



# Who is Present? Individuality in the Call Structure of the Eurasian Otter Whistle

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Are there individual call signatures in the Eurasian otter whistle that allow to distinguish between individuals?

## Data Collection:

- 6 Zoos in Switzerland
- 11 Individuals (6 males, 5 females)
- Recorded from Jan – Sep 2019
- Stationary microphones recorded continuously for minimum 72h
- Directional microphone for focal recording
- Additional historical data set from Germany

## Data Processing:

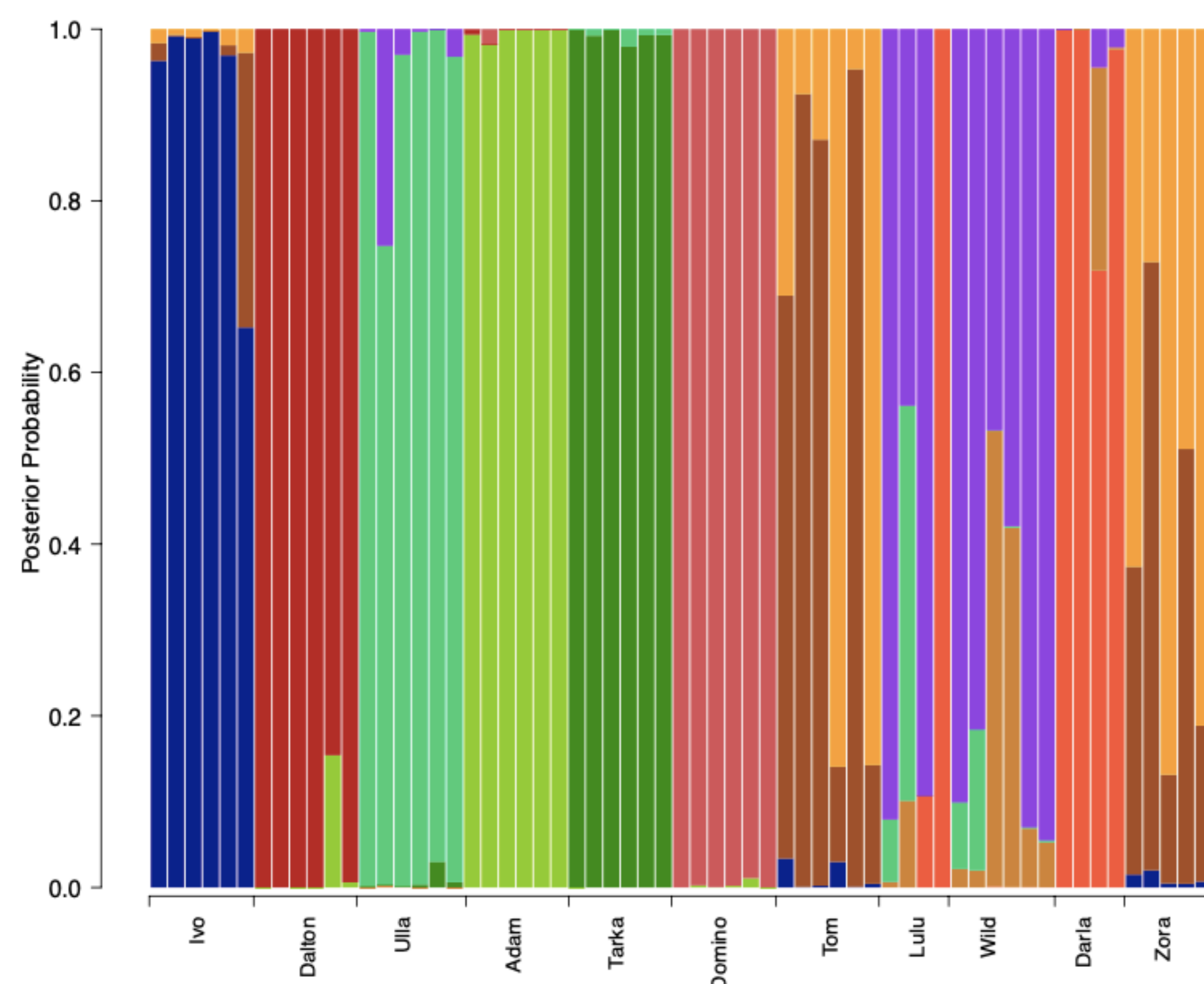
- Audacity: Labelling and cutting of calls
- Praat: Standardizing and analysing the calls

## Statistical Analysis:

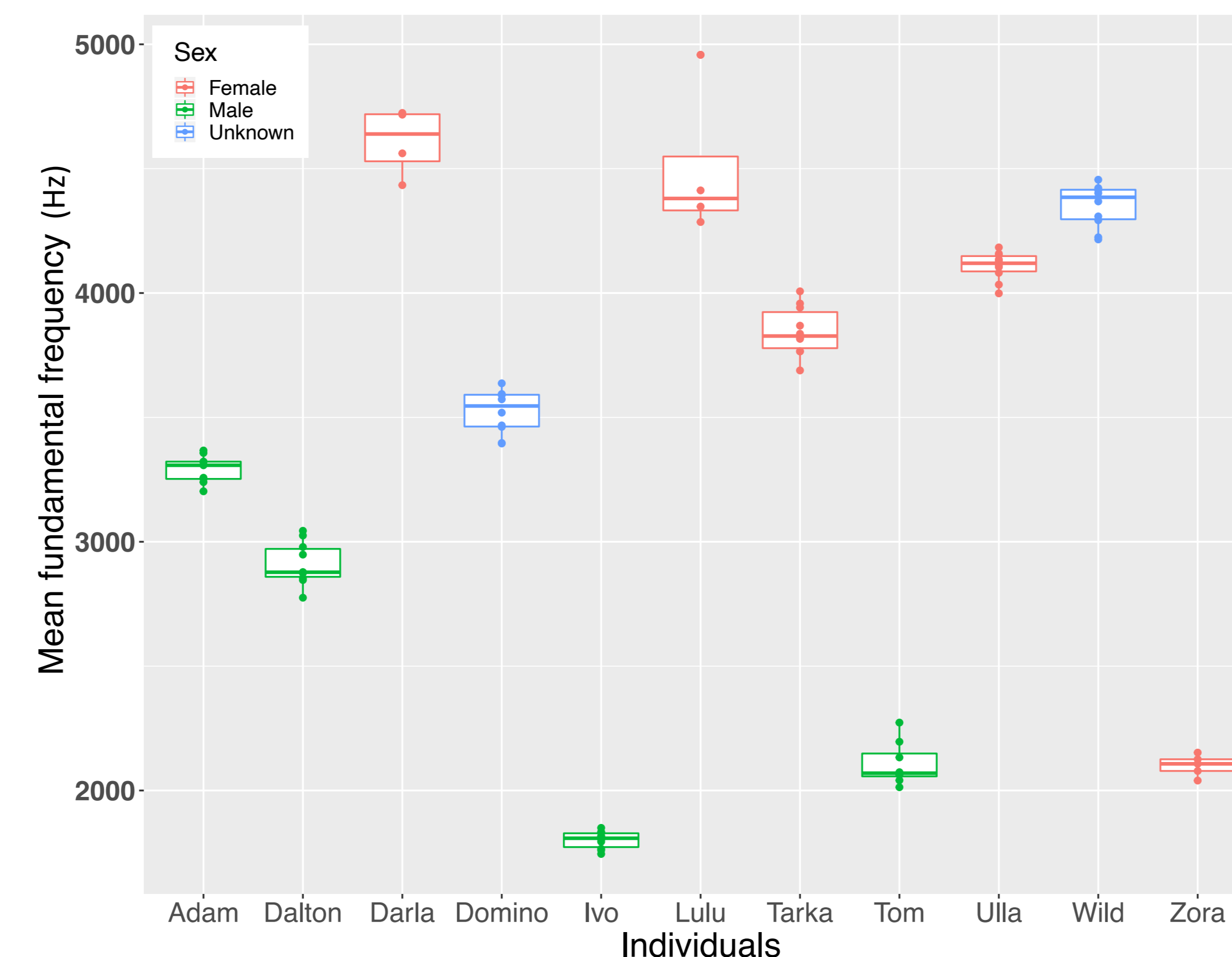
- Beechers H<sub>2</sub>: to reduce number of parameters
- pDFA: "leave-one-out" method with permutations
- Final model with only two parameters : call duration & mean fundamental frequency

## Results:

- Permuted discriminant function analysis revealed that the eleven otters showed individual differences in their call structure.
- High-quality (96.4%) and low-quality whistles (79.3%, Fig. 2a) were correctly classified and low-quality whistles both higher than expected by chance.
- Fundamental frequency is the most important parameter (Fig. 2b)



**Fig 1a.** Correct classification of each call for the lower-quality calls. Each call is represented by a bar. The different colours of the bars show how often an individual has been allocated to a call.



**Fig 1b.** The mean and variation (SD) of the fundamental frequency of the eleven individuals. The variation of the fundamental frequency within an individual was usually 300 to 350 Hz in all individuals.

## Conclusions:

- ✓ Eurasian otters show individual call signature in the whistle call.  
 → 'mean fundamental frequency' and 'call duration' proved sufficient to correctly classify high-quality whistles and low-quality whistles.
- ✓ PAM has high potential and could be applied to other elusive species that are not considered as highly vocal.

## The Eurasian otter (*Lutra lutra*)

- Lives elusive and nocturnal
- Monitoring relies on tracks and spraints (faeces)
- Detection probability of spraints is 30% on a 600m transect<sup>1</sup>
- Marking behaviour varies between sexes<sup>2</sup> and seasons<sup>3</sup>
- Individuality is based on DNA extraction from spraints
- A total of 6 different call types are described<sup>4</sup>

## References:

<sup>1</sup> Parry GS, Bodger O, McDonald RA, Forman DW. 2013. A systematic re-sampling approach to assess the probability of detecting otters *Lutra lutra* using spraint surveys on small lowland rivers. <sup>2</sup> Lampa S, Mihoub JB, Gruber B, Klenke R, Henle K. 2015. Non-invasive genetic mark-recapture as a means to study population sizes and marking behaviour of the elusive Eurasian otter (*Lutra lutra*) <sup>3</sup> Macdonald SM, Mason CF. 1987. Seasonal Marking in an Otter Population. <sup>4</sup> Gnoli C, Prigioni C. 1995. Preliminary study on the acoustic communication of captive otters (*Lutra lutra*).

## Acknowledgements:

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