Appendix S4. Find below a discussion on the model assumptions and limitations.

For site occupancy models to apply, several assumptions must be fulfilled and discussed (MacKenzie et al. 2003, MacKenzie 2006). First, the species should not be detected when absent from a site. In our study, all scats were genetically controlled thus allowing false positive identification (Duchamp et al. 2012). As noted below, false positive detection by the dog was not an issue in our study. Second, detection histories in all sampling units are assumed to be independent. Since the study focuses on wolf scat detection rather than species (i.e. living and mobile animals) detection, the detection probability of scats is independent on whether the wolves are in the vicinity of the survey or not. We thus assume that this second assumption is true. Third, the closure assumption (Rota et al. 2009) assumes that the status of a site should not change through occasions (or in our dog detection design, through spatial replicate, i.e. surveys segments *j*). Because scats may persist for weeks, one should interpret the occupancy estimates in terms of sites used by the species (i.e. sites where the species was present sometime during or before the survey period, as opposed as sites strictly occupied during the survey). It is thus appropriate to relax the assumption that all locations are closed, and consider that 'occupied locations' are in fact 'used locations'; this is especially true for highly mobile species (MacKenzie et al. 2004) such as wolves. Thus, as long as wolves deposit scats during marking behaviour, it is not necessary that wolves may be present at the site for a detection to occur (Long et al. 2007a, b). As the dog detection was not on mobile animals, but on their scats, and the surveys from segments *j* in each sample unit *i* lasted less than three days, we assume that this closure assumption was considered true. This reasoning is also true for detection by FWN observers. If movements occurred inside or outside of the sampling sites, it is likely that the probability of occupancy (of wolf scats) in a given time interval did not depend on the occupancy status of a site in the previous time interval. In this situation of random temporary emigrations, the bias in parameter estimates is minimal, but occupancy should be interpreted as use of the sampling area (Louvrier et al. 2018).

Data from citizen science are often collected with protocols that do not count for variations in the sampling effort. If the sampling effort is variable during time or space, this might lead to false absence on sites insufficiently surveyed (Kéry et al. 2010). As a consequence, if sampling effort is not controlled for, detectability can be estimated low leading to biases estimates (van Strien et al. 2013). In the case of several species being monitored, the detection of a species in a site informs about the non-detection of other species because this site is known to have been sampled (van Strien et al. 2013). For single-species settings the assumption is made that all site where at least one detection occurred are sampled throughout the whole duration of the study (Rich et al. 2013). In our opportunistic sampling by FWN, observers are asked to report for all wolf signs in addition to scats (camera, visual observations, depredation on livestock, wild prey, snow prints, hair samples, etc. (Duchamp et al. 2012). These other surveys signs allow to know if a sample unit is also monitored, even when no scat detection occur.

In this pilot experiment, we choose a very simple single-season site-occupancy model that did not account for factors that may affect scat detection by the dog. Weather-related variables are obviously known to affect a dog's scenting ability and performance (Smith et al. 2003, 2005, Wasser et al. 2004). However, we did not account for potential effects of precipitation, temperature, wind or humidity in our analyses, as our sample data was small. Cross roads are also known to be used as marking sites (Barja et al. 2004, 2005), so the density of crossroads in the chosen survey may have an impact on detection probability. How these parameters affect

detection probability may be studied in a future study. In the framework of a more comprehensive study, the current model will be extended to an integrated modelling of habitat and occupancy dynamics (MacKenzie 2006, Kéry et al. 2009).

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