



UNIVERSITY
OF ALBERTA



Alberta Conservation Association Chair in Fisheries and Wildlife

Dr. Mark S. Boyce | 2022 Chair Report
Faculty of Science | Department of Biological Sciences

Photo credit
Mark S. Boyce

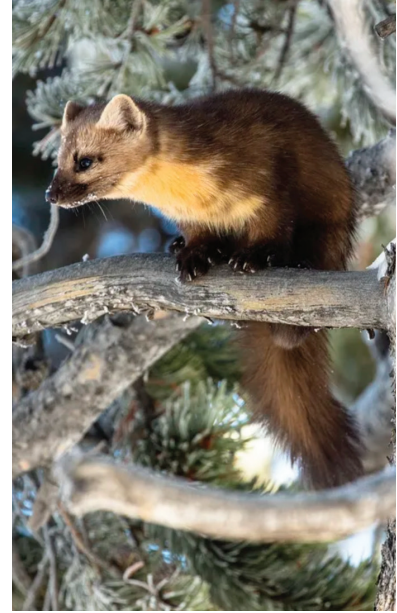




A special thank you

"I have been privileged to hold the Alberta Conservation Association Chair in Fisheries and Wildlife since 1999, and this year, my appointment to this Chair was renewed for an additional seven years. I cannot imagine a position that better aligns with my research interests and motivation. I have the best job in the world; thank you for making this possible."

Dr. Mark S. Boyce



Dr. Boyce (left), photo credit John Ulan; need caption for (right)

Overview

Our research on predator-prey systems involving migratory ungulate populations has been published in ecology's leading peer-reviewed periodical, *Trends in Ecology and Evolution*. In addition, we continue to publish results from our five-year study of grazing systems on carbon sequestration and storage. I continued to enjoy teaching my course on population ecology (BIOL 331) during winter term and providing public seminars and workshops.

Impact + Outcomes

Canada has implemented a carbon tax, which was shown by William Nordhaus—who received the Nobel Prize in Economics—to be an effective way to reduce emissions. But how best to invest these revenues has been the focus of our research on carbon sequestration and storage in grazing systems, with many results appearing this year. This five-year grazing study was funded by the Agricultural Greenhouse Gas Program of Agriculture and Agri-Foods Canada and involved an excellent collaboration with six colleagues at the University of Alberta.

My teaching this year continued online. While online lecturing presents its challenges (and was not particularly popular

among my colleagues), I enjoyed it and employed some useful options, e.g., comments in the chat and break-out rooms. The Population Ecology class comprehensively explores the principles of population ecology as they apply to plants and animals; population consequences of variation among individuals; habitat structure and population structure; habitat selection and foraging theory; life tables, demography, and the evolution of life history patterns; population dynamics; interactions among organisms (predation, competition, mutualism); and population regulation.

Additional Accomplishments + Achievements

This year, I was awarded the University of Alberta's top research award, the J. Gordin Kaplan Award. I also received the Kristine Nordstrom Dedicated Service Award from The Wildlife Society.

My NSERC Discovery Grant was extended for one year due to COVID. In addition, I was awarded \$64,000 from the Minister's Special License program administered by the Alberta Fish and Game Association.

I published 11 articles over the past year, including the following:

- Broekman, M. J. E., et al. 2022. Empirical validation of expert-based habitat suitability information with GPS-tracking data of terrestrial mammals. *Global Ecol. Biogeogr.* doi: 10.1111/geb.13523.
- O'Donovan, E., and M. S. Boyce. 2022. Visual marking of ground nests might attract corvids. *Hum.-Wildl. Interact.* 15(3):1-10.
- Brownlee, M., M. S. Boyce, and C. Warbington. 2022. Monitoring sitatunga (*Tragelaphus spekii*) populations using camera traps. *Afr. J. Ecol.* (doi: 10.1111/aje.12972).
- Döbert, T. F., J. Randall, M. Iravani, E. W. Bork, and M. S. Boyce. 2021. Bird community responses to rest-rotation grazing in western Canada's grasslands. *Internat. Grassland Congr. Proc.* 24(4):12 (<https://uknowledge.uky.edu/igc/24/4/12>).



William D. Nordhaus (born May 31, 1941) is an American economist, a Sterling Professor of Economics at Yale University, best known for his work in economic modeling and climate change, and one of two recipients of the 2018 Nobel Memorial Prize in Economic Sciences. Nordhaus received the prize "for integrating climate change into long-run macroeconomic analysis."



28,995

Citations on ResearchGate

20,203

Citations on Scopus in
13,411 documents

246

Documents by author
on Scopus

11

Publications in 2021-22

- Ma, Z., B. M. Shrestha, E. W. Bork, S. X. Chang, C. N. Carlyle, T. F. Döbert, L. S. Sobrinho, and M. S. Boyce. 2021. Soil greenhouse gas emissions and grazing management in northern temperate grasslands. *Sci. Total Environ.* 796:148975.
- Döbert, T., , E. W. Bork, S. Apfelbaum, C. N. Carlyle, S. X. Chang, U. Khatri-Chhetri, L. S. Sobrinho, R. Thompson, and M. S. Boyce. 2021. Adaptive multi-paddock grazing improves water infiltration in Canadian grassland soils. *Geoderma* 401:115314 (<https://doi.org/10.1016/j.geoderma.2021.115314>).
- Bork, E. W., T. F. Döbert, J. S. J. Grenke, C. N. Carlyle, J. F. Cahill Jr., and M. S. Boyce. 2021. Comparative pasture management on Canadian cattle ranches with and without adaptive multipaddock grazing. *Range Ecol. Manage.* 78:5-14 (doi.org/10.1016/j.rama.2021.04.010).
- Sabal, M., M. S. Boyce, C. L. Charpentier, N. B. Furey, T. M. Luhring, H. W. Martin, M. C. Melnychuk, R. B. Srygley, C. M. Wagner, A. J. Wirsing, R. C. Ydenberg, and E. P. Palkovacs. 2021. Ecological and evolutionary effects of predators on migratory prey. *Trends Ecol. Evol.* 36(8):737-749 (doi.org/10.1016/j.tree.2021.04.010).
- I gave several webinars this year on grasslands, predator-prey interactions, and citizen science.



What's Next?

I currently have four active graduate students, each with a specific focus:

Josh Pigeon, MSc: climate change and multivariate morphometrics of marten

Ian Gazeley, PhD: movement ecology of bighorn sheep and risk of contact with domestic sheep and goats in southern Alberta

Michelle Hoang, MSc: distribution, and ecology of sea wolves in coast British Columbia

Wyatt Villettard, MSc: movement ecology of Sandhill Cranes in Alberta

Each of these projects are relatively new with exciting fieldwork and analysis underway. I am also now collaborating with John Linnell from Norway on human coexistence with large carnivores, emerging from our long-term studies of elk and large carnivores in Alberta. Several papers are at various stages of publication from work on elk, bighorns, wolves, cougars, and bears. This fall, I will be writing a proposal for a new Discovery Grant.



John D.C. Linnell currently works as a senior scientist at the Department of Terrestrial Ecology, Norwegian Institute for Nature Research, and as a professor at the Department of Forestry and Wildlife Management at the Inland Norway University of Applied Science. John conducts interdisciplinary research on the interactions between humans and wildlife with a view to promoting coexistence and wildlife conservation, primarily focusing on large carnivores (especially Eurasian lynx) and large herbivores (especially roe deer).



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