University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Science

of

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BSc (University of British Columbia, 2011)

# "Evaluating the Conservation Potential of Urban and Rural Ecosystems for Aquatic-breeding Amphibians: A Case Study of Two Native Frogs in Southwestern British Columbia"

School of Environmental Studies

Tuesday, September 11, 2018
10:00 A.M.
David Turpin Building
Room A140

Supervisory Committee:
Dr. Purnima Govindarajulu, School of Environmental Studies, University of Victoria (Co-Supervisor)
Dr. Eric Higgs, School of Environmental Studies, UVic (Co-Supervisor)

External Examiner:
Dr. Andy McKinnon, Ministry of Forests, Lands and Natural Resources, Government of BC

Chair of Oral Examination:
Dr. Michael Hayes, School of Public Health and Social Policy, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

## Abstract

The conservation of aquatic-breeding amphibian populations and their habitats is increasingly challenged by urban and rural development, which is occurring more intensively and more rapidly than ever before. Some species are now impacted by development throughout their range. This has forced a re-evaluation of the potential of developed landscapes for providing habitat and contributing to regional conservation strategies. For many amphibians, little is known about the criteria necessary for persistence in a developed landscape. Considerable variation in the physiology, habitat requirements, and movement behaviour of amphibians suggests that responses to habitat loss, alteration, and fragmentation are species-specific. In this thesis, I investigate species-habitat relationships for the northern red-legged frog (*Rana aurora*) and the Pacific chorus frog (*Pseudacris regilla*) in a mixed urban-rural landscape in southwestern British Columbia to evaluate the potential for species persistence despite urban and rural development throughout their range. I used repeat auditory surveys of the species' breeding chorus to determine presence or absence at potential breeding wetlands. I then related species occurrence and abundance to characteristics of the aquatic and terrestrial environment measured at multiple spatial scales. Both species were found to use rural and urban wetlands, though *R. aurora* were rarely detected while *P. regilla* were common. Occurrence was best explained by characteristics of the terrestrial environment, rather than within-wetland characteristics, though influential terrestrial characteristics and their scale of impact differed between species. Within the context of the developed landscape, I identify species-specific positive and negative habitat associations and suggest the spatial scales at which management of these habitat characteristics will be most effective. These criteria may help to explain the species' current distribution, prioritize management strategies, predict the effectiveness of habitat conservation and restoration projects, and inform development in municipalities seeking to maintain or enhance amphibian diversity.