

Experimentally assessing the effect of search effort on snare detectability

Electronic Supplementary Materials

Appendix S1. Experimental Design

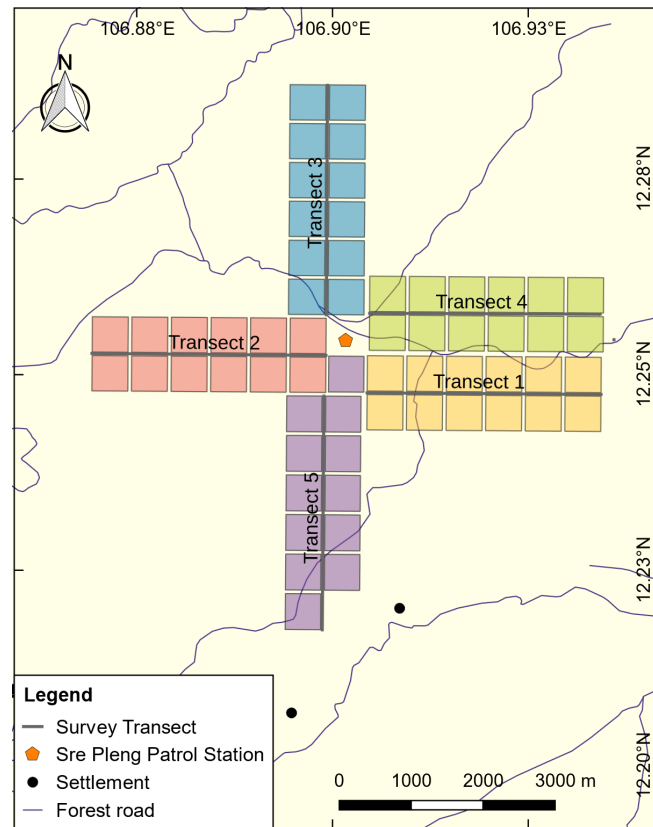


Figure S1a. Location of transects within Keo Seima Wildlife Sanctuary. Five 3.25km long transects were established radiating out from Sre Pleng patrol station. The bottom right quadrat on Transect 5 was relocated to directly below the patrol station due to insufficient forest cover in the original location. Along each transect, 12x 0.25km² (500m x 500m) quadrats were demarcated in QGIS. Each quadrat was numbered, with quadrats 1 & 2 always nearest the patrol station, and quadrats 11 & 12 always furthest from the patrol station.

Table S1a. Example of allocation of a team's quadrat searches. Numbers in the table represent quadrat ID numbers.

Team	Quadrats in which team set snares	Quadrat search order								
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th
1	6, 10, 12	1	3	5	7	9	11	2	4	8
2	2, 4, 8	11	9	7	5	3	1	6	10	12
3	5, 9, 11	2	4	6	8	10	12	1	3	7
4	1, 3, 7	12	10	8	6	4	2	5	9	11
Day 1		Day 2						Day 3		

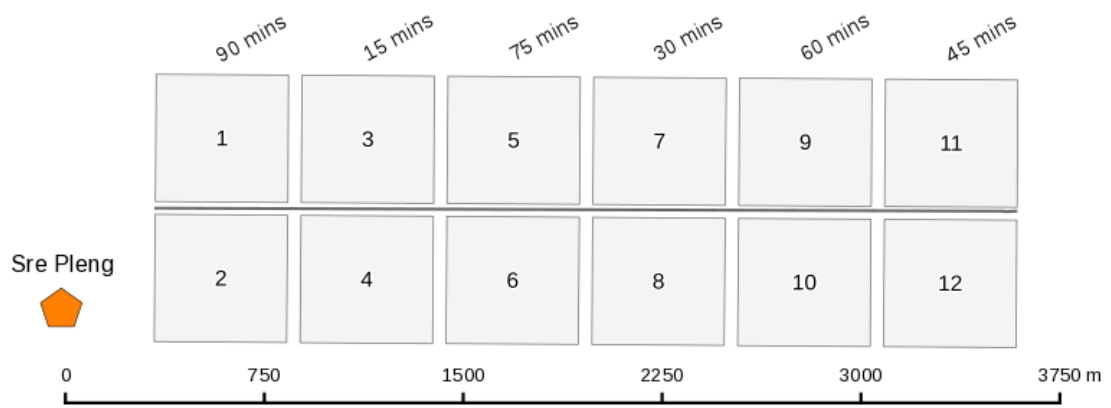


Figure S1b. Levels of search effort allocated per quadrat in a given transect. Search times were fixed across transects. Quadrat ID is shown in the centre of each quadrat.

Appendix S2. Further analyses

Table S2a. Repeated snare detections

Season	Dry		Wet		Total	
	N	%	N	%	N	%
Snares detected by 0 teams	265	60%	249	56%	514	58%
Snares detected by 1 team	104	23%	130	30%	234	26%
Snares detected by 2 teams	61	14%	52	12%	113	13%
Snares detected by 3 teams	12	3%	13	3%	25	3%
Total detections	177	40%	195	44%	372	42%

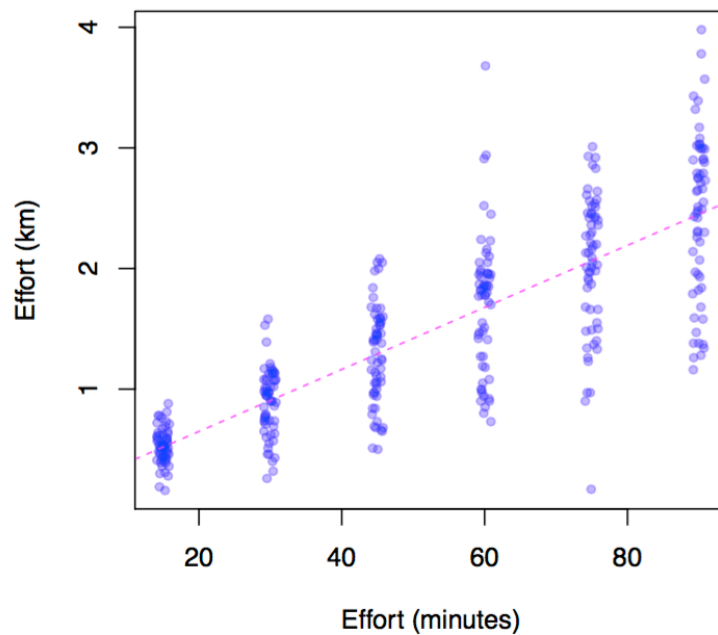


Figure S2a. Relationship between two different measures of effort - distance searched (km) and time spent searching (minutes)

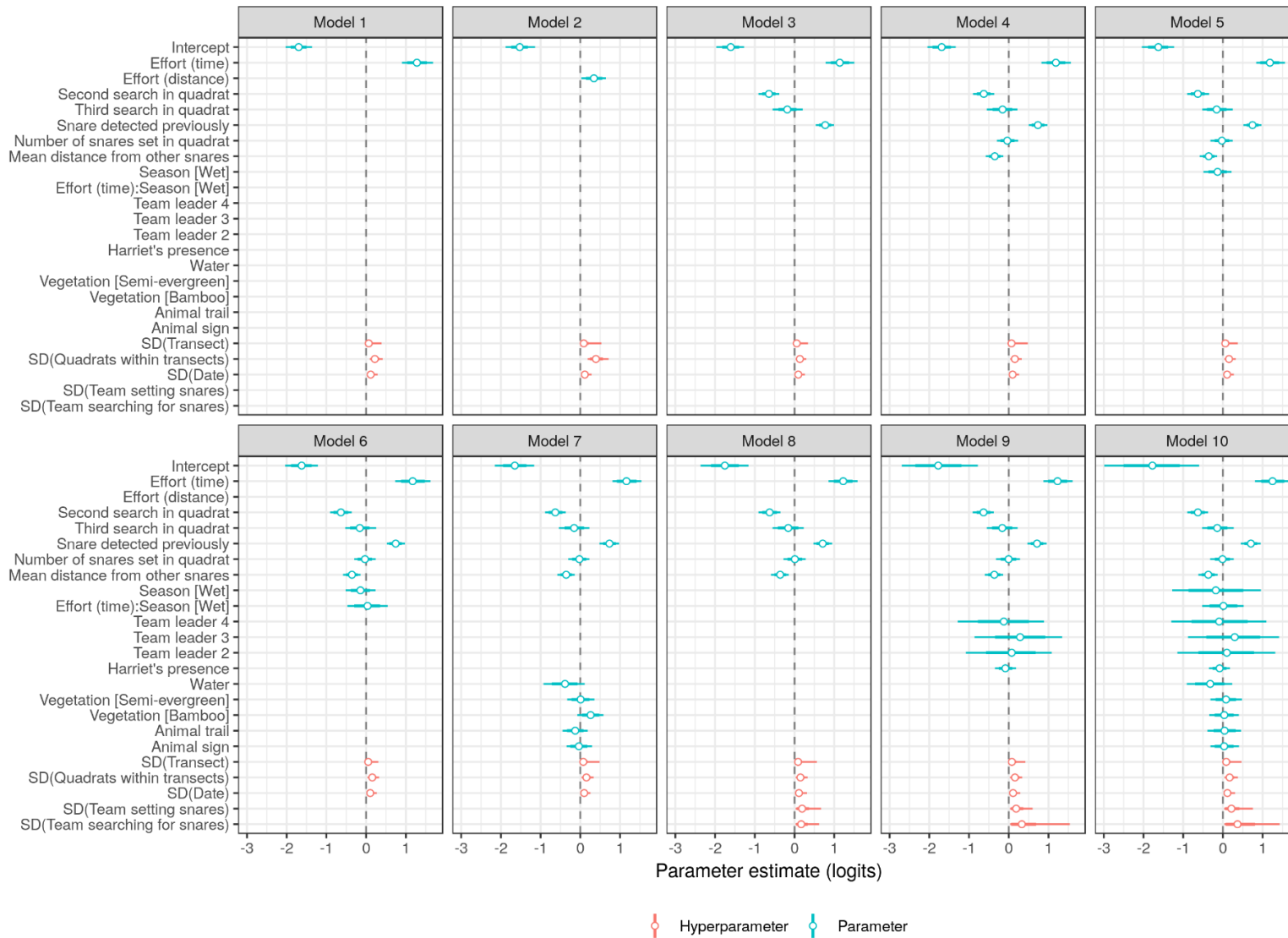
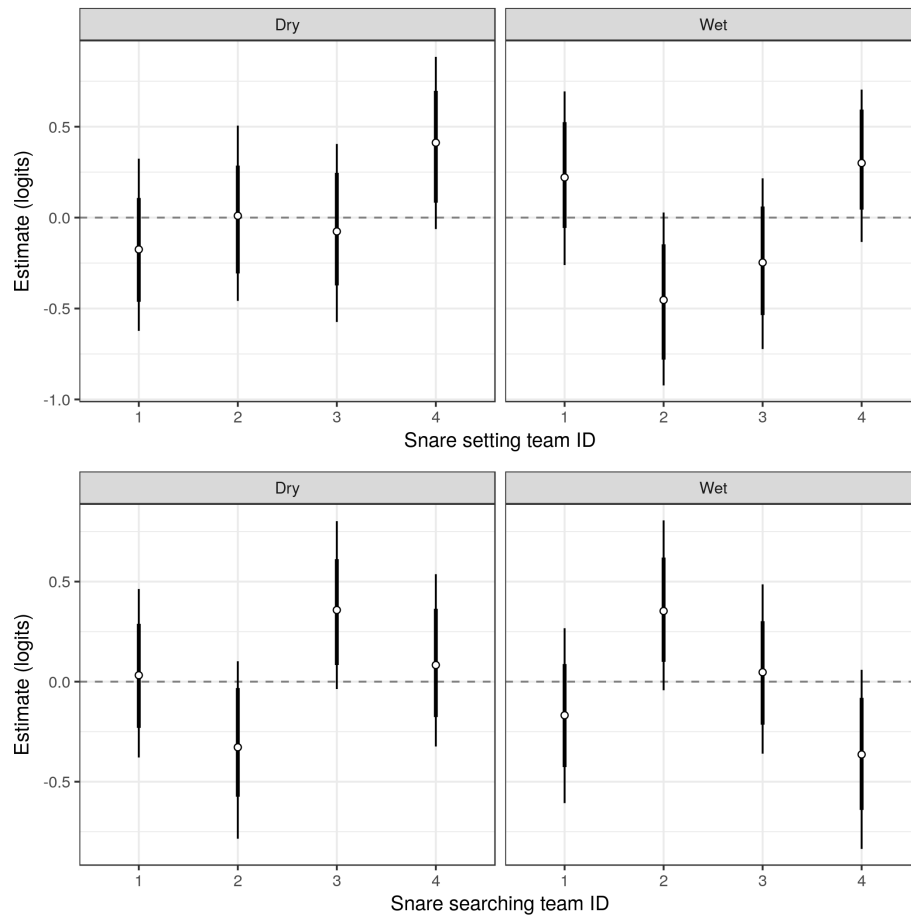


Figure S2b. Parameter estimates for the full candidate set of 10 models. Points represent the mean estimate; thick lines represent 80% credible intervals and thin lines represent 95% credible intervals. Estimates for the standard deviations of hyperpriors for grouping variables are coloured pink while other parameters are coloured turquoise.



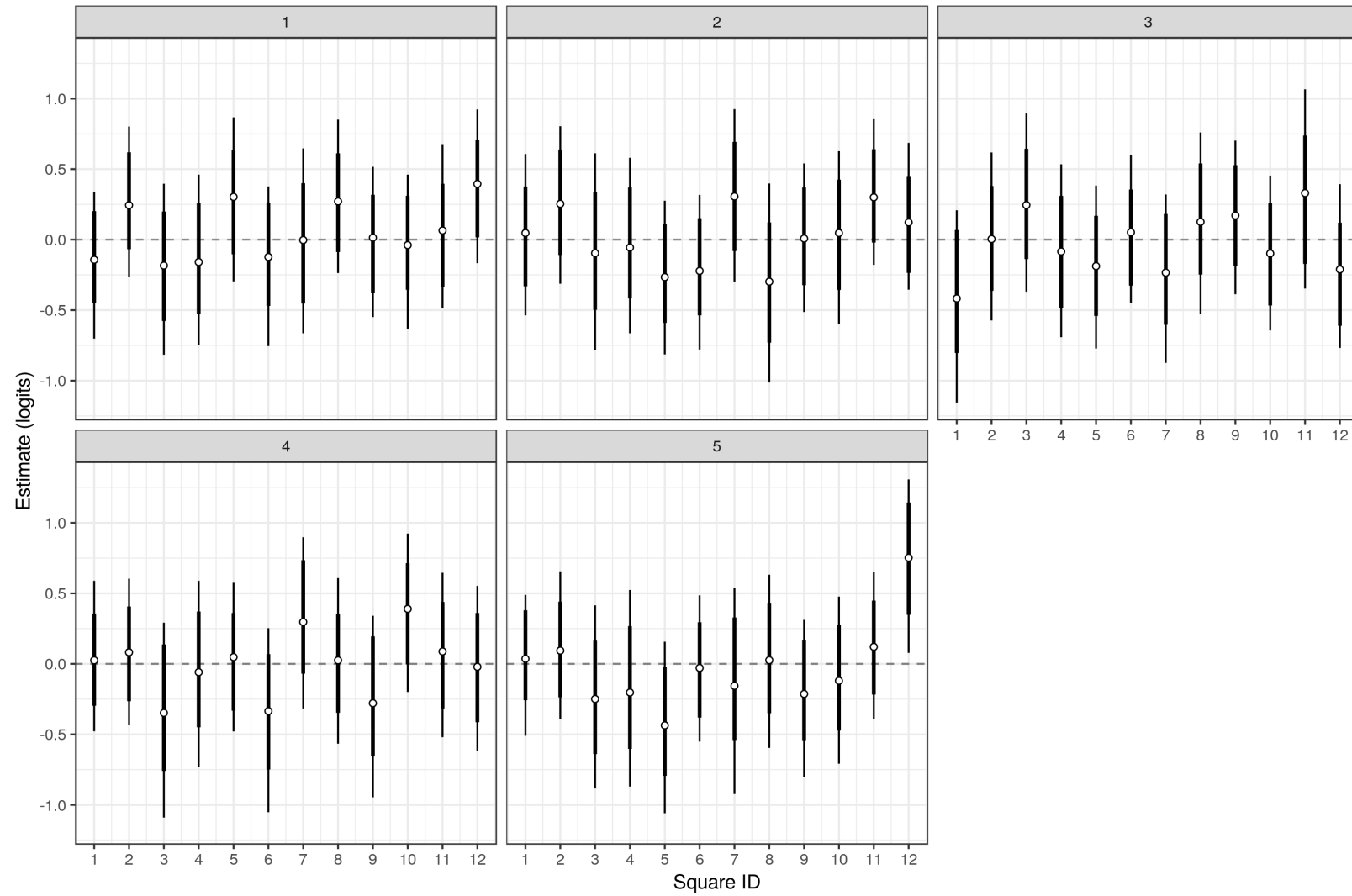


Figure S2d. Comparison of parameter estimates for the effects of Quadrat ID on snare detectability. Results show variability between quadrats, but broadly this was non-significant.

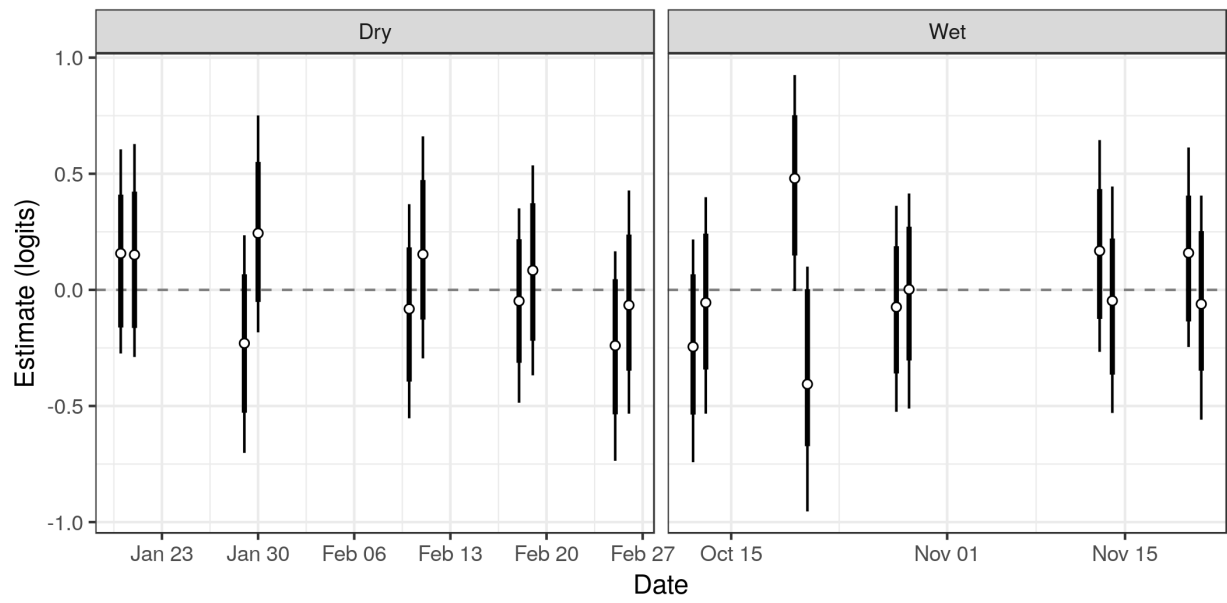


Figure S2e. Comparison of parameter estimates for the effects of season on snare detectability.

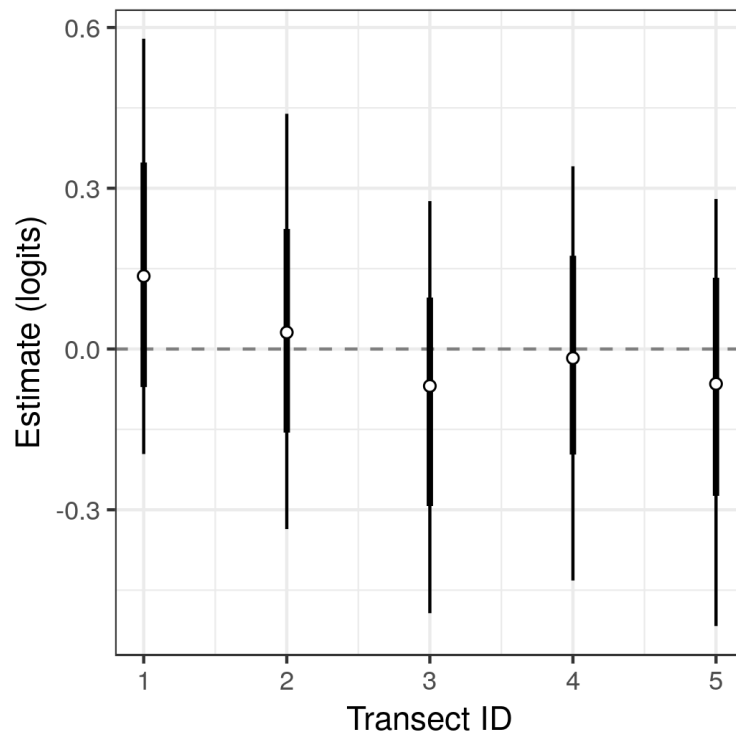


Figure S2f. Comparison of parameter estimates for the effects of transect on snare detectability.

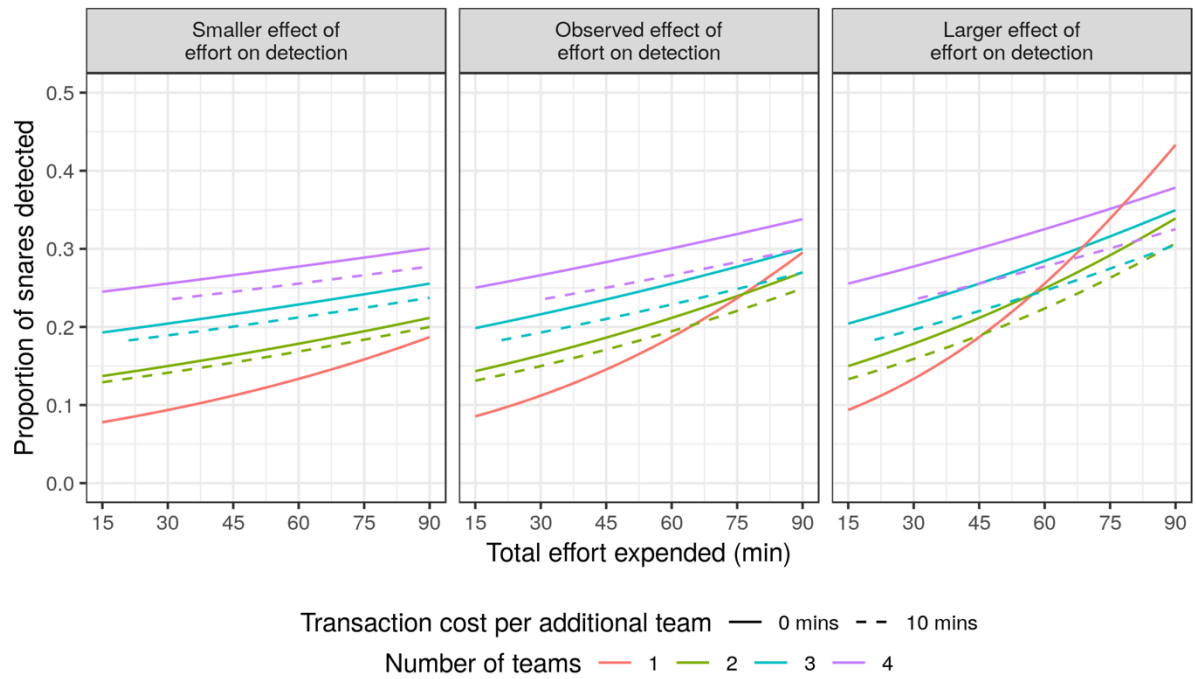


Figure S2g. Variations in modelled effect of dividing total search effort across multiple search teams on detection probability, when effects of effort on detection and transaction costs vary.

Appendix S3. Assessing the performance of individual searchers

Typically, the assignment of rangers to patrolling tasks is undertaken by supervisors, who allocate roles based on their assessment of individual's ability to perform them. Those in possession of certain characteristics (e.g. years on the job, rank, age) may be perceived to be experts, and are therefore assumed to perform better. However, this assumption does not always hold true. The relationship between perceived expertise and actual performance has not been explored in PA management, including the relationship between perceived ability to find snares and actual snare-finding ability.

Predicting performance

Prior to the start of the dry season survey, we asked searchers basic questions about their expertise with regards to setting and searching for snares, how long they had lived or worked in the study area, and whether they thought snares would be easier to find in the wet or dry season. In order to gauge expectations of self-performance we asked individuals *"How well do you think you will perform? where 0 = means you will find no snares, and 10 = means you will find all the snares"*. We then asked each individual to judge how well they thought each of their peers would perform by asking the question *"How well do you think XXXX will perform? If 0 = means they will find no snares, and 10 = means they will find all the snares"*. This exercise was conducted on the first day of the snare experiment fieldwork. Only eight of the 29 local guides were present for this exercise, meaning that consistent predictions of performance and actual performance rankings were only available for the five WCS staff.

We averaged the predictions of performance given to each individual by their peers, and ranked the scores to identify who peers expected to perform best and worst. During analysis, we compared both self and peer predictions against actual performance.

Results

Searcher experience

In total, 35 searchers participated in the study; six individuals from WCS, and 29 local guides. Only one WCS member grew up in KSWs and had experience setting snares as a child, all others originated from different parts of the country. WCS staff had spent on average 11.5 years (37% of their lives) working in KSWs. In contrast, most local guides had lived in KSWs their whole life, and all but one guide set snares as a child. Based on the length of time spent living in KSWs we predicted that local guides would be more familiar with the forest habitat, distribution of wildlife and hunting techniques and thus would be better at detecting snares than WCS staff. However, we found this to be untrue. The mean number of snares detected per transect by each

WCS employee was 6 (min: 2; max: 22) compared to 3 snares per local guides (min: 0, max: 9). The six WCS staff were responsible for detecting 59% of the total snares found.

Self-prediction vs peer-prediction

Of WCS staff, two individuals thought they would find more snares than their peers expected them to (Table 3). These two individuals were both older and in more senior positions. The other three WCS staff members expected to find fewer snares than their peers predicted. No group estimates were available for Searcher F. Results showed that once averaged and ranked, peer-predictions accurately predicted actual performance. Only one individual (the worst performing individual) correctly predicted their own performance. Overall, aggregated and ranked peer-predictions provided a better estimate of performance than self-prediction.

Table 3: Self and peer predictions of performance versus actual performance, measured by the number of successful detections per individual divided by the number of detection opportunities.

Participant	Self		Peer		Actual performance		
	Prediction	Rank	Prediction	Rank	(Detections / Opportunities)		Rank
Searcher C	7	4.5	8.7	1	91 / 597	15%	1
Searcher F	7	4.5	NA	NA	70 / 670	10%	2
Searcher E	8	2.5	8.1	2	57 / 670	8%	3
Searcher D	9	1	7.5	3	47 / 668	7%	4
Searcher A	8	2.5	7.3	4	35 / 658	5%	5
Searcher B	4	6	6.6	5	14 / 483	3%	6
					314 / 2661	12%	

*Predictions based on a scale where 0 = Will find no snares, 10 = Will find all snares.