Understanding the influence of environmental factors on disease dynamics: Insights from Desert Bighorn Sheep Populations

Heterogeneity in host contact patterns, driven by individual and group traits, affects pathogen invasion and persistence. We study how environmental conditions impact disease dynamics in Desert Bighorn Sheep populations. Analyzing data from eight populations in the Mojave Desert, we explore the role of environmental variation in contact ecology, individual traits versus population-level conditions, and the consequences for disease outbreak size and persistence. By upscaling contact networks based on different temporal scales reflecting three pathogen infectious periods, we find significant effects of rainfall, temperature, and sex-reproductive season interactions on social contacts. Our research sheds light on the interplay between environmental and demographic factors in disease transmission dynamics, offering insights into wildlife ecology and disease management.

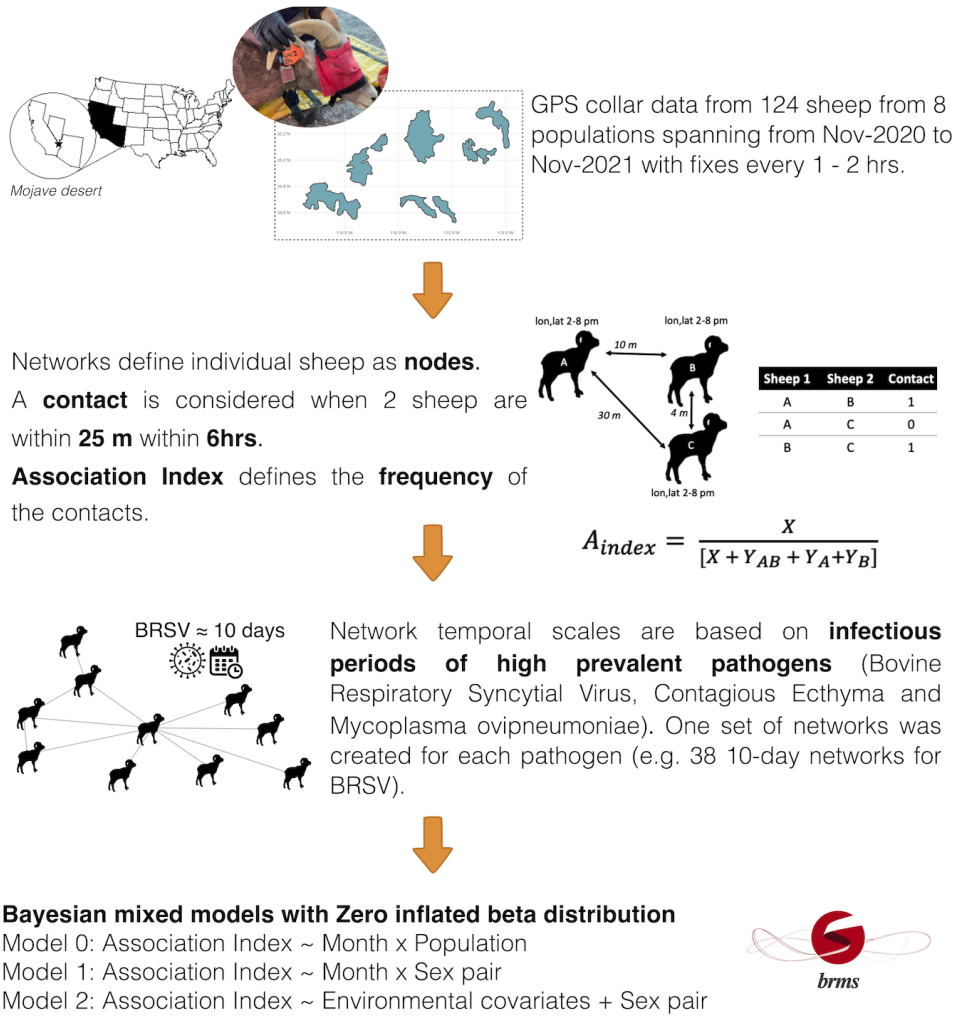

Figure 1 Summary of the methods used for this research.