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## Methodology used for the European badger (*Meles meles*) monitoring in Wallonia

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During the seventies, den gassing has been broadly applied in Belgium to control rabies. The goal was to limit the red fox (*Vulpes vulpes*) population, identified as the main epizootic vector. However, this method deeply affected the European badger (*Meles meles*) population (decrease of 90%). At the end of the eighties, an oral vaccine was successfully used to eradicate the rhabdovirus which helped the badger to restore its population.

Different badger surveys have been performed in Wallonia during the last 30 years. They mainly concerned den inventories. The most recent survey started in 2006 with the support of the 'Service public de Wallonie' : it included different tasks. Between 2006 and 2008, the den atlas has been updated on the Walloon territory with the help of forestry agents and other collaborators : around 1500 setts have been checked and characterized. Though, as it was impossible to have a complete overview, a habitat modelling was elaborated. Based on the badger ecological needs (proximal and direct variables) to build dens, it was designed to assess the part of overlooked setts in the main area of distribution of the badger (southeastern Belgium). The predictive model used consists in calculating the Mahalanobis distance statistic ( $D^2$ ) which is a presence-only modelling technique allowing to identify den locations. The results indicate that around 22% of the potential dens expected in the study area are not included in the current inventory. This value has been taken into consideration to correct the badger population estimate. Furthermore, different areas that were not comprised in the den inventory of 2006-2008 were recently checked for new badger setts, allowing to validate the model.

Associated with badger counts, these data were used to assess the population level in Wallonia. Counts were organized to define the mean number of individuals occupying a sett, as well as the mean social group size. Between 2007 and 2009, a first selection of 50 setts was used. Since 2010, a new sampling was defined in order to select a den in each area of 80km<sup>2</sup> within the species distribution area. Therefore, the total number of dens considered in Wallonia reached 139. Finally, since 2007, between 24 and 50 dens a year were checked by 3 successful lookouts. The social group size was calculated through the inventory of all additional occupied dens within a home range of around 110 ha, corresponding to the mean average home range size of a social group of badgers in Belgium. During the lookouts, all observed individuals were classified into 3 age categories : adults, subadults and juveniles. Statistical analyses enlightened significant variables explaining badger population changes. After a population decrease recorded in 2009, the population level is statistically stable since four years.