

Dynamics of demographic expansion and population structure in the otter *Lutra lutra*

Supervisors

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Project description

Studies of genetic structure in natural populations of terrestrial species usually focus on assessments at a single time point, failing to capture temporal population dynamics. The Eurasian otter (*Lutra lutra*) suffered continental scale declines during the 1950s-70s, from which it is now recovering. In the UK, previous research suggests considerable sub-structuring, with 4 major groupings likely to have arisen from geographically separated remnant populations (Stanton et al 2014). Following recovery, these subpopulations are now largely contiguous; it is likely that the degree of admixture reflects (i) permeability of landscape barriers, (ii) otter home ranges, and (iii) dispersal distances from natal sites. Little is known, however, about any of these elements.

This project will use molecular techniques to investigate changes in otter population structure over a twenty-year period of recolonisation, at a national scale. Furthermore, it aims to gain new and previously intractable information on home range and (potentially sex-biased) dispersal, and to examine the permeability of landscape barriers to movement.

Specifically, the PhD student will

- (1) Characterise population structure at 5 year intervals across a twenty year period, using geolocated muscle tissue samples collected and archived at Cardiff from across England and Wales.
- (2) Assess and compare dispersal distances in three distinct regions with contrasting barriers to dispersal, by identifying first order relatives from tissue samples collected across the same twenty year period.
- (3) Identify individual movements and characterise home range size over a three year period, using spraint samples collected from the River Tone in Somerset. In addition to molecular analyses, novel chemical analysis of volatiles in scent material (Kean et al., 2011) will enable discrimination of juveniles from adults, non-invasively, for the first time in wild otter populations.
- (4) Identify landscape barriers to otter movement, using data from (1) and (2).

This is an attractive project addressing novel questions and providing diverse training opportunities in molecular ecology and bioinformatics, spatial analysis, ecological survey and analytical chemistry. It offers the potential to

deliver a major advance in our knowledge of the processes driving population structure in expanding populations, and also has practical implications for conservation of a charismatic European protected species.

Stanton et al., 2014. Contrasting genetic structure of the Eurasian otter (*Lutra lutra*) across a latitudinal divide. *Journal of Mammalogy* 95 (4), 814-823.

Kean et al., 2011. Otter scent signals age, sex, and reproductive status. *Chemical Senses*, 36 (6), 555-564.

