Climate change invites alien invaders -- Is Canada ready?

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A comprehensive multi-disciplinary synthesis just published in *Environmental Reviews* reveals the urgent need for further investigation and policy development to address significant environmental, social and economic impacts of invasive alien species (IAS) and climate change. "Effects of climate change on the distribution of invasive alien species in Canada: a knowledge synthesis of range change prediction in a warming world" is the collaborative effort of a team of dedicated researchers at York University's Institute for Research and Innovation in Sustainability (IRIS).

"Many species' distributions are already changing in response to a warming climate, and ecosystems are predicted to become more vulnerable to invasive species as climatic barriers are eliminated," says author Dr. Andrea Smith, IRIS Senior Fellow, currently conducting a legislative review of invasive species policy in Canada for the Ontario Ministry of Natural Resources and the Canadian Aquatic Invasive Species Network. "The interactive effects of climate change and invasive species are expected to have profound consequences for environments, economies and societies worldwide. For example, many new infectious diseases will likely spread to the Arctic, and coordinated circumpolar disease monitoring and targeted healthcare planning will be needed to handle this new pressure. Yet, these two drivers of global change are rarely considered jointly in policy and management initiatives."

This review reveals the barriers to predicting invasive species' range

changes under climate change, including the complexity of the issue, lack of ecological data, and failure to address climate change–IAS interactions in research and policy. Despite the multi-disciplinary nature of the issue, very few studies examine the socio-economic dimensions of the problem and research has tended to focus on predictions of how the distribution of existing invasive species in Canada (including mountain pine beetle, gypsy moth, smallmouth bass and lyme disease) will be affected by climate change, rather than on potential invasive species that might expand their range into Canada.

"This is just another example of how climate change is a big threat multiplier," notes Dr. John P. Smol, Editor of Environmental Reviews and professor at Queen's University where he also holds the Canada Research Chair in Environmental Change. "We simply have not even begun to understand all the negative repercussions of this problem." This synthesis is the first to characterize the current state of knowledge on this critical issue in Canada. According to Smith, this knowledge synthesis approach is useful for identifying both what we know and what we don't know, so that research, policy, and management can be targeted toward addressing those gaps. And, although knowledge of the impact of climate change on invasive species distribution is incomplete, scientific research is accumulating which can be used as the foundation for policy development.

More information: Smith, A., Hewitt, N., Klenk, N., Bazely, D.R., Yan, N., Wood, S., Henriques, I., MacLellan, J.I., Lipsig-Mummé, C. 2012. Effects of climate change on the distribution of invasive alien species in Canada: a knowledge synthesis of range change projections in a warming world. *Environmental Reviews*, 20, 1-16. doi: 10-1139/a11-020

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