

## **Linking Prey Abundance to Predator Occupancy Under Variable Winter Conditions**

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Linking predator and prey has been a central concept in ecology since the Lotka-Volterra population models. The ability to link prey occupancy and abundance to the occupancy patterns of predators has been something that has largely eluded ecologists, but is a needed concept given the vast utility of occupancy models and joint species distribution models. We present some of the first examples of linking single visit surveys intended to estimate prey abundance (snowshoe hare) to that of repeat visit forest carnivore occupancy surveys (camera trap surveys) at different spatial scales via Bayesian hierarchical modeling and species interaction factors. Our results show strong links between snowshoe hare abundance and the occupancy patterns of fisher, coyote and bobcat. Further, we demonstrate an increase in the species present in the predator guild during below average snow conditions, which is becoming more common under climate change forecasts.