

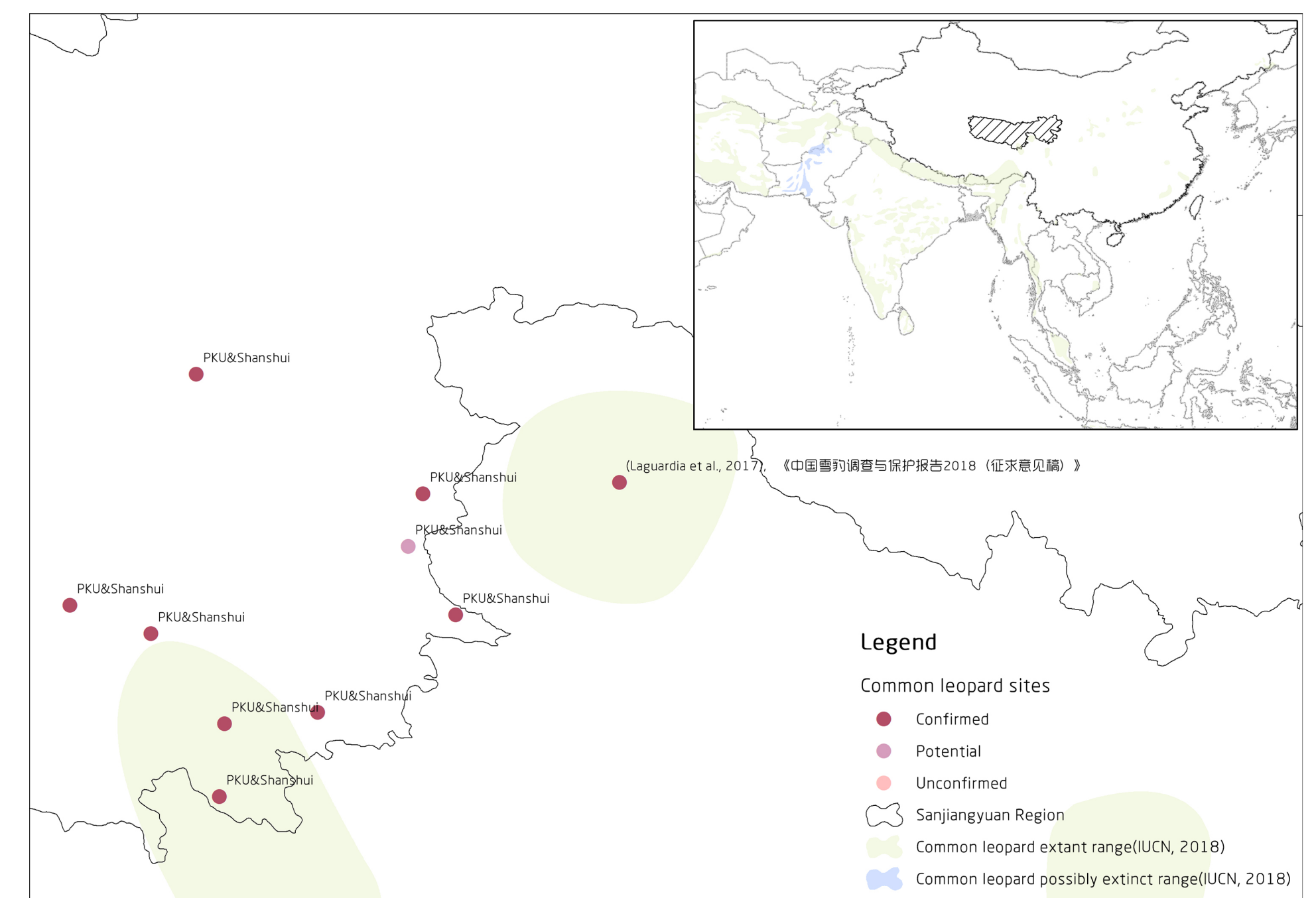
The "Uncommon" Leopard in Sanjiangyuan

Abstract

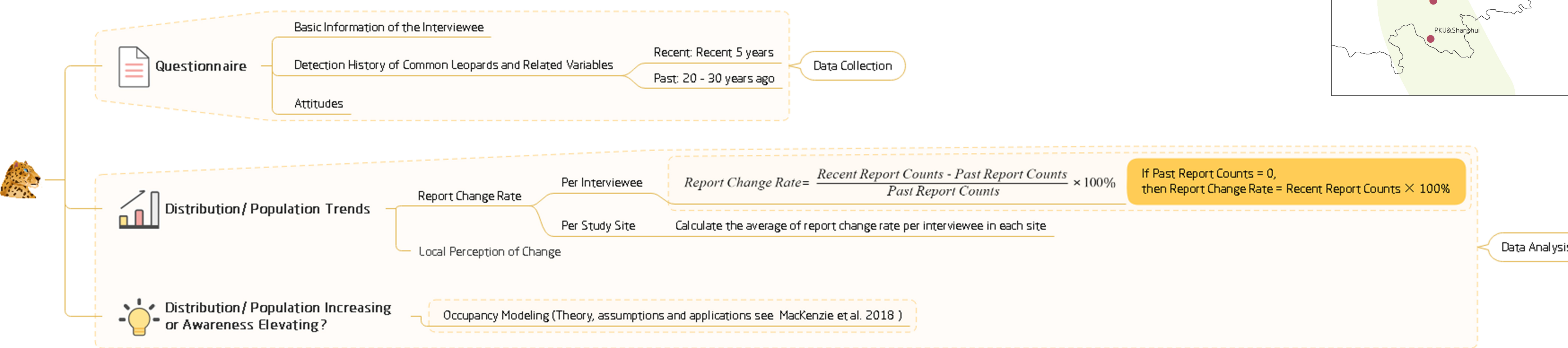
Common leopard (*Panthera pardus*) population is decreasing globally (Stein et al, 2020), however it is increasingly reported at high altitudes in southern Yushu prefecture on the Tibetan Plateau, China. To build a better understanding of common leopard status in high elevated areas of China, survey for its local distribution and local attitudes has been conducted. Common leopards possess a considerable **occupancy probability** (0.68 ± 0.09), and the **colonization probability** (0.17 ± 0.13) indicates that their distribution/ population is under a potential growth in Yushu. The reports change rate increased by **56%** overall, sharing the same trend. Herders here express friendliness towards common leopards while worries towards life and livestock security still exist.

Background

During past camera trap survey, our limited data suggests several stable populations in certain areas of Yushu. The mountainous areas with patched forest here could be a refuge for common leopards. Meanwhile leopards are reported to depredate on the livestock of local communities (Edgaonkar et al, 2002; Vidya et al, 2016), potentially leading to negative attitudes. The survey is designed under the framework of **Occupancy**, a species distribution model based on presence and absence data, introducing detection probability to compensate imperfect detections. Occupancy has been performed well in elusive species like snow leopards (*Panthera uncia*) (Ghoshal et al, 2017; Taubmann et al, 2016), and questionnaire survey is proved to be an effective method to cover large area (Martínez-Martí et al, 2016; Pillay et al, 2011).

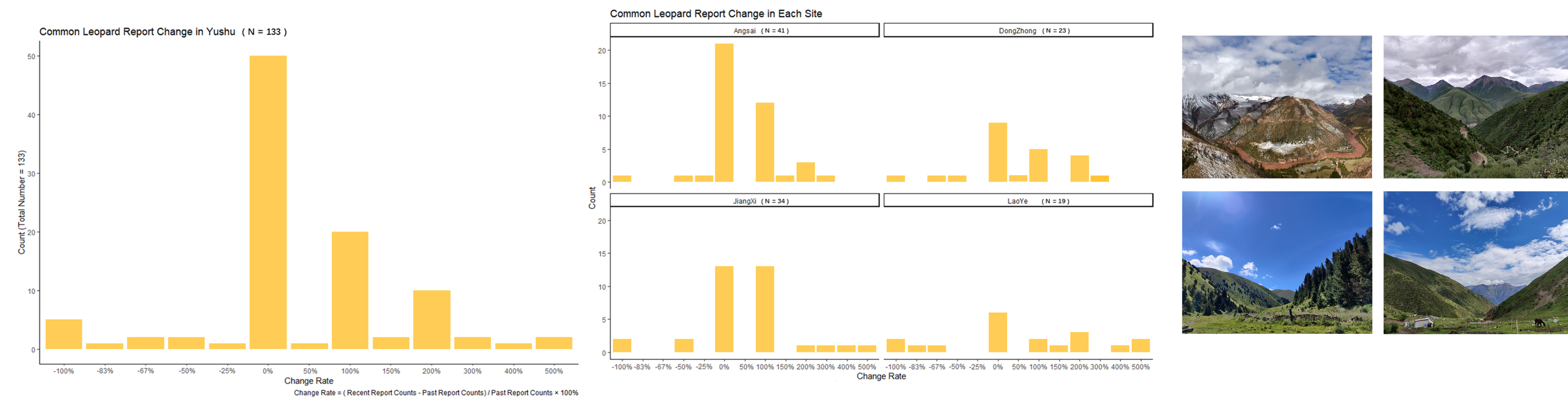


Methods

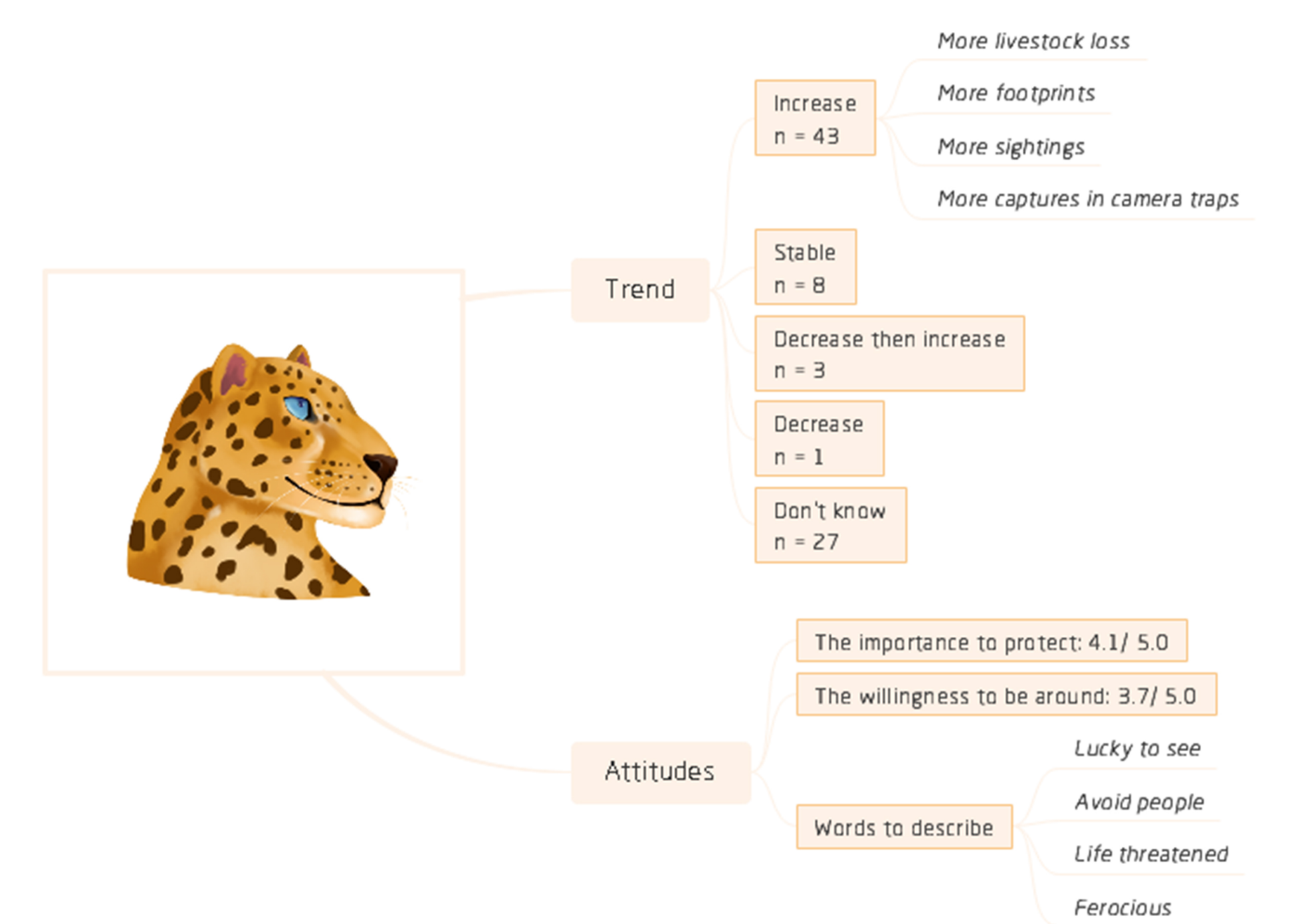


Results

Not alien to local herders, the reports are elevating



"Is the population under change?" - Local perception and attitudes

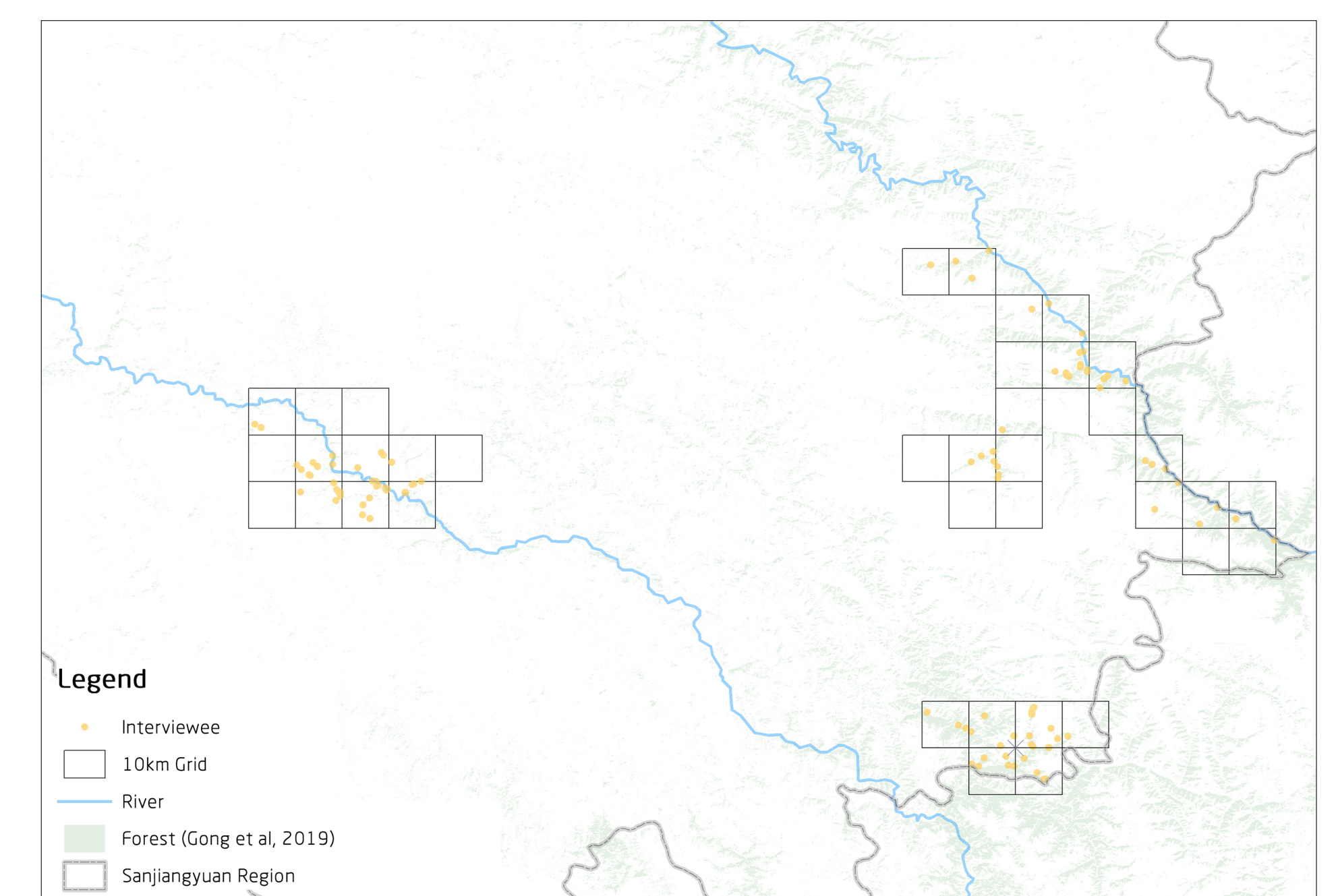


The reports change rate for Common leopards were increased by 56% among all sites, while exhibited a considerable difference for each site. Among 133 interviewees, 81 of them report Common leopards in recent 5 years, while only 51 of them report Common leopards in past 20 - 30 years. Total report counts for Common leopard in the past were 92, and increased to 155 for recent 5 years. Report change rate, report herders and total report counts all reflect an increase of Common leopard presence.

Increased population or awareness? Possibly both!

	Occupancy probability	Std.err	95% conf. interval	Detection probability	Std.err	95% conf. interval
Simple Single-season Null Model						
Recent	0.68	0.09	0.47 - 0.83	0.50	0.04	0.41 - 0.58
Past	0.63	0.11	0.41 - 0.81	0.38	0.05	0.30 - 0.48
Simple Multi-season Null Model						
Recent	0.65	0.09	-	0.46	0.03	0.40 - 0.52
Past	0.58	0.11	0.38 - 0.75	0.46	0.03	0.40 - 0.52

Single- season models were conducted separately for recent and past data. The occupancy probability and detection probability both showed an increase, which indicated that the distribution or population of common leopards possibly grew and local herders possessed a higher probability to detect them during these years. The simple multi- season model, assuming that the detection probability stayed same, showed the same trend as the former model. Probability of unoccupied site being colonized γ , indicated slight probability of common leopards expansion (0.17 ± 0.13).



Discussion

Common leopard population is currently experiencing an expansion in Sanjiangyuan region, comparing to 20 - 30 years ago, around the time when hunting was prohibited (Zhu, 2020). The driving factors of the change and the determinants of common leopard habitat choice on the plateau remains unveiled. Site- level study should be carried out, and the environmental covariates shall be concluded to explain common leopard occupancy probability and its change in the following analysis.

