Appendix S3a. Detection histories (dog team).

We began the survey at one end of the trail route and proceeded in order along the *k* total segments of the route (Hines et al. 2010). The data resulting were treated as detection histories for each of the sample units *i* (large cells). Each detection history corresponding to one survey in the same sample unit *i* was grafted to the precedent to construct one unique detection history per sample unit *i* (Appendix 3a). Each detection history contained a "0" (no detected scat) or a "1" (detected scat) per segment *j*. For example, one detection history for segment *i* may be h_i = 1001. There were no detection of wolf scat on segments 2, and 3, but scats were detected on segments 1 and 4. The following parameters were used in the experimental design: ψ = Pr(sample unit *i* occupied); θ = Pr(wolf scat present on segment *j* sample | unit *i* occupied by wolf species); *p* = Pr(detection at a segment *j* | sample unit occupied by wolf species and wolf scat present on segment *j*).

$$Pr(h_j = 1001) = \psi \{(\theta p) \times [\theta(1 - p) + (1 - \theta)] \times [\theta(1 - p) + (1 - \theta)] \times (\theta p)\}$$

The first term, ψ, corresponds to the probability that the sample unit *i* is occupied. As scats were collected at segments 1 and 4, we know that the sample unit is occupied. The first term θp in the brackets corresponds to the probability that the first segment is occupied. The next segment is then either occupied with no detection $\theta(1 - p)$ or not occupied $1 - \theta$.

For each sample unit, occupancy was determined as a Bernouilli trial with probability ψ. For units that were occupied, presence at each segment of the survey was determined as a Bernouilli trial with probability θ and absence with probability $(1 - \theta)$. Species presence and absence at the remaining segments were determined similarly, with probability of presence at segment t being independent on presence at segment t – 1. At each segment where scats were detected, detection was determined as Bern (*p*).

Detection histories (Dog team)

Data WP

h[,1]	h[,2]	h[,3]	h[,4]	h[,5]	h[,6]	h[,7]	h[,8]	h[,9]	h[,10]	h[,11]	h[,12]	h[,13]
	h[,14]	h[,15]	h[,16]	h[,17]	h[,18]	h[,19]	h[,20]	h[,21]	h[,22]	h[,23]	h[,24]	h[,25]
	h[,26]	h[,27]										
1	1	0	0	0	0	0	1	1	0	1	0	0
	0	0	0	0	1	1	1	1	1	0	1	1
	0	NA										
1	0	1	0	0	0	0	0	0	0	0	0	0
	1	1	1	0	0	0	0	0	0	0	0	1
	0	NA										
1	0	1	1	0	0	0	1	1	1	1	0	0
	0	0	0	0	0	0	0	0	1	0	NA	NA
	NA	NA										
0	1	1	0	1	0	0	0	0	0	0	0	0
	1	0	0	0	1	0	0	0	1	0	0	NA
	NA	NA										
1	1	1	1	0	0	0	0	1	0	0	1	1
	0	0	0	0	0	0	1	0	0	0	0	1
	0	0										
0	1	1	1	0	0	NA	NA	NA	NA	NA	NA	NA

NA NA NA NA NA NA NA NA NA NA NA NA
NA NA
0 0 1 0 0 1 0 1 0 0 0 NA NA
NA NA NA NA NA NA NA NA NA NA NA NA
NA NA
END

Data No-WP

h[,1] h[,2] h[,3] h[,4] h[,5] h[,6] h[,7] h[,8] h[,9] h[,10] h[,11] h[,12] h[,13]
h[,14] h[,15] h[,16] h[,17] h[,18] h[,19] h[,20] h[,21] h[,22] h[,23] h[,24] h[,25]
h[,26] h[,27] h[,28] h[,29] h[,30] h[,31] h[,32]
0 0 1 0 0 0 0 0 0 0 0 0 0
0 0 1 1 0 0 1 1 0 0 0 0
0 1 0 NA NA NA NA
0 1 1 0 0 0 0 0 0 0 1 0 0
0 0 0 0 0 0 0 NA NA NA NA NA
NA NA NA NA NA NA NA
0 0 0 0 0 0 1 1 0 0 0 1 0
1 0 0 0 0 0 0 0 0 0 0 0 0
0 0 1 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 1 1
0 0 0 0 1 0 NA
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 0 1 0
0 0 0 0 NA NA NA
END