle of Skye, Scotland, since 1999. This has been done using regular visits to record sprainting activity and sightings with binoculars. Since 2007 camera traps have been set at locations along the coast, where there are active sprainting points near freshwater pools. These pools are essential for coastal otters so that they can remove the salt from their fur. A coating of salt can reduce the thermal insulation by about 30% which clearly



Figure 2. Habitat of Loch na Dal, Isle of Skye

has serious implications for otters hunting in cold water (**Kruuk & Balharry, 1990**).

At Loch na Dal the home range of the female otter is 2.1km of coastline which is made of Torridonian sandstone (**Yoxon, 1999**). It has been found that this Torridonian coastline is some of the best otter habitat on the Isle of Skye, as the rock allows the formation of many freshwater pools (**Yoxon, 2013**).

Our data from the 18 years since 1999 shows that there have only been a total of seven otter cubs. This means that on average this female home range is producing 0.38 cubs per year.

There are several factors which influence the presence or absence of any species: food availability, habitat suitability, availability of resting places (holts), pollution, human disturbance and possible predators. The coastal section at Loch na Dal provides prime otter habitat and is some of the best in the UK, with virtually no disturbance.

If otters in such excellent habitat with ample prey, holt sites and minimum disturbance, have such a low reproductive rate, it must clearly be far more difficult for them to reproduce and expand their range in less optimum habitats? Otters are certainly adaptable, as we can see from their use of more urban waterways, but their slow rate of reproduction means that they are not able to re-establish themselves at the rapid rate reported. It is safe to say that it is likely that numbers are increasing but only slowly and reports that otters are “flooding” back into areas are greatly exaggerated.

So do we still need to worry about otter conservation in the UK, and indeed in Europe?

Otters continue to face many threats and there are a number of factors which could lead to an expansion in home range:

- **Loss of holt sites:** In certain areas, river banks are still being straightened and bankside vegetation removed, thus reducing the availability of suitable holt sites.
- **Reduction in availability of prey:** Eels form a large part of the diet of freshwater otters in the UK. However, eel numbers have declined drastically, in some places by about 95% according to the Environment Agency (**Morris, 2009; Barry, 2013; Beaton, 2013**). This could be what is driving them to people’s fish ponds and causing problems with fisheries.
- **Roads:** Roads are responsible for the greatest number of non-natural deaths of otters and if a female is killed it can result in the loss of the whole family (**Green, 2003**).

Clearly we should be delighted that otter numbers are beginning to improve but we must treat this with a great degree of caution and maintain our vigilance for their conservation.

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SOME PRELIMINARY OBSERVATIONS AND CONSERVATION MEASURES ON OTTER (*Lutra lutra*) IN MONTENEGRO

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Abstract

This short text aims to inform people outside of Montenegro about the activities that are being done in our country in relation to research of the otter. Since otter habitats in Montenegro are highly endangered (construction and development, wastewater, garbage, construction of small hydro power plants), this text also has the purpose of highlighting the vulnerability of the otter and raising the protection of its habitats to a higher level.

Keywords: *Lutra lutra*, Skadar Lake National Park, Biogradska Gora National Park, Ulcinj Salt, Piva National Park, fishing traps, traffic warning signs

Introduction

There is little awareness of the presence of Eurasian otters (*Lutra lutra*) in Montenegro, although in the past some literature did mention their presence (**Order on Hunting Wild Animals, 1892; Hunting Act 1910**). These data were obtained from local residents or hunters, and as such they were accepted. However, the data only referred to the place where the otter was seen and the conclusion would not include any further research or text. Comments were also very negative as the otter was considered to be a big pest and classified as a harmful wild animal, free to be hunted and killed all year. There were some relatively unclear references to the fact that the otter is an aquatic marten but there was no serious research or work on the species purely because it was perceived as a pest and not as an indicator of clean water and healthy habitats. Some more serious studies were carried out from 1970-1995 as reported in **Paunović & Milenković (1996)**.



Figure 1. Location map of Skadar Lake

Study Area

The location of the study area is shown in **Figure 1**. Skadar Lake is the largest lake on the Balkan peninsula. Two thirds of the lake belongs to Montenegro and one third to Albania. Skadar Lake is the National Park in Montenegro that is dominated by aquatic and wetland ecosystems. At the lake 281 bird species live, nest, spend the winter or migrate, so it has a status as an “Important Bird Area” (IBA) and it is also on the world list of wetlands habitats of international importance (RAMSAR). There are many species of fish in the Park, numerous amphibians, reptiles and insects. Of the 40 species of mammals, the only species using the water is the otter.

Work and Methods

I started working at the Skadar Lake NP in 2011. In the beginning, I was interested in otters and we carried out a survey with the local community, asking “Have you seen the otter?” That flyer was the beginning of otter-related activity and the project “Mapping Potential Habitat for *Lutra lutra*” was started. Since the Park had only a small amount of resources for this activity (just fuel) and we did not have any equipment, we decided to use a non-invasive method of direct observation of secondary signs (spraint or faeces and tracks). This method is good because it can be done during the day, so we did not disturb the otter, which is predominantly nocturnal. However, it was difficult to obtain field data because access to the lake shore from the land is over very inaccessible terrain with dense vegetation and it is not easy to see the signs. Nevertheless my colleague Hajdana Ilic Bozovic and I have great enthusiasm for the project and so we successfully located a number of otter traces (spraint, food remains, holts, etc.).

In 2012, on the basis of the field research and events in the Park, we managed to bring in some protection measures for the otters in the Skadar Lake NP. The first measures of protection concerned the prohibition of fishing and the setting up of fishing traps in the region where otters were recorded. In this region of Uvala Šišarina and Jovovica, two otters were caught and drowned in fishing traps. So, in the fishing permits issued by the Park, we have added a measure that forbids placing fishing traps in this zone.

In 2013, the German Society for International Co-operation, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), project started “Conservation and Sustainable Use of Biodiversity at Lakes Prespa, Ohrid and Shkodra/Skadar (CSBL)”. We managed to interest GIZ as a donor, to include research about the otter in this project. This provided funding for more research exploring the Montenegrin part of Skadar Lake and numerous tributaries. During the project we were able to put traffic warning signs in places where



Figure 2. Traffic warning signs erected to warn drivers of otters crossing

otters had been hit by cars (**Figure 2**).

Based on our research we issued a document: “Proposal of measures for reducing negative impacts on the environment with an Action Plan drawn up on the basis of Environmental Information for 2013.” This defines measures for the protection of otters and their habitats, based on our results and monitoring. However, this is only a proposal and as yet there are no documents that specify measures to be implemented.

However, we were able to obtain the support of the Park’s management for the project, and so we have expanded the research into the presence of otter to other areas managed by the Public Enterprise for National Parks of Montenegro. We have started exploring the Biogradska Gora NP and Ulcinj Salt, and in both areas, we have detected the presence of otter, through tracks, spraint and food remains. We also conducted research in the Piva NP, where we found spraint and tracks of otter on the Vrbnica River.

In 2017, GIZ continued the second phase of the CSBL project. This time we had more resources, so we toured the lake by boat. This made it much easier to find tracks and spraint, and we also visited a large number of islands and islets – there are about 40. By visiting the islands, we obtained more data as well as identifying important so-called hotspot sites, where the otter indicates its territory which it communicates through the spraint. It was very interesting to see in one place, more than 10 spraints, both old (3–4 months) and very fresh faeces. It is important to note that this project was also carried out in the Albanian part of the lake.

A change in otter predation habits

Skadar Lake used to be rich in fish with 52 species. The latest report on three years of fish monitoring carried out by GIZ found that there are now only 19 species of fish. This is largely due to over-fishing, especially using illegal means, i.e. electro-fishing and use of powerful generators with 220w, which has resulted in a large decrease in the number of fish in the lake.

Due to the lack of bigger fish, predators such as the otter change their behaviour and it has been noted lately that they often appear on artificial platforms, which have been used for nesting by Dalmatian pelicans (*Pelecanus crispus*) for four years. The otters come at night and the pelicans are naturally frightened and on one occasion an otter made 38 pelicans leave the platform all night. This is a sensitive time for the birds and this disturbance could result in the loss of eggs.

We do not know if the otters have started to feed on the pelicans, but in a lagoon in the Golden Gate National Recreation Area in California, there was a similar situation, with eutrophication and a reduction in numbers of larger fish (**Salman, 2007**). This resulted in a change in the diet of the otter, which began to take pelicans so the pelicans abandoned the lagoon and migrated elsewhere. However, these were different species of otter and pelicans – North American River Otter (*Lontra canadensis*) and California brown pelicans (*Pelecanus occidentalis*).

Discussion

We hope that we will be able to obtain funds for DNA analysis of spraint so that we can begin to determine the number of otters, first in Skadar Lake and then in other locations in Montenegro. We will also monitor the impact of otters on the pelicans in summer.

Also, our research has interested the public and several articles were published in local newspapers and on web portals. Only a few years ago in Montenegro almost nothing was known about otters. Now there is more talk and people send us pictures or video clips of otters from various locations in Montenegro.

We are now in the process of creating a web portal that aims to collect data where otters are spotted. Our goal is to engage with people and make an active society for the protection of otters and their habitats. We also want to involve appropriate institutions at national level to make a national plan for the protection and conservation of otters in Montenegro.

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OTTER SIGHTING IN SRI LANKA AT VIL UYANA, SIGIRIYA, SRI LANKA

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Introduction

There is only one species of otter, the Eurasian otter (*Lutra lutra*), inhabiting the wetlands of Sri Lanka and it is assigned the sub-species, *Lutra lutra nair*. Otters are a neglected species on the island so many people are unaware of the very existence of the otter in the wetlands. Often large mammals such as the elephant and the leopard are popular among conservationists.

Otters cannot live in polluted waters. When they disappear from a particular water body, it is mostly due to extensive human interference bringing about pollution. In fact, the otter is considered a useful 'indicator species' of aquatic pollution. Only a few realise that just as much as humans need clean water for their existence the otter also needs clean water for its survival.

The otters inhabit estuaries, lagoons and freshwaters from the sea level up to the highest elevations (over 2000 m) in the island (**de Silva, 1991a, 1991b**). They feed on aquatic fauna, mainly crabs, fish, frogs and occasionally aquatic birds (**de Silva, 1996, 1997**). Therefore, the otter is considered as a top carnivore in Sri Lankan wetlands. Crocodiles also inhabit almost the same habitats but they feed on many terrestrial animals in addition to aquatic fauna.

Decline of otter population

The otter population is declining in most of the Asian countries. This has been brought about mainly by severe habitat destruction and chemical pollution of waters due to high levels of industrialisation in Asia. At present, in Sri Lanka there are also a large number of development projects such as road construction, housing schemes, and agricultural projects, being carried out. These invariably bring about further habitat destruction and disturbance to the wetlands resulting in depletion of fauna and flora. The disappearance of animals like the otter becomes inevitable under these circumstances.

Important sighting of otters

Observing otters is a difficult task as it is an elusive and nocturnal animal in Sri Lanka. Researchers mostly use otter signs such as footprints and spraints (faeces) when they conduct a survey of otters in and around water bodies. In addition, the use of camera traps has become a relatively easy way of collecting data on the presence of otters in an area as well as studying their behaviour.

Recently, a very enthusiastic group of young conservationists working for the Jetwing Vil Uyana had made an effort to establish a safe haven for various fauna and flora by converting an abandoned area of paddy fields at Rangirigama, in the neighbourhood of the historical city, Sigiriya. It is called 'Vil Uyana' and recently, the environmentalist, Mr Chaminda Jayasekara was successful in camera trapping an otter in Vil Uyana (**Figure 1**).



Figure 1. Camera trap photo of Eurasian otter (*Lutra lutra*) at Vil Uyana © Chaminda Jayasekara



Figure 2. Eurasian otter seen during the day time at Vil Uyana © Chaminda Jayasekara

In Sri Lanka, it is extremely difficult to observe otters during the daytime but, at Vil Uyana, otters are even seen in the daytime (**Figure 2**).

These sightings add to the earlier records of the presence of the Eurasian otter on the island. It also gives an opportunity to gather more information on the declining population of otters in Sri Lanka, and the Jetwing Group welcomes wildlife enthusiasts to Vil Uyana for such activities.

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CURRENT STATUS AND CONSERVATION THREATS TO OTTERS IN NEPAL: A REVIEW

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Abstract

*The aim of the paper is to present a literature review of the status of otters in Nepal. There are three species of otter in Nepal: Eurasian otter (*Lutra lutra*), smooth-coated otter (*Lutra perspicillata*) and Asian small-clawed otter (*Aonyx cinereus*). Otters are mysterious nocturnal mammals belonging to the family Mustelidae. They are top predators in a wetland ecosystem and use both the land and aquatic habitats. So they have been referred to as “flagship species” for both habitats. There is no national survey and major investigation on the status and distribution of otter species in Nepal, where there is a lack of otter research workers and lack of proper laws for their protection. Otters receive little attention from the general public as well as the respective governments as compared to other mammals. In recent decades, the populations have probably declined as a consequence of hunting and the overall loss of natural habitats. It is high time now to initiate more research, awareness and conservation intervention for the survival and conservation of otters in Nepal. There is a need for research in the river basins and lakes in order to determine the current distribution, status and factors affecting the survival of otter species. An attempt is being made here to review the work done so far on these important species with a Nepal perspective. This will show the current status and it will encourage government agencies, academic institutions, and other stakeholders to increase research and conservation activities, which will be helpful for the conservation management of the otter species.*

Keywords: *Eurasian otter, smooth coated otter, Asian small-clawed otter, human disturbance, hunting, conservation threat*

Introduction

Otters belong to the order Carnivora and they are a top predator in wetland ecosystems. As they use both the land and aquatic habitats they serve as an indicator species as to the health of the environment (Yoxon, 2007; Acharya & Lamsal, 2010). The preferred habitat of otters is shallower water, moderate current, soft sand and clay riverine banks with good coverage of riparian vegetation (Acharya, 2006). Otters have been depicted as symbols of undamaged nature, of clean water and pure vegetation (Acharya & Lamsal, 2010). The main food items of otters are fish, crab, frogs and insects with seasonal variations (Kafle, 2008).

There are 13 species worldwide – they are all listed in the IUCN Red List and 12 are still declining in number (Acharya & Rajbhandari, 2011). Five species of otters are found in Asia and Nepal is home to three of them: Eurasian otter (*Lutra lutra* Linnaeus, 1758), smooth-coated otter (*Lutra perspicillata*) and Asian small-clawed otter (*Aonyx cinereus*) (Acharya & Rajbhandari, 2011).

The Eurasian otter is included as Near Threatened (NT) in the IUCN Red List and is in

Appendix I of CITES; the smooth coated otter is included in the IUCN Vulnerable (VU) category and is in Appendix II of CITES; and the Asian small-clawed otter is in the IUCN Vulnerable (VU) category (**Hilton-Taylor 2000; IUCN, 2008**) and is also in Appendix II of CITES. However, these species are not included in the protected list in Nepal under the National Parks and Wildlife Conservation Act 1973 (**Acharya & Rajbhandari, 2011**).

Research on otters is inadequate in Nepal and the distribution of otter species is still poorly known. Despite its importance as an indicator of the health of aquatic habitats (**Foster-Turley et al., 1990; Yoxon, 2007**), until recently its conservation has not been considered a priority in Nepal.

Habitat destruction, human disturbance, conflict with fishpond owners, water pollution, intentional killing and lack of awareness are the major threats to otters in Nepal. There is little data on distribution and status of otters (**Acharya 1998**), but their populations do appear to have declined as a consequence of overall loss of natural habitat and deliberate killing (**Acharya & Rajbhandari, 2011**). More information is needed to develop conservation measures for the protection of these species and it is now necessary to initiate more research, awareness and conservation intervention for the survival and conservation of otters in Nepal. If timely intervention is not carried out, it is likely that otters will soon be on the verge of extinction in this country (**Kafle, 2008; 2009**).

This paper aims to review the work done so far on these important species with a Nepal perspective. This will demonstrate what work is needed and will help government agencies, academic institutions, and other stakeholders to increase research and conservation activities.

Methods

The current status and conservation threat of otter species is assessed based on the study of recent literature, journals and personal observation. Some published and unpublished papers on otters were also reviewed to examine the challenges in otter conservation.

Status of otters in Nepal

The conservation focus on otters in Nepal is not high priority as compared to other flagship species such as tiger, rhinoceros, and elephant. The otter species present in Nepal were reported by **Hodgson (1839); Yonzon (1998) and Acharya (1998)**.

Eurasian otter

The Eurasian otter is the most widespread otter species, being found across Europe, Asia and northern Africa. Eurasian otters have a life span of 5 to 12 years, although some individuals have been found living as long as 15–16 years in the wild (**Sherrard-Smith & Chadwick, 2010**). They are largely solitary and the male and female only really come together to breed.

Habitat: This species of otter uses many different habitats – rivers, lakes, marshes, canals, estuaries and the coast, and from sea level to an altitude of more than 4000m in Tibet (**Yoxon & Yoxon, 2017**). They live in holts which may be burrows under tree roots, or within rock piles, and many are found in Nepal near the banks of lakes which are covered with ferns (**Acharya & Gurung, 1991; Acharya & Rajbhandari, 2011**).

Morphology: They have an elongated and graceful body. The tapering tail is muscular and thick at the base. The feet are well webbed with strong claws. The nostrils, eyes and ears are placed in one line to allow otters to swim on the surface whilst using these senses.

Distribution in Nepal: Past research reported this species from the Annapurna Conservation Area, Makalu Braun National Park, Lake Rare National Park, Bardia National Park and districts of Saptari, Chitwan, Kapilvastu, Bardia, Kailali, Kanchanpur, Bajhang, Bajura, Ilam, Panchthar, Taplejung and Sankhuwasabha (**BPP 1995**). It is also recorded from Arun River, Seti River and its tributaries, Bhote Kosi and Tama Koshi (**pers. comm. Karan Saha, 2011**).

Eurasian otters have been confirmed in Rupa Lake and Bijaypur stream of Pokhara valley (**Kafle, 2011**).

The species has also been reported from Kanchenjunga region and West Seti River (**Yonzon, 1998**) and from Lake Rara (**Bolton, 1976; DNPWC, 2007**) of Rara National Park. It has been found in Begnas and Rupa lakes and the West Seti River basin and is widely distributed in mountain wetlands (**Acharya & Rajbhandari, 2011; Yonzon, 1998**).



Figure 1. Eurasian otter. © Emil Barbelette/IOSF

Smooth-coated otter

Unlike the Eurasian otter, the smooth-coated otter lives in groups. A very vocal and playful animal, the smooth-coated otter can often be seen engaged in play with other members of its species. In some areas, particularly Bangladesh, it is used by local people to help with fishing as the otters chase the fish into the nets (**Feeroz et al., 2011**).

Habitat: This species is found in south Asia, from southern China, through Bangladesh, India and Pakistan and down south east Asia into Indonesia. There is also a small population of a sub-species (*Lutra perspicillata maxwelli*) in Iraq. They live in a variety of wetland habitats ranging from large rivers and estuaries to coastal mangrove swamps. In the Royal Bardia National Park of Nepal it seems that the otters use the main Karnali River in the dry season but move during the rainy season into smaller channels in the flooded forest (**Thapa, 2002**).

Morphology: The smooth-coated otter is the largest Asian otter and it has very short, velvety fur, which is dark brown to black with yellow or white chin and throat markings. One of the most obvious features is the size of the webbed feet.

Distribution in Nepal: As with the other otter species, the distribution of the smooth-coated otter in Nepal is still poorly known, although it has been reported from the major river basins: Koshi, Narayani, Karnali and Mahakali (**Thapa, 2002; Acharya & Lamsal, 2010; Acharya, 2012**). It was also reported from Annapurna Conservation Area, Makalu Barun National Park, Bardia National Park, Chitwan National Park, Koshi Tappu Wildlife Reserve, Suklaphanta Wildlife Reserve and districts of Kailali and Kanchanpur (**BPP, 1995; Acharya & Rajbhandari, 2011**). Smooth-coated otters have been reported from Geruwa, Khaura, Batahani, Patkanua, Banjara Ghat, Gaida Machan area, Lamak Tal, Bagaura Phant (**Thapa, 2002; Acharya & Rajbhandari, 2011**) and it was also sighted in Khaura River (**pers. comm. N.B.M. Pradhan, 2008**). Smooth-coated otters are common along the length of the Naryani river, where it relies heavily on fish (**Houghton, 1987**).

The status of the smooth-coated otter in Narayani was investigated by **Evans et al. (1985)** and **Acharya's (1998)** study on otters in Rapti River indicated a very sparse otter



Figure 2. Smooth-coated otters
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population (Acharya & Rajbhandari, 2011). A study was also carried out on the smooth-coated otter in Khauraha River of Bardiya National Park (Acharya, 2017). Smooth-coated otters have been reported from Babai Valley of Bardia National Park (Acharya and Rajbhandari, 2012).

Asian small-clawed otter

This is the smallest otter in the world and, as the name suggests, its claws do not extend beyond the fingers. Hodgson in 1839 mentioned the occurrence of

small-clawed otters from Nepal, China, Sikkim and Assam India. However, he did not give the exact locality in Nepal. BPP (1995) mentions its distribution in the districts of Kailali and Kanchanpur, but the information on status and distribution of this species is still unknown in Nepal (Acharya & Rajbhandari, 2011).

Habitat: Asian small-clawed otters live in very varied habitats – small streams, rivers, lakes, marshes, paddy fields, coasts and mangroves, and even high up in the mountains

Morphology: The head is more rounded than in most other species and the teeth are adapted for crushing rather than for slicing or cutting through food. Due to the small claws they can use their digits like fingers.

Distribution in Nepal: The Asian small-clawed otter has a wide distribution, from the Himalayan foothills, through India, Nepal, Bhutan, Bangladesh, Myanmar (Burma), southern China and into southeast Asia. However, in spite of this wide distribution, numbers are decreasing rapidly and in some parts of their range they have become extinct.



Figure 3. Asian small-clawed otter
© Lorraine Mitchell/IOSF

There appears to be even less information on the distribution of the Asian small-clawed otter in Nepal than the other two species, although it has been recorded up to about 1300m. There are few localities nowadays which are known for this otter, although it is present in Kailali and Kapilvastu (Kafle, 2009). BPP (1995) mentions its distribution in the districts of Kailali and Kanchanpur. Dharke stream and Indrawati stream bordering Kavre and Sindhupalchowk districts holds potential for their existence (Kafle, 2011).

Threats to Otters

The presence of otters is favoured by suitable habitat (shallower water, moderate current, sloppy sand and clay riverine banks with good coverage of riparian vegetation) (Acharya, 2006).

Moreover, the barriers created (e.g. dam walls) prevent natural movements and migration of fish and other species (Holmquist et al., 1998), and dams have been implicated in the decline of the Eurasian otter (*Lutra lutra*) in Europe (Foster-Turley et al., 1990). In recent decades otter populations in Nepal have largely declined because of hunting and the overall loss of natural habitats (Acharya & Gurung, 1991; Acharya, 1997; 2006;

2016; Acharya & Rajbhandari, 2011; Acharya & Lamsal, 2010, Acharya, 2017). They are hunted for their pelt, meat and internal organs for indigenous medicine (IOSF, 2014). In Rupa and Begnas lakes, otters are killed by trapping with nets, and by chasing the animal to exhaustion and then shooting it (Acharya & Gurung, 1994).

In summary, the conservation threats to otters in Nepal are:

- Inadequate awareness
- Habitat over-exploitation and destruction
- Hunting and trapping
- Fishing activities (over-fishing and poisoning to obtain a high harvest of fish)
- High human disturbance (fishing, grazing, sand and boulder extraction, exploitation of natural resources)
- Environmental pollution including an increased use of fertilizer and pesticides which reduces the water quality

Other problems faced by otters in Nepal are:

- Lack of otter research workers in Nepal
- Lack of proper laws for its protection
- Otters receive little attention from the general public as well as the respective governments as compared to other mammals

Conclusions and recommendations

The main problem regarding otter conservation is the lack of awareness about the animals and the major threats they face. Habitat fragmentation, especially the degradation of wetlands, has had a significant impact on otter populations, and over-hunting, especially for the illegal fur trade, threatens their survival in many parts of Nepal.

There are still knowledge gaps in the distribution of otters, their population status and their natural habitats all over Nepal and there has been a lack of research workers in the field. There is an urgent need for further data on the status of otters in major river water basins as there is very little information on otter biology and ecology (Acharya 1998; Acharya & Rajbhandari, 2011).

Therefore it is very urgent to conduct further research to investigate the following:

- **Distribution and status:** Detailed surveys should be conducted in river basins and lakes in order to determine the current distribution, status and factors affecting otter survival.
- **Habitats and ecology:** There is little information on habitats and ecology
- **Impact of hydro-electric dams and barrages:** The construction of major hydro-electric dams and barrages, such as West Seti, Karnali and Narayani, have affected otter populations. The extent of the impact should be investigated and there should be Environmental Impact Assessments carried out for all future major development projects
- **Effects of industrial pollution:** Research is needed on the level of water pollution and its effects on aquatic life including otters.
- Further conservation initiatives are also needed:
- **Public awareness**
- **Conservation of otters outside protected areas**

- **Monitoring of otter habitats**
- **An Otter Conservation Action Plan:** The government of Nepal should prepare a long-term otter conservation action plan which should be implemented. There is now an active Nepal Otter Network to develop otter conservation work and work with the government on an Otter Conservation Action Plan. This network is linked to the International Otter Survival Fund (IOSF) Asian Otter Network which aims to encourage collaboration and sharing of experience and education materials throughout the continent (**Bandhari, 2017**)

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MORTALITY CAUSES AND BODY DIMENSIONS OF OTTERS (*Lutra lutra*) DETERMINED BY MEANS OF POST MORTEM ANALYSIS IN HUNGARY

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Abstract

We examined the mortality causes, body mass, body length and tail length of carcasses (males $n = 195$, females $n = 165$, unknown $n = 4$) of the strictly protected otter (*Lutra lutra*) collected in Hungary between 1999 and 2017. Sexual dimorphism was marked in all body dimensions. Body mass of adult males was significantly higher compared to females (mean \pm SE, 8.48 ± 0.14 kg vs. 6.23 ± 0.10 kg). Most otter carcasses were collected as road casualties (total: 88.7%). Within this, road deaths combined relatively frequently with otter (6.0%) or dog (1.1%) bites. Illegal hunting (poaching) could rarely be proved (2.2%). Mortality caused by otter attacks (1.9%) and dog or other carnivore attacks (3.7%) was relatively frequent. Occasionally, death due to possible poisoning, drowning in fish-traps and disease were also detected. Post mortem monitoring serves the efforts of conservation of otters and their habitats.

Keywords: conservation, *Lutra lutra*, monitoring, poaching, road kills

Introduction

The Eurasian otter (*Lutra lutra*: Linnaeus, 1758; hereafter otter) has the widest distribution of all otter species (Mason & Macdonald, 1986; Reuther, 1993; Kruuk, 2006), and is listed as an animal species of European Community importance (EEA, 2009). It is the top predator in many aquatic food chains. Human activities in the past resulted in population decline and fragmentation across major parts of Europe (West, 1975; Macdonald & Mason, 1976; Randi et al., 2003; Kruuk, 2006). Assessment

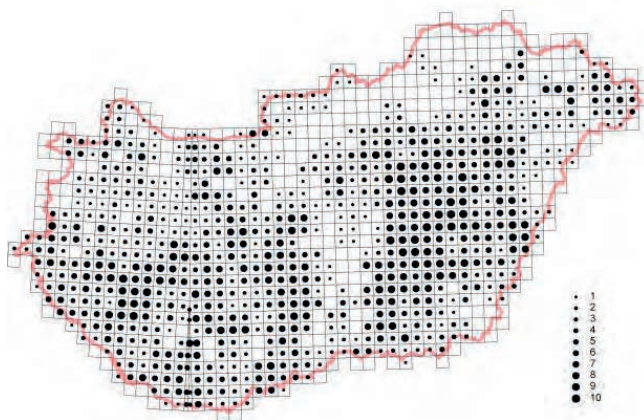


Figure 1. Occurrence of otters in Hungary based on the total responses of questionnaires survey between 1990 and 2006 (Heltai et al., 2012)

Legend: 1 – if otter occurred in a given 10×10 km UTM cell only in one year, 10 – if otter occurred in a cell in all the 10 years surveyed.

of the otter populations from the 1990s showed a general recovery in most of its range in Europe (**Conroy & Chanin, 2002; EEA, 2009**), which is believed to be due to factors such as active and passive protection, general improvement and rehabilitation of wetlands, and a decrease in pollutants in the environment. However, the real or suspected damage caused by otters has been increasing and persecution of the species has resumed (**Kranz, 2000; Reuther, 2002**), mainly in Central and Eastern Europe after privatisation of fishponds during the 1990s.

The distribution range of the otter in Hungary (**Figure 1**) has remained wide (covering approximately 72,000 km² or 77.5% of the country's area), and its population has been considered stable, although regional fluctuations and differences have been reported (**Heltai et al., 2012**). Lower densities of otters have been reported in the mountains (north eastern part of the country) and in the dry plain areas (in the Kiskunság region in central Hungary) with little wetland habitat. On the basis of field surveys (**Heltai et al., 2012**) and local molecular genetic analyses (**Lanszki, Hidas et al., 2008; Lanszki et al., 2010**) of Hungarian populations, it has been suggested that the otter population is currently increasing. However, because of the increasing vehicle traffic and the occurrence of poaching, otters in fact remain threatened (**Rakonczay, 1989, pp67-68**). Since 1974 the otter has been a protected species in Hungary, and has been strictly protected since 1982. Due to the lack of an Action Plan and a unified national monitoring system, data collection concerning otters is sporadic. Broadening our knowledge by all means remains essential and the collection and examination of carcasses is a useful method to gather information.

Post mortem examination of dead specimens is important in population monitoring of species which are not easily seen in the wild, such as the otter (**Simpson, 1997, 2000; Reuther et al., 2000**). Through a detailed otter post mortem examination, data can be obtained about wild populations e.g. accumulation of toxic substances in the food chain (**Roos et al., 2001**), long-term population trends (**Elmeros et al., 2006**), threatening factors (**Kruuk & Conroy, 1991; Simpson, 1997; Hauer et al., 2002a**), age structure (**Hauer et al., 2000; Sherrard-Smith & Chadwick, 2010**), reproduction characteristics (**Elmeros & Madsen, 1999; Hauer et al., 2002b**). This information could not be obtained otherwise or only at high costs. The post mortem examination of dead otters of Hungary started in 2002, following the serious cyanide and heavy metal spills in the rivers flowing to Eastern Hungary from Romania in 2000. This examination also gave new knowledge about the Hungarian otter population, i.e. about genetic structure and fragmentation (**Lehoczky et al., 2015**), reproductive characteristics, toxicology status and feeding biology (**Lanszki, Sugár et al., 2008; Lanszki et al., 2009, 2015**).

In the present study, our aim was to examine the mortality (threatening) factors and some body dimensions of otters based on post mortem analysis. With these examinations, as part of a larger study, we aim to record basic data for further otter population analyses and to contribute to the efficiency of otter conservation programmes.

Methods

The otter carcasses examined were collected by staff of the Hungarian National Parks with permission of the competent authorities, in order to study the ecology of the species. Altogether, 364 otters were analysed between 2002 and 2017 (some specimens had been collected before the study started). The bodies originated from near Lake Balaton and Kis-Balaton (n = 56), Lake Velence (n = 18), other standing waters (artificial fishponds, gravel pit ponds, backwaters, marshes; n = 75), the Danube (n = 17) and Tisza river valley (n = 31) as well as other rivers (n = 23), small watercourses (streams, canals and ditches; n = 92), and from sources which cannot be defined or are unknown (n = 52). The

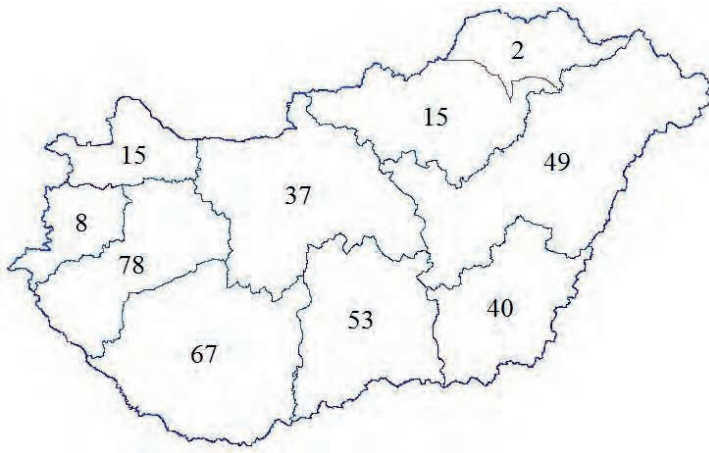


Figure 2. Location of otter carcasses collected in different regions of Hungary (according to the operating area of 10 national park directorates)

regional distribution of otter carcasses collected is shown in **Figure 2**.

The bodies were stored frozen (-18°C) until analysis and the post mortem analysis was carried out using **Simpson's (2000)** protocol. During the examination we recorded the general data (date of collection, location, circumstances) and measured the body dimensions, i.e. body mass (BM) with 10g accuracy, body length (BL, length from nose to anus) and tail length (TL, from anus to tail tip, excluding terminal hairs). The carcasses were categorised according to body mass, measurements and teeth characters (**Heggberget, 1984; Reuther, 1999**) into adult (>2 years), subadult (between 1 and 2 years) and juvenile (<1 year) age groups. No detailed age determination has been carried out on the basis of incremental cementum of teeth (**Heggberget, 1984**). Further details on the measurements carried out and the collection of tissue samples can be found elsewhere (**Lanszki, Sugár et al., 2008; Lanszki et al., 2009**).

In the three age groups, the number of males were $n = 147, 25$ and 23 , and that of the females $n = 96, 48$ and 20 respectively. Furthermore, in the case of one female, and four bodies of unknown sex, the age was impossible to determine. Some of the bodies were so severely damaged in road accidents, that it was not possible to measure all dimensions, therefore different sample sizes can be found in some traits. The seasonal distribution of carcasses collected was the following: autumn ($n = 100$), winter ($n = 92$), spring ($n = 65$), summer ($n = 56$) and unknown ($n = 51$).

To analyse differences of body dimensions (normal data distributions), independent samples t-test was used, between sexes in the adult age group (SPSS 11.5).

Results and Discussion

Body dimension data obtained from post mortem analysis show the characterisation of the Hungarian otter population. Sexual dimorphism was marked. Body mass of adult males (mean \pm SE) was significantly higher compared to females (males, $n = 132, 8.48 \pm 0.14$ kg, females, $n = 83, 6.23 \pm 0.10$ kg, independent samples t-test, $t_{213} = 11.46, P < 0.001$: Figure 3). The heaviest male was 12.68 kg, and the heaviest female was 8.59 kg. Body length of adult males was significantly greater than in females (males, $n = 139, 691 \pm 4$ mm, females, $n = 86, 654 \pm 6$ mm, $t_{223} = 5.02, P < 0.001$). Likewise, the tail length of males was significantly longer compared to females (males, $n = 142, 424 \pm 3$ mm, females, $n = 92, 403 \pm 3$ mm, $t_{232} = 5.24, P < 0.001$).

On the Shetland coasts the average body mass of adult males was 7.35 kg ($n = 31$), and that of adult females was 5.05 kg ($n = 42$) (**Kruuk, 1995**). However, as with our measurements, otters of larger body mass were found for example in the internal areas

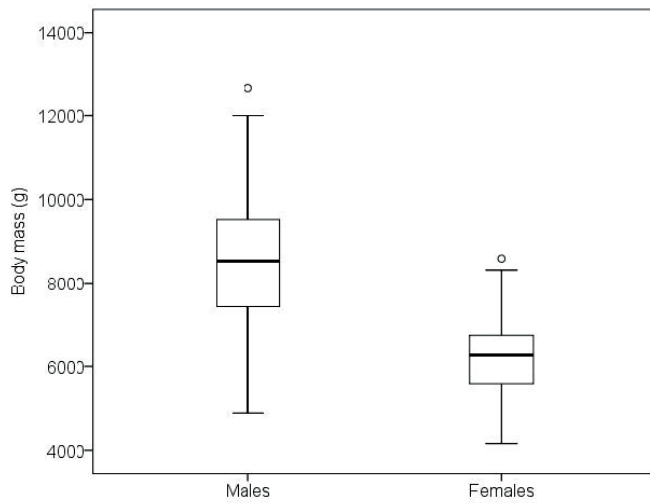


Figure 3. Difference in body mass of male and female otters from post mortem analysis performed in Hungary

of Great Britain (males, n = 433, 10.1 kg, females, n = 220, 7.0 kg), Ireland (males, n = 15, 9.1 kg, females, n = 12, 6.2 kg), Denmark (males, n = 32, 8.3 kg, females, n = 35, 6.2 kg (**Chanin, 1985**); and Germany (males, n = 13, 8.78 kg, females, n = 8, 5.61 kg (**Reuther, 1993**).

Table 1: Mortality causes of post mortem examined otters in Hungary.

Mortality causes	N	%
Traffic killed	296	81.3
Traffic (& dog attack together)	4	1.1
Traffic (& otter attack together)	22	6.0
Traffic (& attack of unknown carnivore together)	1	0.3
Shooting (illegal hunting)	4	1.1
Beating to death	3	0.8
Dog attack & direct human intervention together	1	0.3
Dog attack (stray or human-instructed animals)	10	2.7
Dog and otter attack	2	0.5
Carnivore (unknown species) attack	2	0.5
Poisoning	1	0.3
Drowning in fyke nets	3	0.8
Otter attack	7	1.9
Disease, organ dysfunction (distemper, unknown)	4	1.1
Unknown	4	1.1
Total (n)	364	

In our study, most mortalities (**Table 1**) were due to road traffic accidents, combined occasionally with dog or relatively frequently with otter bites (based on bite mark and canine distance) (indirect anthropogenic effects, total 88.7%). Proof of illegal hunting (shooting, beating to death), as direct human intervention, was scarce. Dog and people together (bite mark on body and evidence of beating on the head), or dog attack (it is unknown whether caused by stray or dogs instructed by humans) caused the death of otters in several cases.

Occasional drowning in fyke net and suspected poisoning also occurred. Mortality caused by events other than human intervention, e.g. an otter attack, was relatively frequent, while diseases proved to be a rare cause (**Table 1**). Enteritis caused the death of two rescued otters kept in enclosures. The condition of otters which died from dog or otter attack was usually poor.

Increasing traffic is an important anthropogenic mortality factor and potential threat to otter populations (e.g. **Mason & Macdonald, 1986; Grogan et al., 2001; Elmeros et al., 2006**). For example, in Shetland, in 49% of the cases death was caused by road traffic accidents (n = 113), in 5% by dog or otter attacks, and non-violent mortality causes (different kind of diseases) were frequent (46%) (**Kruuk & Conroy, 1991**). In Germany, the most frequent mortality cause (69.9%, n = 1067) was road traffic accident (rarely by train). Besides that, there were diseases (6.6%), drowning in fyke net (6%), illegal hunting (4.1%) and other causes, e. g. poisoning, dog attack, electric fence, ship collision, drowning under ice, electric fishing (**Hauer et al., 2002a**). While in Denmark in the 1970s and 1980s fishing fyke nets killed most of the otters, nowadays road traffic accident is the main cause (**Elmeros et al., 2006**).

However, the probability of identification of different causes of mortality varies (**Kruuk & Conroy, 1991**). The limitation of the mortality pattern presented is that the rates of easily detectable traffic accident are overestimated, while other reasons (e.g. illegal hunting) can be underestimated. Although poaching remains hidden, its occurrence is confirmed. The purpose of otter post mortem analysis is population conservation, and it reveals important population parameters more accurately. This knowledge may be helpful in designing and constructing green fauna passages, and in the reconstruction and management of wetland habitats.

Acknowledgements

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AN OTTER SURVEY OF THE UPPER REACHES AND HEADWATERS OF THE RIVER DEE, ABERDEENSHIRE, SCOTLAND, 2017

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Abstract

The upper reaches and headwaters of the River Dee were surveyed for otter activity as a continuation of a previous survey of the upper, middle and lower reaches conducted during May and November 2016. Following the same methods, the presence of otter was assessed by means of spot-checks for spraint sites every 2km, from the White Bridge up to the base of the Braeriach. A total of 55 spraint sites were found, the majority of which comprised of old spraints. Fresh and recent spraints were scattered throughout the survey area, with no distinct concentrations observed. The most abundant prey items found in the spraints analysed were amphibian bones (56.4% occurrence). Other prey included salmonids, bird and mammal (including water voles).

Keywords: *Amphibians; otter; Pools of Dee; River Dee; salmonids; spraints; water vole*

Introduction

The aim of this survey was to examine the upper reaches and headwaters of the River Dee only. This is a continuation of a previous survey conducted during May and November 2016, in which the Dee was surveyed from the White Bridge (Forest of Mar) down to the sea at Aberdeen Harbour (Rothwell, 2017). This earlier survey also included a brief look at historical studies, and so this is not repeated here. The same methodology was used as in the previous survey, i.e., spot-checks for spraint sites (deposits of otter faeces), from the White Bridge up to the river source at the Braeriach plateau (linear length approximately 16km).

This supplementary account combined with the previous survey results, provides information on otter occurrence on the River Dee from source to sea.

Study Area

The River Dee rises from a series of spring-fed pools, referred to as the Wells of Dee (Grid ref: NN 938988), on the Braeriach plateau in the Cairngorm Mountains of Scotland. At a height of around 1220m it is the highest source of any major river in the British Isles. The water then travels over Braeriach and down the mountain at the aptly named Falls of Dee and becomes the headwaters of the River Dee called Allt a' Gharbh-choire.

The Pools of Dee further to the northeast are often mistaken for the source of the Dee. However, a tributary, called Allt na Lairig Ghru, flows from these pools along the mountain pass of Lairig Ghru, and joins the River Dee about 2.5km downstream. From here the River Dee continues southwards through Glen Dee and the Chest of Dee onto the White Bridge (Forest of Mar; Grid ref: NO 018884). Then it flows eastwards to the Linn of Dee, on to Braemar and eventually reaches the coast at Aberdeen Harbour.

The survey route ran from White Bridge to the source of the River Dee and covered three main tributaries of the River Dee: (1) the Geldie Burn (together with its tributaries the Bynack Burn, and

the Allt an t-Seilich a tributary of the Bynack Burn) southwest of the White Bridge; (2) the Geusachan Burn which joins the River Dee at Glen Dee; (3) the Allt na Lairig Ghru, which arises from the Pools of Dee (Figure 1).

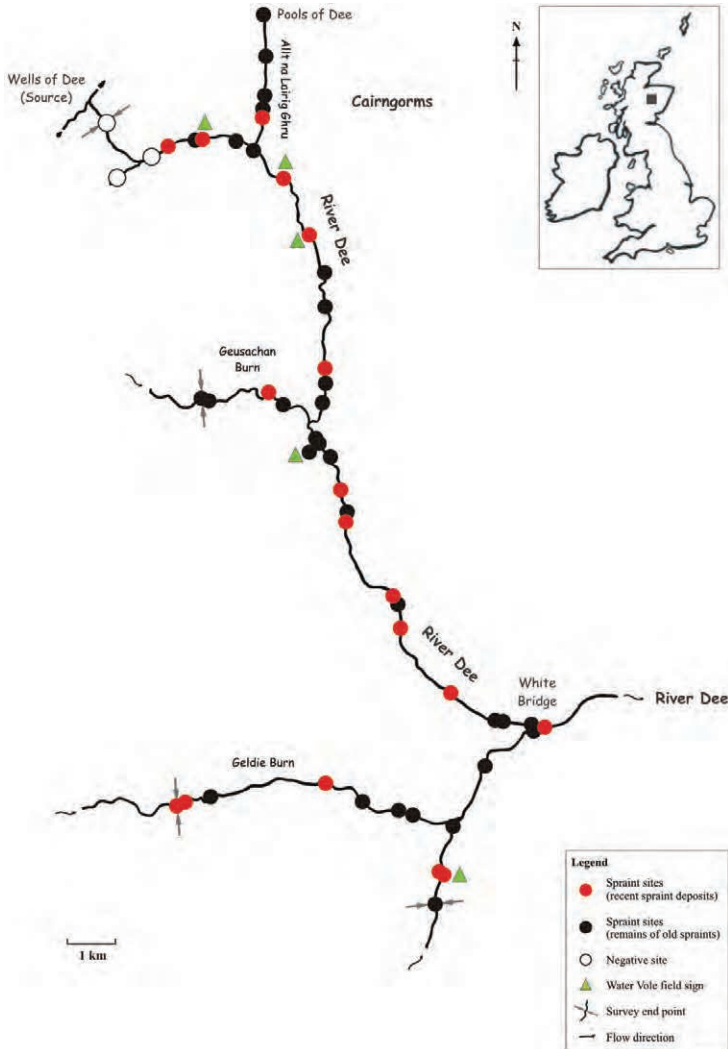


Figure 1. Survey location, spraint sites and water vole occurrence on the upper reaches and headwaters of the River Dee, Aberdeenshire, during spot-checks at random sites chosen every 2km, conducted in May 2017.

Methods

A series of survey sites were chosen at roughly every 2 to 3 km apart, on either side of the riverbanks (based on ease of accessibility). At each survey site, any field signs indicating otter activity found was recorded. In summary this included SPRAINTS (otter faeces); SPRAINT SITES (where spraints are deposited at regularly visited areas within the otter's territory, such as on grass tufts, rocks, and under bridges) (Chanin, 1985; Mason & Macdonald, 1986); FOOTPRINTS (otter footprints normally show five toes and are webbed: sometimes the fifth toe leaves no mark and the print becomes lopsided, compared to the more symmetrical four-toed prints of dogs and foxes); and REST-SITES (rest-sites can vary depending on the geographical resources present, ranging from substantial piles of branches/logs; dug burrows; dense scrub or amongst rocks and boulders. The main resting site of an otter is commonly referred to as a holt, but they may also use temporary and much smaller resting places. These are often referred to as a 'lie up' 'hover' or 'couch' and can be under dense scrub, small rocky outcrops and simply amongst grass or sedge tussocks).

For the purpose of this survey, a holt was defined as a substantial burrow system, or any

natural crevices and boulder matrix, with many signs indicative of regular use by otters. All other small shelters above ground deemed to be utilised by otters were categorised as rest-sites.

If a survey site was perceived as negative, then up to 15 minutes was spent traversing the riverbanks to establish if there were any field signs evident beyond the initial focus point. The distance travelled within the 15 minutes of extra search time varied depending on the terrain and operative fatigue. Any incidental field sign of otter activity found during travel to the next survey site was also recorded.

An assessment of spraint contents was made in the field with a x10 magnification hand lens, but where this was not possible samples were taken for laboratory examination. Then each spraint was put separately into a jam jar with hot water and a denture-cleansing tablet. The samples were soaked in solution for 24 hours and then rinsed through a 0.5mm sieve. The spraint contents were allowed to dry at room temperature on filter paper before examination under a binocular microscope. The remains were identified using a personal reference collection and published keys from **Webb (1977)**, **Watson (1978)**, and **Conroy *et al.* (1993)**.

In addition to the main component of this survey, a small portion of the River Dee between the White Bridge and Braemar was examined at a couple of locations where it was found to be negative during the previous survey conducted in 2016 (**Rothwell, 2017**). Also a few select main tributaries of the River Dee not previously surveyed were investigated based on a quick spot-check around their associated bridges.

Results

This survey was conducted for four days during favourable weather conditions in May 2017. Whilst it was intended to reach the Wells of Dee, time constraints and the mountainous terrain meant that getting to the true source of the River Dee had to be abandoned during this survey. However, the base of the Falls of Dee (approximately 1km downstream from the source) was reached (**Figure 2**).



Figure 2. End survey point of the River Dee headwaters at the Falls of Dee.

This was the only area where no field signs of otter activity were found and all other survey sites were positive for otter activity, as summarised in **Figure 1** and **Table 1**.

Table 1. Number of spraints and spraint sites found on the tributaries of the River Dee along the upper reaches and headwaters during May 2017.

Date	Tributary Name	Dee Region	Total	
			Spraint Sites	Spraints
May 2017	Allt an t-Seilich	Upper / Headwaters	4	13
May 2017	Allt Coire an t-Seilich	Upper / Headwaters	1	1
May 2017	Allt na Lairig Ghru	Upper / Headwaters	4	12
May 2017	Bynack Burn	Upper / Headwaters	1	1
May 2017	Geldie Burn	Upper / Headwaters	9	18
May 2017	Geusachan Burn	Upper / Headwaters	4	12
May 2017	Pools of Dee	Upper / Headwaters	2	6



Figure 3. Typical spraint sites along the Geldie Burn.

Spraint sites were by far the most abundant field signs of otter activity (**Figure 3**) and a total of 55 were found. The majority of these comprised old spraints or remains of old spraint fragments (79.2%, $n = 133$, where n is the number of old spraints found) and only 35 spraints (20.8%) were either a fresh or recent deposit.

Recent and fresh spraints were scattered throughout the course of the River Dee and on its main tributaries, with no distinct concentrations observed. There were noticeable areas of old spraints deposited, first from the Chest of Dee down to the White Bridge and upstream of the Geldie Burn for the first 4km; second around the confluence of the River Dee and the Geusachan Burn at Glen Dee; and third along most of the Allt na Lairig Ghru.



Figure 4. The Pools of Dee.

The nearest sign of otter activity to the real river source was a spraint site approximately 3km downstream from the Wells of Dee. This was located furthest along the headwaters by Allt a' Gharbh-choire at an altitude of 731m and a recent spraint was also found here which contained amphibian bones. The other five spraints found here were all old deposits and three of these comprised amphibian bones and two contained small salmonids.

The two spraint sites at the Pools of Dee (**Figure 4**) were at an altitude of 815m, the

highest and most northerly point where a spraint site was found during this survey. All six spraints found here were old and four contained amphibian bones (66.7%), and two contained small salmonids (33.3%).

Only two gel spraints were found: one fresh at Glen Dee, and one old on the tributary Allt na Lairig Ghru.



Figure 5. Sign heap and clawing marks down a steep-sided bank of Allt an t-Seilich, a tributary of the Geldie Burn.

Other field signs observed included a sign heap (where otters scrape substrate or vegetation into a small mound, where they place spraint) and clawing marks down a steep-sided bank (**Figure 5**), on the Allt an t-Seilich.

Despite the exposed nature of the topography, there were suitable areas along the riverbanks, which presented rest-site opportunities, including boulder crevices and eroded bank overhangs.

Nine active rest-sites were found; four on the River Dee and one on each of the main tributaries. One was under a large erratic boulder on the moorlands of Glen Dee (**Figure 6**). Most rest-sites exhibited recent spraints deposited within them, although two on the River Dee, together with the erratic at Glen Dee, only had old spraints associated with them. The



Figure 6. Rest-site under large erratic on the marshes of Glen Dee.

rest-site on the bank of the Geusachan Burn had only one recent spraint outside of the peat burrow entrance, but it could have potentially been part of a holt? The depth and complexity of the burrow was not investigated further, and was assumed just to be a single burrow rest-site.

Spraint analysis

The majority of spraints were examined in situ ($n = 155$) and 13 spraints were taken for laboratory analysis. The most abundant prey items were amphibian bones (56.4% occurrence) and other diet components comprised fish (26.5%), mammal (12.2%) and bird (5.0%). The fish bones predominately represented salmonids (salmon and trout species, 22.1% and 4.4% respectively), together with a low percentage of unidentified fragments (Figure 7). All of the salmonid bones were from small-sized fish, which were assumed to be taken directly by otters rather than being a prey item from other animals that the otter may have eaten.

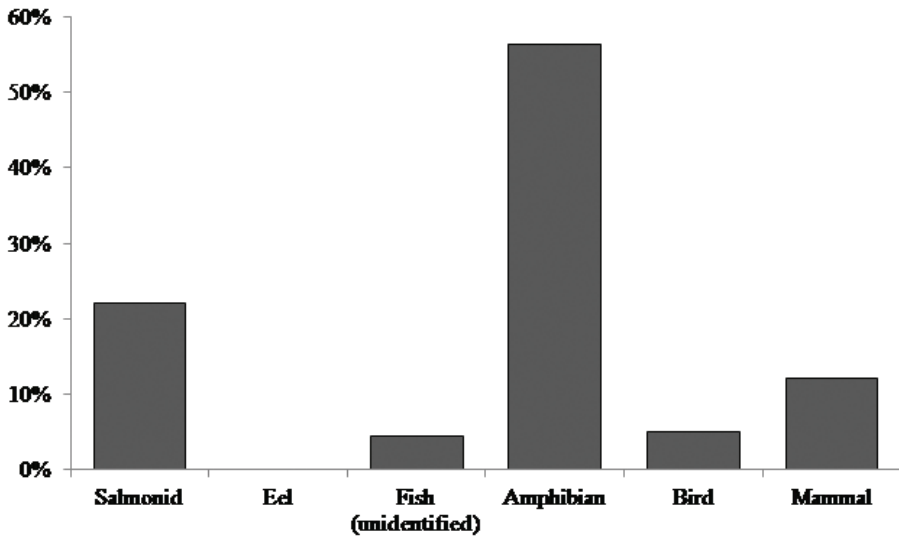


Figure 7. Combined percentage occurrence of prey items of 168 spraints, from those observed in situ ($n=155$) and laboratory analysis ($n=13$).

The relatively low number of spraints collected from the field had a high percentage of fish bones (54.5%), of which salmonids were the only fish family represented. Mammal remains were the highest of the non-fish element of the spraint contents (27.3%) and amphibian bones were the second most common non-fish prey item (18.2%).

It was interesting to note that water vole teeth occurred in 0 spraints at two sites along Lairig Ghru at the same location where water vole activity was found (see next section). Water vole teeth were also found in a spraint on the Geldie Burn, some 5.5km upstream from the nearest site of water vole activity. However, the occurrence of water vole as a prey species only accounted for 1.7% of the identifiable mammal remains.



Figure 8. Site of water vole droppings and otter spraints under bankside boulders along the Lairig Ghru pass.

Other mammal observations

The presence of water vole (*Arvicola amphibius* formerly *A. terrestris*) was found at five locations in the survey area (Figure 1). Burrows with droppings outside the entrance, were found in the river banks of the Dee at Lairig Ghru and droppings were also found at a second site at Lairig Ghru, on a boulder at the water's edge. Further upstream at Allt a' Gharbh-choire, droppings were found by an overhanging boulder on the bankside (Figure 8), which was also an active rest-site for otter, with eight spraints inside. Similarly the rest-site under the large erratic in Glen Dee (Figure 6) also had water vole droppings under the rock, which were placed on top of an otter spraint.

Water vole activity was also found on the Allt an t-Seilich in the form of several burrows in the eroded river banks with droppings outside some entrances. It was at these steep sided banks that an otter had also made its mark by clawing down the bankside and scraping up a sign heap (Figure 5).

All the water vole activity was observed at an altitude over 400m, with the lowest on the Allt an t-Seilich at 441m, and the highest at 649m on Allt a' Gharbh-choire.

A mountain hare (*Lepus timidus*) was briefly seen on the mountainous moorland of Glen Dee.

Additional survey element (White Bridge to Braemar)

Two of the main tributaries of the River Dee along its upper reaches between the White Bridge and Braemar, were not surveyed during the previous survey conducted in November 2016 (Rothwell, 2017) and so they were included in this study. In addition three other main tributaries, which were negative in 2016, were re-examined to establish if otters were sprainting here during May 2017. The results of these spot-check surveys under bridges were all positive for spraint sites (Table 2).

Table 2. Presence/absence of field signs for otter activity at eight survey sites examined during spot-checks carried out in 2016 and 2017 along the upper reaches of the River Dee between the White Bridge and Braemar. Numbers of spraints and spraint sites for the 2017 survey only.

Waterbody	Location	November	May	Total	
		2016	2017	Spraint Sites	Spraints
Corriemulzie Burn	Corriemulzie	Negative	Positive	1	3
Ey Burn	Meikle Inverey	Negative	Positive	1	6
Lui Water	Lui Bridge	Negative	Positive	1	2
Allt an t-Slugain	North of Braemar	Not surveyed	Positive	2	16
Quoich Water	Linn of Quoich	Not surveyed	Positive	5	31
River Dee	500m upstream from the River Dee and Clunie Water confluence	Negative *	Positive †	2	6
River Dee	Linn of Dee Bridge	Not accessed	Positive	1	1
River Dee	Tomnainioine	Positive	Positive	1	2

* Survey conducted on the south-eastern bank (true right-hand bank) only

† Survey conducted on the north-western bank (true left-hand bank) only

A relatively high number of spraints were found on Quoich Water. The nature of the outcrop strata here provides many rock overhangs and crevices which are suitable spraint and rest-sites. One typical example along the Linn of Quoich had 17 spraints inside (Figure 9).



Figure 9. Spraint site under an outcrop overhang along the Linn of Quoich.

Three survey sites along the River Dee were also examined (**Table 2**). During November 2016 no spraint sites were found for a distance of 1km along the south-eastern bank (true right-hand bank) upstream from the confluence with Clunie Water. However in May 2017 spraint sites were found from a quick spot-check along the north-western bank (true left-hand bank), 500m upstream from the confluence.

Although the Linn of Dee site was positive for otter activity in 2016, it was not possible to inspect under the bridge itself due to unsafe access caused by ice covering the outcrop rocks. In May 2017 one recent spraint was found on top of the gorge, under the bridge (**Figure 10**).



Figure 10. Spraint site under the Linn of Dee Bridge.

At the end of the field day on 24 May 2017, a juvenile otter was briefly seen running along the track and up into the moorland at Deeside (Forest of Mar), near Tomnamoine. A prominent spraint site marked by a lush green patch of grass was positioned on the river banks below this location. This was easily recognisable from the track and this spraint site was also used in November 2016.

From all of the additional spot-checks carried out between the White Bridge and Braemar, 69 spraints were found, most of which were old deposits ($n = 54$; 78.3%), and few were fresh or relatively recent ($n = 15$; 21.7%). Spraint analysis revealed fish was the dominate prey item (**Figure 11**), which principally comprised salmonids (38.4%) and eel (14%). Mammal bones were the most non-fish items in the spraints (23.7%) followed closely by amphibian bones (22.4%) with bird remains the least represented (1.3%).

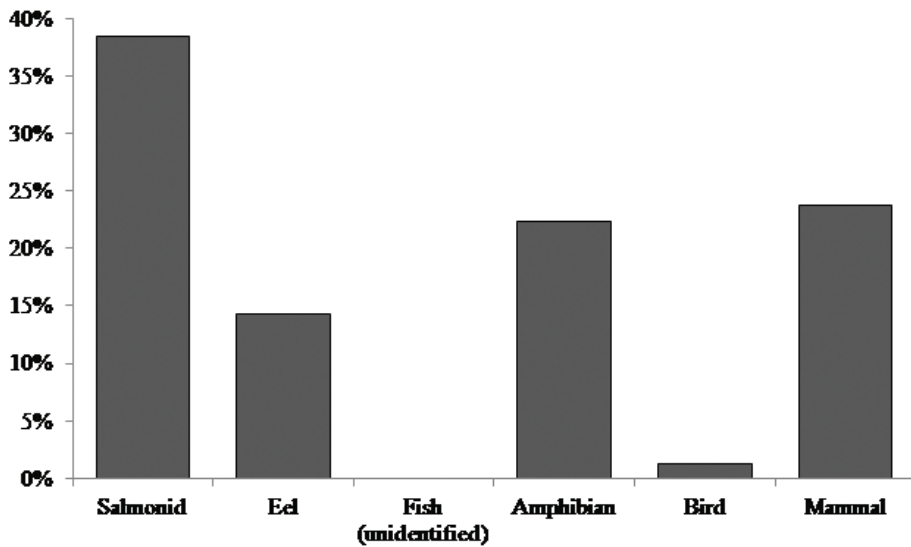


Figure 11. Combined percentage occurrence of prey items of 69 spraints, from those observed in situ (n=67) and laboratory analysis (n=2), found on the selected regions of the upper River Dee between White Bridge and Braemar, May 2017.

Discussion

The overall results of this survey show that evidence of otters in the form of spraints was found throughout the upper reaches and headwaters of the River Dee. In addition, recent spraints indicate that otters are utilising these areas during May.

The survey end point was at the base of the Falls of Dee. From here reaching the source at the Wells of Dee would involve an arduous steep climb. Although otters are competent climbers it would be much more efficient to reach the Braeriach plateau following the Allt Coire Dhondail (headwater of Loch Eanaich), to the west of the plateau; or alternatively headwaters of the River Eidart (tributary of the River Feshie), to the southwest of the plateau. A somewhat anthropomorphic statement perhaps, but in such mountainous environments efficiency is key to any animal utilising such habitat. However, the Braeriach plateau is in an area of the Cairngorms where snow cover is prominent and has the longest-lasting patches of snow in the UK (McKenzie, 2017). As such, the Wells of Dee may have limiting access and prey availability for an otter for most of the year.

The Pools of Dee further to the northeast are much more accessible, being in the lay of a mountain pass. Geographically it could also be considered a central point for communication of several headwaters from three major river systems in the Cairngorms: the River Dee to the south, River Avon to the east and River Spey to the northwest. However a more substantial link between the Rivers Dee and Spey does exist via the Geusachan Burn from the River Dee and Allt Luineag of the River Eidart/Loch Eanaich headwaters.

Spraint sites were found at the Pools of Dee and several along the Allt na Lairig Ghru, which indicates that otters are traversing the Lairig Ghru pass, and it is plausible that otters will then disperse into other neighbouring river systems. Anecdotal field accounts have indicated that fish are in the Pools of Dee (e.g. ‘Border Reiver’, 2011). Therefore the Pools of Dee could be viewed as an important resource for an otter utilising the headwaters in the Cairngorms.

Only a small number of spraints was taken for laboratory analysis, so the results were combined with those from field analysis, and the most numerous prey items found were amphibian bones. Otters will take a variety of prey depending on availability (Jenkins

& Burrows, 1980; Mason & Macdonald, 1986; Kruuk, 1995; Carss et al., 1998; Ruiz-Olmo, 1998) and amphibians are an important food source (Weber, 1990; Clavero et al., 2005; Kruuk, 2006; Lanszki et al., 2009; Pagacz & Witzuk, 2010). The seasonality of amphibian intake by otters has been observed by many authors. Lanszki et al. (2009) found that amphibians were the primary prey item on the Dombó-channel near Gyékényes, Hungary, except in winter. However, on the Wołosaty Stream in the Bieszczady Mountains, Poland, Pagacz & Witzuk (2010) found that amphibians were the dominant prey during winter and spring. Weber (1990) conducted a study in 1987 on selected sites on the middle reaches of the River Dee catchment between the Muir of Dinnet and Banchory, and found a correlation between the availability of amphibians and their consumption by otters. This mostly occurred during amphibian spawning and hibernation periods (i.e. spring and winter) and so amphibians made up to half of the prey items at a time of year when fish numbers were low (Weber, 1990).

Clearly, otters traversing the mountainous regions of the study area must be exploiting the seasonal abundance of amphibians to sustain themselves, especially in the headwaters where fish abundance is presumably very low or non-existent at certain times of year. Although not presented in the results, salmonid parr were observed in a deep pool of the River Dee (at an attitude of 550m), south of Corrour along the Lairig Ghru pass, some 7km from the Falls of Dee (and 6km from the Pools of Dee). No other fish observations were made during this survey.

All the salmonid bones from spraints found were from small-sized fish, which were assumed to be taken directly by otters. Comparatively, small-sized fish were the main dietary component of otters on small watercourses of the Dráva River catchment, Hungary (Lanszki et al., 2009).

Mammal remains were also found and accounted for the second most frequent non-fish item, albeit a relatively low percentage occurrence (Figure 7). Three spraints containing mammal bones, revealed water vole teeth, and only unidentifiable fragments were found in the remaining spraints containing mammal bones. From the size of these fragments they were from small mammals (most likely small rodents, including water vole).

It is well documented that the American mink (*Neovison vison*), is an important predator of the water vole (Strachan & Jefferies, 1993; Strachan, 1997, 1998; Macdonald & Strachan, 1999). However, otters also prey on water voles and several authors have documented this (for example Erlinge, 1967; Jenkins et al., 1979; Chanin, 1985). In 1976, a study revealed that 14% of mammal remains in spraints from the Dinnet Lochs (middle reaches of the Dee catchment) were from water vole (Jenkins et al., 1979). Nevertheless, to quote Jefferies (2003; p. 168), ‘The otter and the water vole have co-existed in Britain’s waterways for thousands of years without the water vole being eliminated by the otter’.

From the additional survey element, the majority of spraints were old deposits (78.3%). When compared with the previous survey in this same region, there were more recent spraint deposits in November 2016 (63.0%). However, it has to be stressed that this comparison must be considered lightly as the 2017 results were only from a sample of 69 spraints at sites predominantly on tributaries, whereas the 2016 results were from 92 spraints all on the main river. Nevertheless, it does suggest that otters are sprainting in this region less in spring and more in winter.

Mainly old spraints were found in the headwaters and upper reaches of the River Dee, which would indicate seasonal use of these areas too. This is likely to be associated with prey movements, for example salmon spawning in winter and frog spawning in spring.

This can be seen from the spraint analyses from both surveys – in November 2016 (Braemar to White Bridge), the main prey items were salmonid species, and in May 2017 (Braemar to source) it was mainly amphibian. It was also noted that eel (*Anguilla anguilla*) was found in spraints from the additional survey from Braemar to White Bridge during May 2017 but no eels were detected from the headwaters survey. This could suggest that otters catching eels along the upper region of the River Dee may not be traveling (and thus sprainting) further upstream into the headwaters during May? Or it may simply mean that there are no eels in the headwaters at this time?

By combining the results of both surveys we can see otter occurrence on the River Dee from source to sea. Although the true source was not reached, recent otter activity has occurred throughout the headwaters. An otter had traversed up into the Cairngorms to the Pools of Dee, and between May 2016 and May 2017 otters were actively utilising the upper, middle and lower reaches of the River Dee, together with the coastal section associated with the river mouth.

Erratum

In my previous survey report (**Rothwell, 2017; p. 59**) I had inadvertently misinterpreted the figures from **Beaton, 2013** in the discussion. It should have read: ‘**Beaton (2013)** showed that eel was significantly less frequent in spraints collected from the River Dee catchment in 2012 (n = 349; 86.4 frequency of occurrence), compared to the historical study (n = 3836; 122.5 frequency of occurrence) of the same areas during 1975–78 (**Jenkins & Harper, 1980**). With one of the main prey items of otter becoming less available, alternatives were being sought. Salmonids had significantly increased in spraint samples (from 75.7 to 109.9 frequency of occurrence), together with significant increases observed with perch, amphibians and birds (**Beaton, 2013**).’ In both cases n equals the total number of spraints analysed.

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A REVIEW OF THE DISTRIBUTION OF RECORDS OF ALBINO OTTERS (*Lutra lutra*)

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Abstract

This paper presents a review of records of albino Eurasian otters in Europe from literature, museum specimens, personal observation, personal communications and the internet.

Keywords: otter; white, cream, albino

Introduction

Interest in the distribution of albinism in the Eurasian otter (*Lutra lutra*) was sparked by a sighting of a white otter in Loch Etive in 1978, and the finding of an injured adult male albino otter on Ayr seafront in 1995. A search of literature and other sundry data suggests that albino otters have been recorded for many years, and, with the development of cheap, portable and efficient cameras and the instant communication of the internet and social media, they are being recorded with greater frequency, accuracy, and certainty.

Caution is required in evaluating records as, at first sight some river catchments appear to have produced records of albino, white or cream-coloured otters for over 100 years, but when records are followed up, the same observations have been repeated in literature sources, thus giving the appearance of a greater concentration of records than can be verified. The Shannon catchment and Northumberland are areas where the incidence of albinism may be exaggerated (**Table 1**). In other cases it is not always possible to ascertain whether a cluster of overlapping records in an area at similar times refer to one or several sightings, nor the number of animals involved. One report may trigger memories of other sightings, but also produce multiple records of the same one. Taxidermy specimens and museum skins are of limited use as most are ancient with dates and sources no longer attached. It appears that specimens are more likely to be found in local country houses than in museums, as examples of stuffed albino otters are reported in houses in areas where there are other records of white otters. It must be remembered that taxidermy was more popular in the past and that taxidermists are adept at supplying market requirements; it is possible to fake albino specimens. Even when deceit is not intended, skins may fade or change colour over time.

Pelt colour in otters

As mammals, otters have melanocytes in hair follicles producing melanin which determines fur colour. Some follicles produce more melanin than others. Melanin takes two forms; eumelanin which makes hair brown or black and phaeomelanin which makes it red or blond, both of which may be present in varying amounts and proportions. Albinism is the result of absence of melanin and melanism is the result of over production of eumelanin. Erythrism is a condition in which the phaeomelanin predominates over eumelanin. Coat colour may be affected by other genetic conditions such as leucism which causes paler pelage, but with normally pigmented eyes and skin and the normal markings still shown. There are other genes which cause a dilution of colour found in some mammals. It is possible that metabolic or environmental factors may also affect

coat colour in some individuals.

Experience of having handled several hundred Eurasian otter carcasses, 145 orphaned or injured otters and observing wild otters for over 40 years suggests that otter pelt colour in Britain varies from light sandy brown to brown so dark as to be almost black. The apparent colour is also influenced by wetting or the angle of light. **Feltwell (2013)** states that albinism is generally more common in wild mammals than melanism, while **Mills (1987)** reported that darker or melanistic otters were more common than albinos in Ireland, citing the dark pelt of *Lutra lutra roensis*. The type specimen of *Lutra lutra roensis* in the Natural History Museum is darker than most British mainland otters, although now faded to a deep reddish brown, and live specimens observed from Northern Ireland have been at the darker end of the colour range. Attempts to devise a system of measuring otter coat colour were unsuccessful as testing light reflection by machine proved too sensitive and attempts to draw on fur trade expertise in matching skins foundered.

Albinism in otters

An absence of melanin produces a white or ivory coloured pelt with pink eyes and nose as there is no melanin in the iris or skin (**Figure 1**).



Figure 1. Albino otter showing pink nose, eyes and skin, Moray coast, Scotland © Karen Jack

Albinism may be caused by alterations in a number of genes involved in the protein pathway of melanin production. In humans around 20 mutations producing albinism have been recognised. This may account for the differences between ‘albino’ otters in different populations. The Swedish example (**Figure 2**) pictured in *National Geographic* (**Howley, 2016**) is notably darker than most British examples.

The Northumberland record, one of the Islay records and the one from Torosay Castle, Mull, are all described as being cream coloured, as was the one from Ayr in 1995. The recent photographs of white otters from Ayrshire and Lanarkshire are all very white. The range of degrees of whiteness shown by albino otters suggests that several mutations are involved in different populations.

Geographical distribution and frequency of albino otters

Although some of the apparent clusters of albino otter records may be the product of



Figure 2. Albino and ‘normal’ pelt coloured otters from Sweden © Hans Ring

repetition of the same sighting, by several authors over many years, there does appear to be a westerly distribution of records. These are concentrated in Scotland, particularly in the western islands and the south west mainland with persistence of sightings over many years. The Inner Hebrides, especially Islay, and the coast of Argyll have been a focus of records of albino otters for more than 150 years, persisting since 1859 and with white otters seen as recently as 1992 (**Table 1**). Jura, Islay, Mull, Lunga and the west coast of Argyll have a spread of records around the Sound of Jura and the Firth of Lorne, with more isolated records from Otter Ferry on Loch Fyne, Loch Etive and the River Awe. In the twenty-first century there has been a considerable number of records and photographs of white otters derived from the Rivers Ayr, Clyde, Black Cart and Irvine on the south west mainland of Scotland, giving the densest cluster of records.

Table 1: Records of albino otters

Date	Location	Comment	Source
1862	R. Aln, Northumberland	2 cream coloured otters killed ‘a few years ago’.	The Field 1862 in Harris, C.J. (1968) . Otters: a study of the recent Lutrinae 1968
1980s	Cragside House, Rothbury, Northumberland	Old taxidermy specimen of white otter, may be one of above.	Gordon Woodroffe, pers. comm. (June 1983 by telephone)
2013	Cragside House, Rothbury, Northumberland	No longer on display, source of specimen unknown.	<i>Pers. obs.</i> February 2014
2016	Northumberland	Records of white otters in Northumberland.	Feltwell, J. (2013)
1893	River Shannon	White otters seen	Hurley, S.J. (1896) . White otters. <i>Field</i> , 91, 142, cited in Harris, 1968 .
1896	River Shannon	2 white otters seen	Hurley, (1896) , cited in Harris, 1968 .
Unknown	River Shannon	‘Perfectly white otters seen’: may be quoting the 1893 or 1896 records listed above in this table.	Scharff, R.F. (1909) . On the occurrence of a speckled otter in Ireland. <i>Ir. Nat.</i> , 18, 141, cited in Harris, 1968
2016	River Shannon	White otters seen. Almost certainly repeating old records.	Feltwell, J. (2013)
1813	The Hebrides	Dr Johnson reports that white otters are sometimes seen.	Daniel, W.B. (1813) . Supplement to the rural sports: 53-56. B.&R. Crosby, London, cited in Harris, 1968 .

1859,1880s	Sound of Islay	White otter put up , two more seen in same place.	Legge, J. (1898). White otters. <i>Field</i> , 91, 142, cited in Harris, 1968.
1892	Killed at Jura Preserved at Kildalton House, Islay	White otter. White otter. Both may be those recorded in 1859 and the 1880s in this table	Harvie-Brown, J.A. & Buckley, T.E. (1892). <i>A vertebrate fauna of Argyll and the Inner Hebrides: 16-18.</i> David Douglas: Edinburgh, cited in Harris, 1968.
1894	Killed at Jura Preserved at Kildalton House	White otter. White otter. Clearly those recorded in 1892 above in this table .	Harting, J.E. (1894). The otter, <i>Lutra vulgaris</i> . <i>Zoologist</i> : 18, 3, 1-10, cited in Harris, 1968.
1898	North east coast of Islay	Lovely white dog otter with pink eyes trapped.	Anon. in Harris, 1968.
1903	Kildalton, Islay	Captured, a cream coloured male otter.	Kirk, C. (1903). Cream coloured otter. <i>Ann. Scot. Nat. Hist.</i> , 12, 117, cited in Harris, 1968.
1910	Preserved at Islay House	White otter killed a short time ago.	Russell, H. (1910). Notes on the mammals of Islay. <i>Zoologist</i> , 14, 4, 114 cited in Harris, 1968.
1935	Torosay Castle Isle of Mull	Otter of delicate cream colour and pink eyes exhibited at Zool. Soc. Lond.	Seth-Smith, D. (1935). Exhibition of mounted specimen of an albino otter. <i>Proc. zool. soc. Lond.</i> 1935, 947, cited in Harris, 1968.
1940s post war	Lunga, Island Argyll	White otter seen for several years.	Andrew McGregor, pers. comm. (March 1978 in conversation)
Before 1954	Otter Ferry, Argyll	White otter reported to Fletcher.	Fletcher, J.M. (1956). A white otter. <i>Scot. Nat.</i> , 68, 59-60, cited in Harris, 1968.
1952	Uninhabited island off west coast of Argyll	White cub seen and reported to Fletcher.	Fletcher, 1956, cited in Harris, 1968.
1954	Uninhabited island west coast of Argyll	All white adult otter seen and followed for some time by Fletcher.	Fletcher, 1956, cited in Harris, 1968.
1992	Eilean Craobhach, Eilean a' Chuin, Eilean Bhride, south east Islay	White otter (s) seen several times.	George Middleton, Kildalton Estate Islay, pers. comm. (June 1992 by telephone)
1968-70	Barrier of Loch Awe, Pass of Brander	Adult albino otter seen over several years in the area, attempts made to live trap it.	Don MacCaskill, Forestry Commission, pers. comm. (1984 in conversation)
1978	Loch Etive	Small white otter seen.	<i>Pers. obs.</i> (May 1978)
1978	Ardmaddy Bay/Port an Dobrain area of east shore of Loch Etive	White otters seen in the area for about 90 years from time to time. Gamekeeper had seen them himself over several years.	Game keeper at Glenkinglas Estate, pers. comm. (May 1978 in conversation)
1963	Tongland Dam, River Dee, Kirkcudbrightshire	White otter seen on dam November 1963.	Cockrell, H.L., in litt. , cited in Harris, 1968.
January 1995	Pitch and Putt course on Ayr seafront	Adult male otter found injured and brought to rehabilitation Centre by SCCPA.	<i>Pers. obs.</i> (January 1995)
April 2011	River Ayr	Adult white otter seen on grass verge and in river, photographed.	Wilson, S. (2011). White otter spotted in River Ayr. <i>Daily Record</i> , 22 April 2011.
May 2011	Ayr	White otter seen beside Argos Ayr town centre.	Heggie, B. (2011). Famous white otter seen near Argos. <i>Daily Record</i> 13 May 2011
February 2015	River Irvine at Galston	White otter seen with white and brown cubs.	Ian Paterson, (2015) (Facebook).
Later 2015	River Irvine at Galston	White cub killed on A71.	Ian Paterson, (2015) (Facebook).
December 2015	River Irvine at Galston	White adult killed on A71.	Ian Paterson, (2015) (Facebook).
August 2014	River Irvine Darvel	White otter swimming video. May be mother of family above.	Axelrosa89, (2014) (YouTube).

April 2016	River Irvine	Picture of white and normal type otters posted on Internet. May be cubs from family above.	Dreghorn Angling Club, (2016).
November 2016	River Irvine	Pictures of 2 white otters offered for sale for fundraising. May be family above.	River Irvine and Garnoch Improvement Association, (2016).
2016	River Irvine, Darvel	Pictures of two white otters. Part of family above?	Equiscot Photography, 2016.
2017	River Irvine between Galston and Hurlford	White otter killed on A71 'last of family'.	Nicola Abson, (by emails 17, 18, 19 January 2018)
January 2018	Black Cart system at Lochwinnoch	White otter killed by car.	Jade Blair, (by email.28 January 2018)
2014	Clyde at Blantyre	White otter seen.	Veverka, (2017). Blantyre Project website
January 2017	River Clyde at Bothwell	White otter watched and photographed near Livingstone Bridge. May be one above.	<i>Daily Record</i> , 27 January 2017.
July 2017	River Clyde at Bothwell	White otter found dead beside road. Probably one above.	MacNeil, A. (2017). Heartache as River Clyde's rare albino otter found dead at roadside. <i>Daily Record</i> , 13 July 2017.
September 2009	Coast of Moray	White otter seen and photographed by Karen Jack.	Johnson, S. (2009) Albino otter spotted by photographer <i>Daily Telegraph</i> , 1 September 2009
Early 20th century	Unknown	Preserved specimen in Museum of Niort France.	Rene Rosoux, <i>pers. comm.</i> (by email 30 January 2018)
1867	China	Preserved specimen in National Museum of France brought back from China by Henri Victor Fontanier.	Jacques Cuisin, <i>pers. comm.</i> (by email 28 February 2018)
1996	Central Poland	White otter reported to be living in central Poland, plans to capture it for Wroclaw Zoo.	Zoo Director, <i>pers. comm.</i> (in conversation March 1996)
July 2016	Baltic coast, central Sweden	Ivory and normal type otters photographed together.	Howley, A. (2016). Albino Otter proves to be as adorable as you'd hoped. <i>National Geographic Blog</i> 29 July 2016
Unknown	Unknown	Skin no BM(NH)1981.2734 Part of Lord Rothschild's collection.	Hills, D. (1996). <i>in litt.</i> 4 June.
Unknown	Unknown	Large skin stored at Wisbeach may be one referred to above.	Andrew Kitchener, <i>pers. comm.</i> (by telephone June 1996)
Unknown 19th century	Unknown	One skin not on display in National Museum of Scotland.	Philip Howard, <i>pers. comm.</i> (by telephone June 1996)

Allowing for probable repetitions and photographs of the same animals in circulation, there appears to have been a minimum of seven individuals seen on these four rivers between 1995 and 2018. This would suppose that a white female had a litter of two white and one brown cubs on the River Irvine, all of which were obliging to photographers. Photographs dating from 2016 appear after reports of the death of at least two of the white family on the River Irvine in 2015, which leaves open the question of whether there was more than one family group present. It would also imply that the Clyde otter was at least three years old when killed. The record from Tongland on the Dee catchment in Dumfries and Galloway is isolated in time and geographically somewhat apart from the cluster in Ayrshire. However, the Water of Dee catchment adjoins the River Doon catchment, which adjoins the River Ayr catchment and is less than 50 miles as the crow flies from the location of the first Ayrshire record. An entirely feasible distance for movement of individuals carrying genes for albinism to travel over 32 years and 10 or more generations of otters. This brings the minimum number of white otters to eight in south west Scotland. This figure is on the conservative side as the road death at

Lochwinnoch was not preceded by any sightings. The otter photographed on the Moray coast (**Figure 1**) is an isolated record in Scotland. **Table 2** shows the maximum and minimum figures derived from available records which indicate a minimum of 23 albino otters recorded over more than 150 years in Scotland and a further four in the rest of the British Isles.

Table 2: The maximum and minimum numbers of white otters in the British Isles from available records

Location	Northumberland	River Shannon	Inner Hebrides	Argyll Mainland	South West Scotland	Moray Coast
Maximum	3	?	14	?	15	1
Minimum	2	2	11	3	8	1

Elsewhere in the British Isles there are old records from the nineteenth century, from the Shannon catchment in Eire and Northumberland in England. Records from continental Europe are much fewer (four) – one of which, the otter from the French Natural History Museum proves to have been brought back from China, showing that albinism in *Lutra lutra* is worldwide.

Discussion

Albinism occurs throughout the animal kingdom, but is less common in mammals than in birds, reptiles or amphibians **Nasr (2015)** states that albinism occurs only in 1:10,000 mammalian births compared with 1:1,764 in birds. In humans the frequency of albino births is given variously as 1:20,000 (**Miller, 2010**) or 1:17,000 (**Gronkov et al., 2007**), but both agree that the carrier frequency is around 1:70. In some isolated populations in the USA the frequency of albino births may reach 1:6,000. Most of the genes involved in albinism are autosomal recessives, but in humans some are X linked. Some mammalian groups show greater frequency of albinism than others; squirrels, having a particularly high occurrence (**Miller, 2010; Hills, 1996**). Little is known of the frequency of albinism in otters, although it is recorded in several species.

The Hardy-Weinberg equilibrium demonstrates that recessive genes are maintained in populations even if they produce adverse conditions in the homozygous state. This equilibrium may be disturbed by genetic drift, particularly if populations are isolated, by new mutations and by natural selection. Albinism is associated with eye problems in humans and certainly makes albino rats and rabbits prone to conjunctivitis in bright sunlight (pers. obs.). As otters are more active at times of low light intensity and do not rely heavily on sight for hunting, this may not be as disadvantageous as it would be to a wholly diurnal species. Otters are killed in large numbers by road traffic and they are difficult for drivers to see at night being dark, low to the ground and having little reflection from the eyes. The risk to albino otters appears to be no less than that to normal coloured otters given that most of those recorded recently appear to have been killed by vehicles. The Lochwinnoch albino's behaviour described by the driver was similar to that of normal coloured otters in similar situations; a sudden rush into the road right in front of the car and dithering about as the driver attempted to avoid it. Even if being white makes albinos easier for drivers to see the behaviour of otters on roads is unfortunately a contributory factor in their frequent deaths in traffic.

The main risk to albino otters detectable from these records is from humans, but the fates of these otters, where known, is unedifying. Ten were killed by keepers or others, at least seven of which, possibly more, were preserved as skins or taxidermy specimens and two others were the object of attempts to capture them for live exhibition. One animal died of wounds

sustained in a fight with another otter (**pers. obs.**) and at least five of the most recently recorded animals were killed on roads. This may represent the minimum estimate of single otters from the Clyde and Black Cart and a family of mother and two white cubs from the River Irvine all killed by road traffic. The most recent records are of animals seen and photographed alive or dead. The otter from Ayr in 2011 was observed on a grass verge, beside a road in daylight and stayed there while the observer went home to collect his camera, which is not usual otter behaviour, suggesting that it was unwell. Later observations of it outside Argos in Ayr town centre suggest that its behaviour was abnormal. There are sufficient quality photographs of the River Irvine otters for them to have been sold for fund-raising purposes, suggesting that the family of albino otters were subject to considerable attention and disturbance. Death as a result of wounds from another otter or death by road traffic are the two most frequently recorded causes of death in Scottish otters (**Green, 2003**) so these statistics are not unexpected, but the human interest which manifests itself in desire for possession of specimens or photographs may still be contributing to the death of albino otters.

The National Otter Survey of Scotland 1977-79 (**Green & Green, 1980**) showed that the Scottish otter population had split into northern and southern parts and that the southern part was partially isolated by the decline in the English population (Lenton et al., 1980). However, while the population of otters in south west Scotland lived through a period of geographical isolation, the otters of the Inner Hebrides and Argyll were always contiguous (**Green & Green, 1980**) with the northern mainland population and occasionally with the Irish otter population. The otter population of Scotland recovered from the low level recorded in 1980 (**Green & Green, 1997**) by the 1990s as did the adjoining population in Cumbria and Northumberland (**Strachan & Jefferies, 1996**) so isolation of the south west Scotland otters was of limited duration and completeness.

Conclusions

Although the population of otters in south west Scotland was isolated for a period of up to 50 years, isolation was not absolute. The first record of albino otters appeared during that time, but all subsequent ones have been two decades after the Scottish otter population had recolonised the whole of the country. The other area of Scotland with a cluster of records of albino otters was never isolated. Local short-term isolation does not appear to have been a factor in the overall distribution of albinism in Scotland. If genetic drift in an isolated population accounts for the unusual numbers of white otters in Scotland, the isolation of otters in the British Isles over thousands of years is the more important factor. The short-term isolation of the population in south west Scotland may account for the recent numbers of white otters there as it postdates recolonisation. Albino otters are unfortunately as endangered by road traffic as brown otters, but are at increased risk of being trapped, killed or disturbed by humans wishing to see, photograph or possess them because of their beauty and rarity.

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ERRATUM. We apologise that in the OTTER, Journal of the International Otter Survival Fund Volume 3, an author’s name was not spelled correctly. The name should have read Jyoti Bhandari not Bandhari, “Developing the Nepal Otter Network”. Apologies to Jyoti.

COVER PHOTO CREDITS:

Top - Southern river otter (*Lontra provocax*), Photo: Jose Luis Bartheld
Centre - Spotted-necked otter (*Hydrictis maculicollis*), Photo: Derek Keats
Bottom - Albino Eurasian otter (*Lutra lutra*), Photo: Karen Jack