

# Silent Peaks

Widespread Progressive Extirpation of American Pika Populations in the Northern Sierra

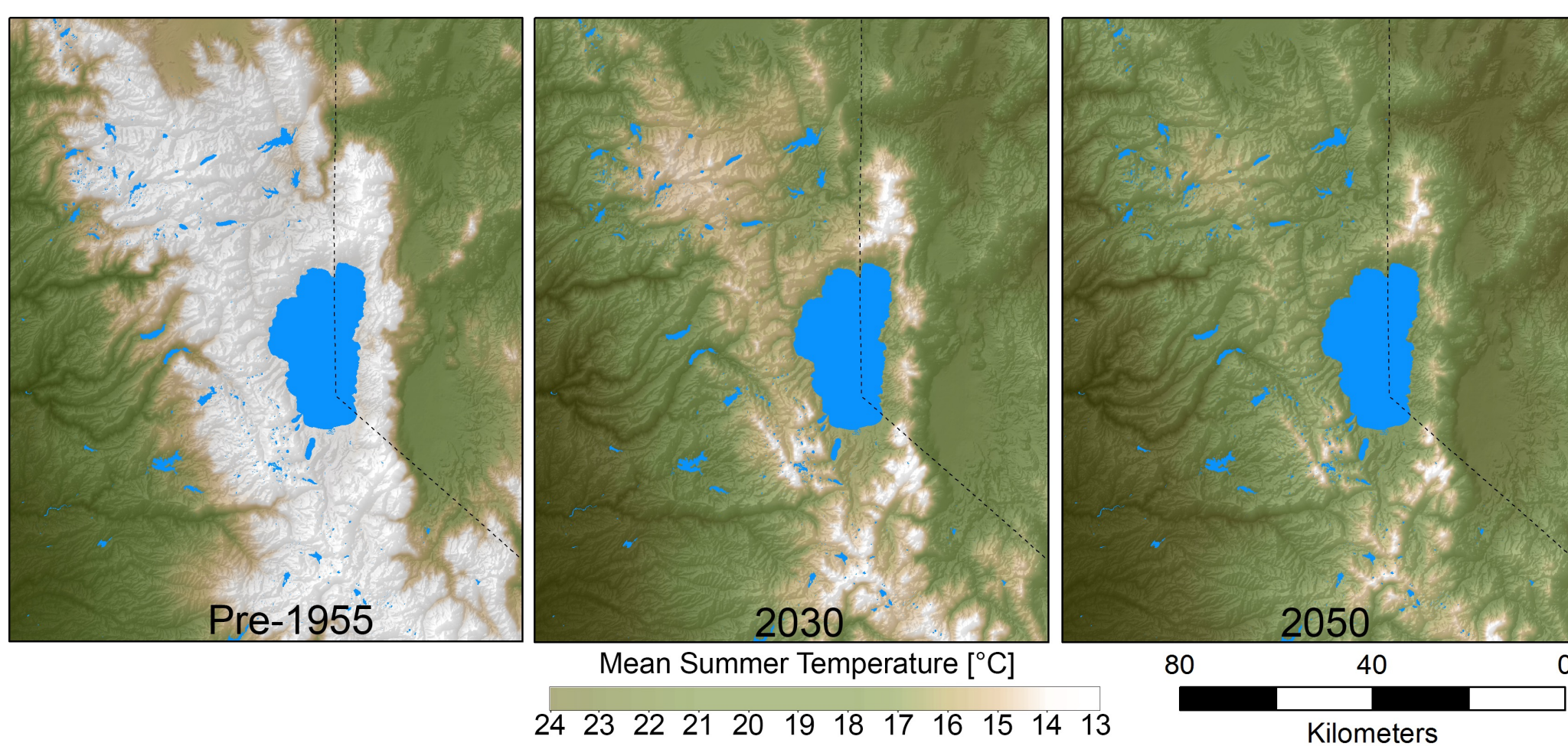
## The American Pika

The American pika, a saxicolous lagomorph, was once found throughout the mountains of western North America. Climate warming, following the Last Glacial Maximum and during the Anthropocene, has led to upslope range contraction. Amongst other traits, the pika's high detectability and persistent scat make them an ideal model for understanding climate-mediated range dynamics.



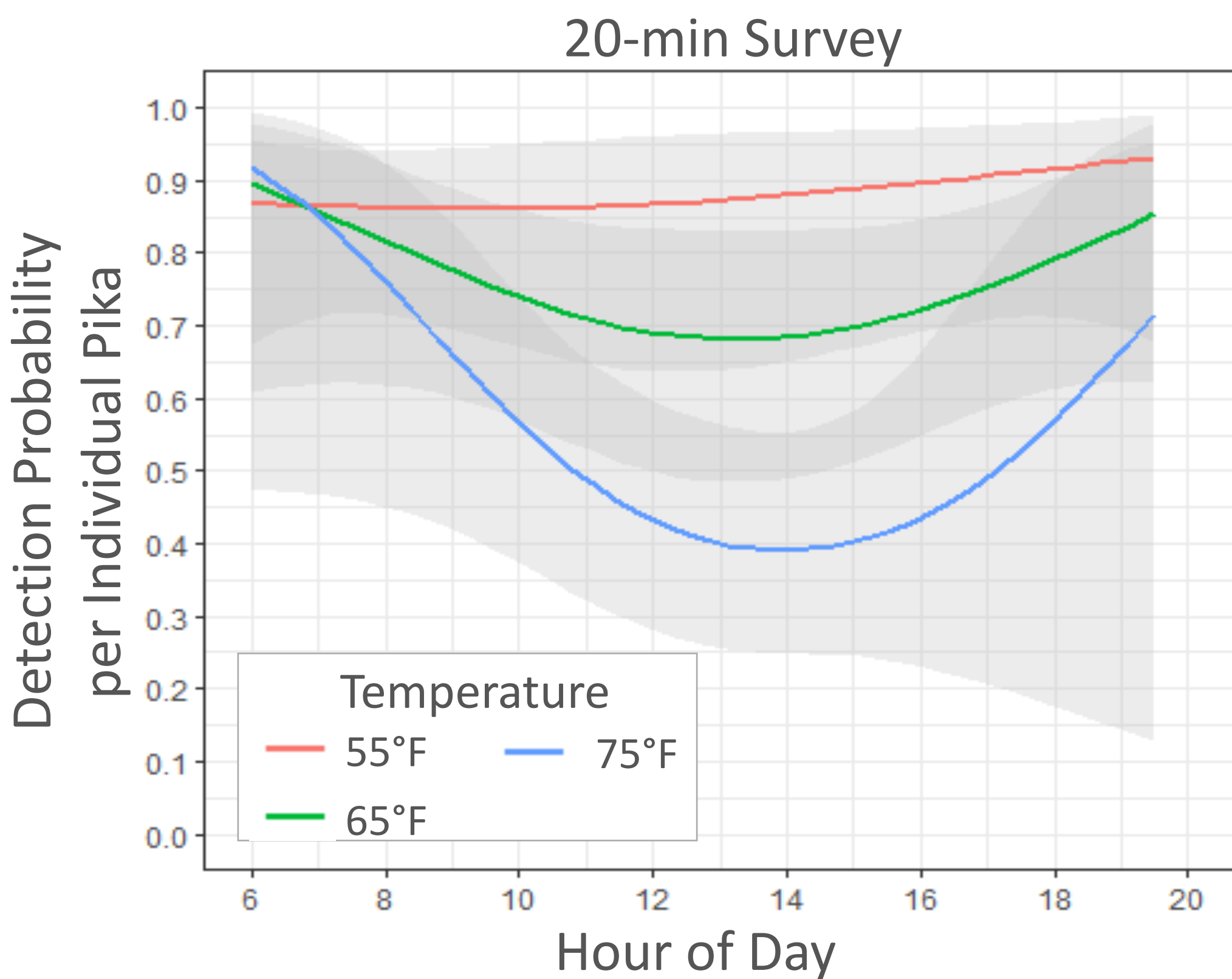
## Rising Tides of Warm Air

14°C mean summer temperature is an approximate threshold above which pika occupancy becomes tenuous. Climate warming appears poised to cause progressive fragmentation and contraction of pika populations over the coming decades.



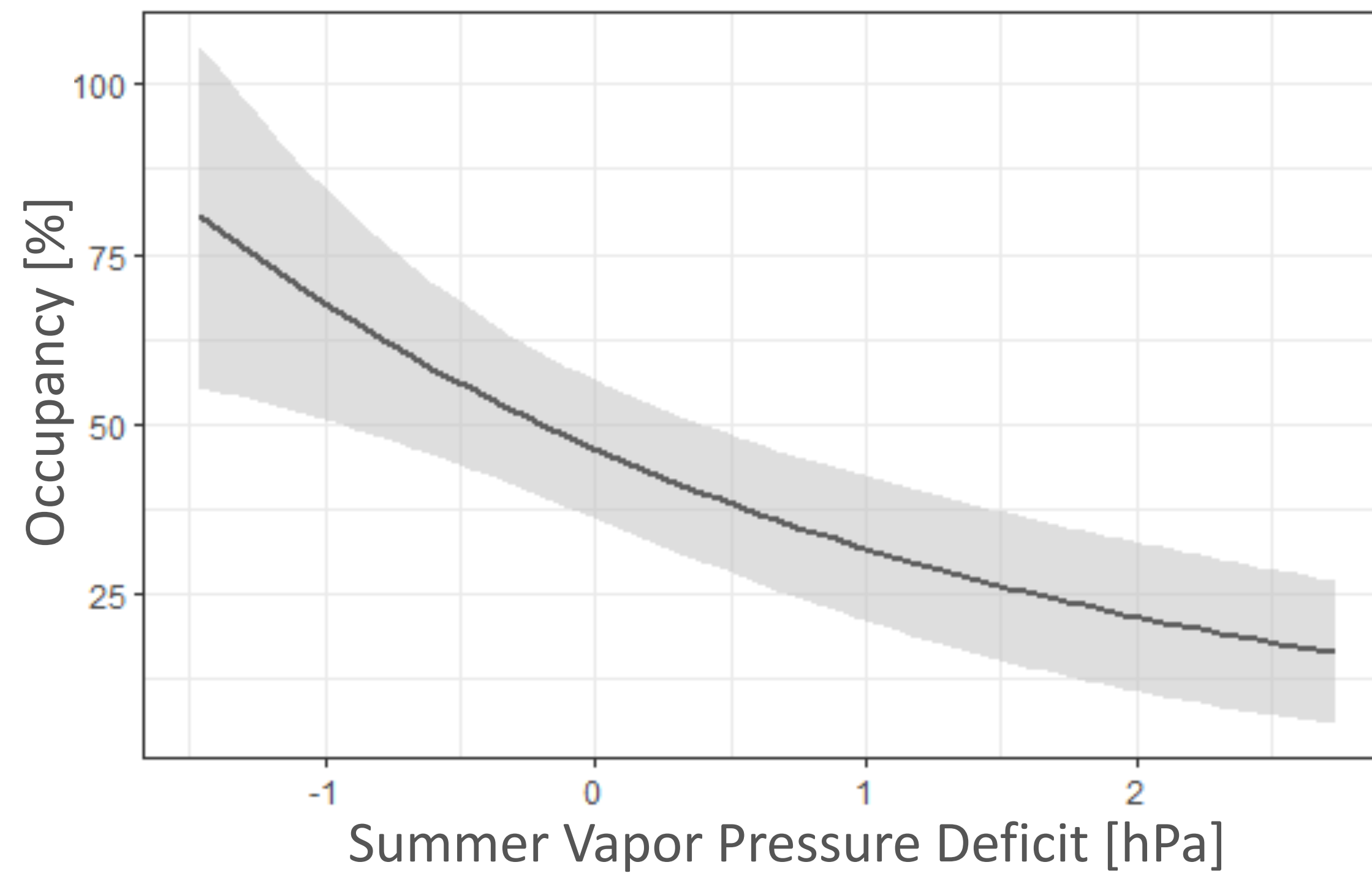
## High Detectability

The probability of detecting an individual pika is high. Where viable populations are present, the probability of detecting  $\geq 1$  pika approaches unity.



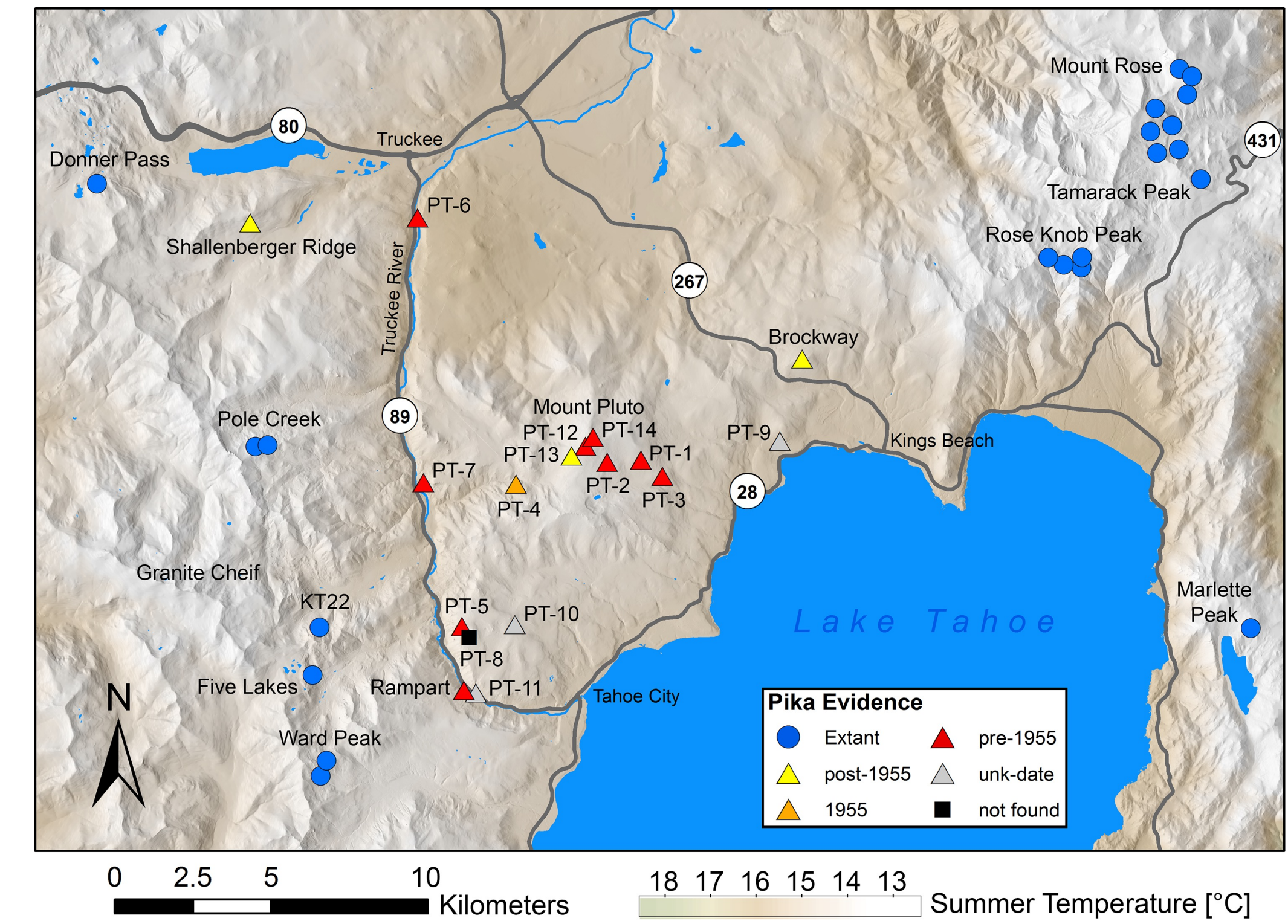
## Preliminary Results

- 680 talus patches surveyed 2022-2023; 55% occupancy.
- Callbacks result in high detectability.
- Talus patches form 62 talus regions (k-means).
  - Pikas appear extirpated from 20 regions, many of which constitute distinct populations.
- Occupancy correlated with summer temperature, aridity, and talus habitat area.
- Pikas now extinct in central Carson Range.
- Pikas rarely present below 7,500 ft.
  - In Tahoe Basin pikas no longer present at lake level.



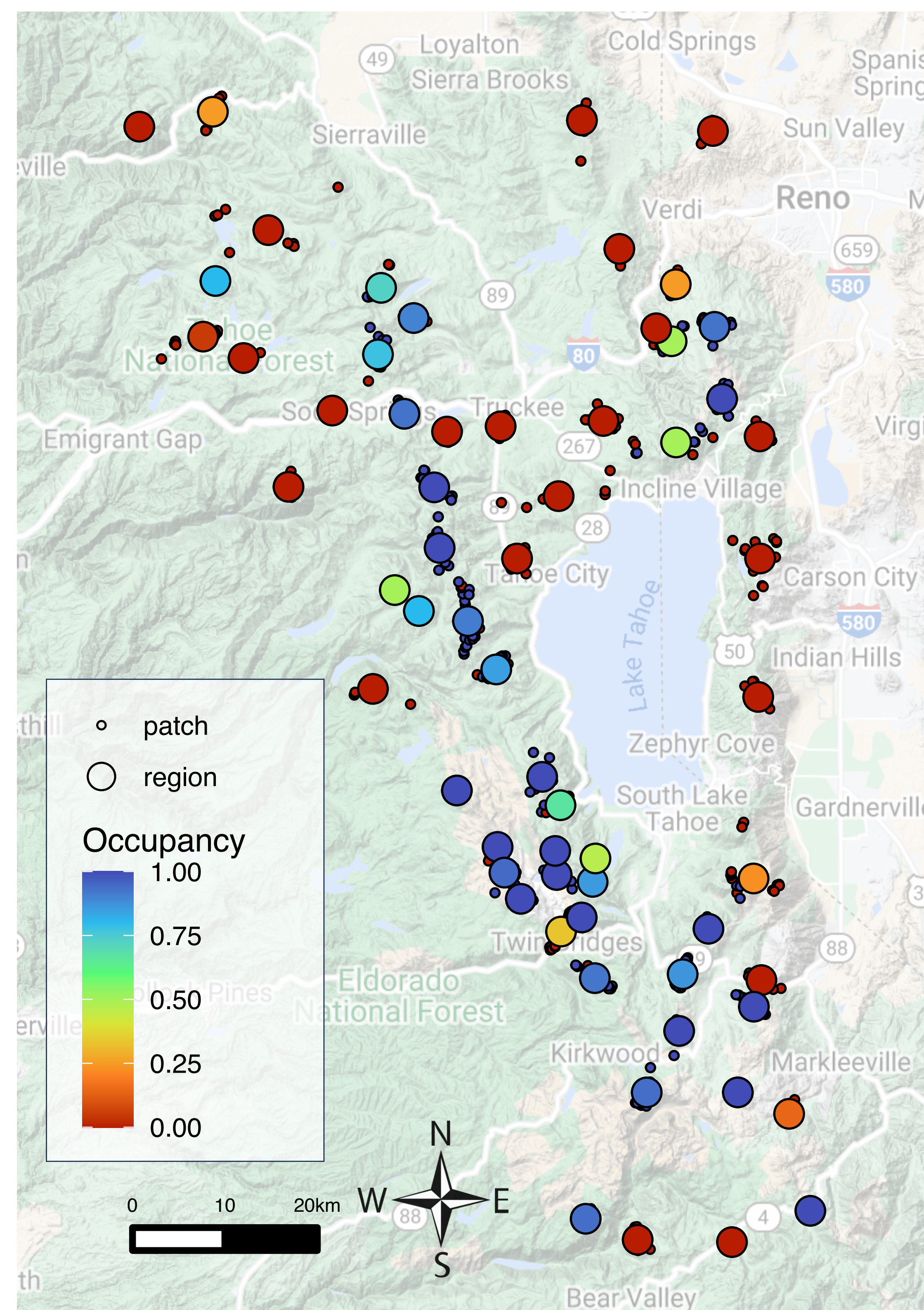
## Progressive Range Collapse

By 2017, radiocarbon dating of old pika scat had already revealed a signal of progressive upslope range collapse (Stewart et al. 2017). Since that time, additional populations have perished.



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In many extirpated regions, long distances from the nearest extant population appear exceedingly challenging for dispersing pikas to overcome. Many of these extirpations appear to constitute long-term extinctions of distinct pika populations. *The call of the pika is unlikely to echo from these peaks again during our lifetimes.* All that remains are the pika's distinctive and persistent scat... and a deafening silence.



## Team

