

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

TOPIC 4: POPULATION DYNAMICS OF NORTHERN SPECIES

Basics of population growth

Population regulation

Stochastic dynamics

Cyclical dynamics

Direct and delayed density dependence

Specialist predator hypothesis

Climate change and the end of cycles?

Experimental population dynamics with snowshoe hares

Something to think about:

Models of population growth typically rely on numerous assumptions that we know are unrealistic for most organisms, yet these models are the foundation of ecology. Does this mean that our theories are too simple? Are the models unreliable caricatures of nature? When would we need more refined models? What are the consequences of building ever more realistic models? What is the role of theory in ecology?

Required reading:

Oli, M. K. 2019. Population cycles in voles and lemmings: state of the science and future directions. *Mammal Review* 49:226-239.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mam.12156>

Related reading:

Johnsen, K., et al. 2019. Phase- and season-dependent changes in social behavior in cyclic vole populations. BMC Ecology 19:5

<https://bmcecol.biomedcentral.com/articles/10.1186/s12898-019-0222-3>

Krebs, C. J., R. Boonstra, A. J. Kenney and B. S. Gilbert. 2018. Hares and small rodent cycles: a 45-year perspective on predator-prey dynamics in the Yukon boreal forest. Australian Zoologist 2018.012 <http://www.zoology.ubc.ca/~krebs/papers/317.pdf>

Myers, J. H. 2018. Population cycles: generalities, exceptions and remaining mysteries. Proceedings of the Royal Society B 285:20172841.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5897639/>