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The oral examination of the doctoral thesis titled
**The ecology of urban wildlife: How do
species respond to rapid environmental
change**

will be held on

Wednesday, April 27, 2022, at 9:00 AM

via Zoom:

<https://umanitoba.zoom.us/j/61973107289?pwd=bzhYUWExelZrOUJCemdHWlQ2Lzg3Zz09>

Examining Committee

Advisor: Dr. Colin Garroway, Biological Sciences

Examiners:

Dr. Kevin Fraser, Biological Sciences

Dr. Jillian Detwiler, Biological Sciences

Dr. Saman Muthukumarana, Statistics

External Examiner:

Dr. Erica Nol, Department of Biology
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Thesis Abstract

Human activities alter ecosystems globally through land-use conversion. Human-caused environmental alterations tend to be rapid and wildlife increasingly find themselves in ecologically and evolutionarily new settings where their persistence is uncertain. Cities, as the planet's newest ecosystems, offer an opportunity to study the ecological responses of animals to rapid environmental change. Yet, how wildlife responds to urbanization is poorly understood. I explored this by characterizing the mechanisms that enable wildlife to colonize and persist in cities. Using continent-wide synthetic analyses, I first investigated which species colonize new environments after rapid environmental change by examining the phenotypic traits of Passerines and the species richness of migratory birds across structurally and socioeconomically varying cities. I then used focal species-specific studies to determine whether behavioral modifications facilitate population persistence in urban environments by investigating differences in the activity of Eastern grey squirrels (*Sciurus carolinensis*) and North American red squirrels (*Tamiasciurus hudsonicus*) between urban and non-urban areas. Finally, I used molecular and serological methods to explore the possible parasite-related ecological consequences of urban colonization by squirrels (Sciuridae) for domestic cats, and humans, in the newly assembled urban ecosystem. I specifically asked whether squirrels are important intermediate hosts of *Toxoplasma gondii* and whether *T. gondii* infection is more common in a city than in a rural area. Overall, I show that cities that vary in their structural and socioeconomic features filter for species with different subsets of traits. I also show that behavioral adjustments likely allow populations to persist in cities and suggest that both competition and artificial light might alter the temporal activity patterns of animals in cities. Lastly, I found no evidence of *T. gondii* infection in squirrels. This likely suggests that squirrels are not important intermediate hosts of *T. gondii* in cities and do not need to be considered as sources of infection to cats. This thesis advances our knowledge of how human activities can predict biodiversity following urbanization and how species and populations are responding to rapid environmental change.