

BIOL/ENST/NORT 3313: ECOLOGICAL STRUCTURE IN NORTHERN ENVIRONMENTS

TOPIC 7: NORTHERN CLIMATE CHANGE

Evidence

Velocity of climate change

Hysteresis

Measuring change with lemmings

Predicting the future

Something to think about:

Our descendants are unlikely to view our legacy of extinguished biodiversity and climate change kindly. If you could solve only one of these two problems, which would you choose? Why? Can you perceive how resolution of one problem would solve the other?

Required reading: NOTE: THE FOLLOWING URLS MAY REQUEST PAYMENT – IF SO, PLEASE ACCESS THE ARTICLES VIA THE LU LIBRARY E-JOURNALS WEBSITE

Hannah, L. et al. 2014. Fine-grain modeling of species' response to climate change: holdouts, stepping-stones, and microrefugia. *Trends in Ecology and Evolution* 29:390-397.

http://ac.els-cdn.com/S0169534714001001/1-s2.0-S0169534714001001-main.pdf?_tid=fadc2396-9547-11e5-b879-0000aab0f26&acdnat=1448657388_d3cd21ff66105516f55da4b5893ed631

Hannah, L. et al. 2015. Place and process in conservation planning for climate change: a reply to Keppel and Wardell-Johnson. *Trends in Ecology and Evolution* 30:234-235. http://ac.els-cdn.com/S0169534715000671/1-s2.0-S0169534715000671-main.pdf?_tid=be97193a-9525-11e5-8560-0000aacb361&acdnat=1448642684_1dc4ce457b88aaf3e6c9da6b205d8181

http://ac.els-cdn.com/S0169534715000671/1-s2.0-S0169534715000671-main.pdf?_tid=be97193a-9525-11e5-8560-0000aacb361&acdnat=1448642684_1dc4ce457b88aaf3e6c9da6b205d8181

Keppel, G. and B.W. Wardell-Johnson. 2015. Refugial capacity defines holdouts, microrefugia and stepping stones: a response to Hannah *et al.* *Trends in Ecology and Evolution* 30:233-234. http://ac.els-cdn.com/S0169534715000208/1-s2.0-S0169534715000208-main.pdf?_tid=cad22236-9547-11e5-bcae-0000aacb360&acdnat=1448657308_79557a9d11d920f54d20a29d4afbd4ac

http://ac.els-cdn.com/S0169534715000208/1-s2.0-S0169534715000208-main.pdf?_tid=cad22236-9547-11e5-bcae-0000aacb360&acdnat=1448657308_79557a9d11d920f54d20a29d4afbd4ac

Smol, J. P. 2012. A planet in flux. *Nature* 483:S12-S15.

http://www.nature.com.ezproxy.lakeheadu.ca/nature/journal/v483/n7387_supp/pdf/483S12a.pdf

Workshop 7:

Submit and assess the class term research proposal.

Edit and submit the final proposal. At the end of class, select one of the following terms describing your self-assessment on this task (exceptional, outstanding, very strong, strong, moderate, insufficient). Do the same for the class as a whole. Submit both 'scores' to your GA before leaving. Answer the following questions:

Who showed outstanding leadership (make a list)?

Who was a solid team member (make a list)?

What did we learn about leadership and teamwork (make a list)?

What would we do differently if given an opportunity to repeat this project?

Individual term project:

Using the template provided, write a two-page review that evaluates and outlines the strengths and weaknesses of the class-generated research proposal.

Some related reading:

Cleland, E. E. 2012. Phenological tracking enables positive species responses to climate change. *Ecology* 93:1765-1771. <http://onlinelibrary.wiley.com/doi/10.1890/11-1912.1/pdf>

Gilg, O. et al. 2012. Climate change and the ecology and evolution of Arctic vertebrates. *Annals of the New York Academy of Sciences* 1249:166-190. http://pure.au.dk/portal/files/52276757/Gilg_et_al_2012.pdf

Loarie, S. et al. 2009. The velocity of climate change. *Nature* 462:1052-1055. <http://www.nature.com/nature/journal/v462/n7276/full/nature08649.html>

Morris, D. W. et al. 2011. Forecasting ecological and evolutionary strategies to global change: an example from habitat selection by lemmings. *Global Change Biology* 17:1266-1276. <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2010.02305.x/pdf>

Morris, D. W. et al. 2012. Climate-induced habitat selection predicts future evolutionary strategies of lemmings. *Evolutionary Ecology Research* 14: 689-705. <http://dmorris.lakeheadu.ca/92.pdf>

Pau, S. et al. 2011. Predicting phenology by integrating ecology, evolution and climate science. *Global Change Biology* 17:3633-3643. <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2011.02515.x/pdf>

Thuiller, W. et al. 2011. Consequences of climate change on the tree of life in Europe. *Nature* 470:531-53. <http://www.nature.com/nature/journal/v470/n7335/full/nature09705.html>

Watson, J. 2016. Bring climate change back from the future. *Nature* 534:437. <http://www.nature.com/news/bring-climate-change-back-from-the-future-1.20126>