August Webinar – Cascading Impacts: Community Dynamics and Landscape Genetics

Speaker Abstracts

The New Top Dogs? Mesopredator Response to Wolf Removal in a Changing Landscape

Baily McCulloch, Melanie Dickie, Robert Serrouya, and Stan Boutin

As apex predators disappear worldwide, their role in structuring systems facing rapid anthropogenic change is a critical avenue of study. The absence of apex predators can have complex ecological consequences, such as mesopredator release – an increase in the number of smaller predators. Although global increases in mesopredator range and abundance are a current conservation concern, it is uncertain whether this effect is driven primarily by apex predator loss, or by a changing landscape becoming more friendly to mesopredators; these factors have previously been challenging to test simultaneously. The wolf control program in Alberta provides a natural experiment to study mesopredator release, while neighbouring Saskatchewan offers a less human-modified baseline compared to Alberta, where industrial activity has left a heavy human footprint. Using a network of camera traps across Alberta and Saskatchewan, established by the Alberta Biodiversity Monitoring Institute, paired with an emerging method for estimating the density of unmarked species, we compare mesopredator densities across different levels of wolf control and human disturbance. At a larger scale, we investigate the relative effect of apex predator presence and anthropogenic disturbance – as well as abiotic factors associated with climate change – on mesopredator occupancy and range, to advance our understanding of the effects of the loss of apex predators and the increasing human footprint on the world's predator systems. We demonstrate that anthropogenic landscape change is associated with a larger change in mesopredator density than the top-down effect of apex predator loss.

Biosketch: As a master's student with Dr. Stan Boutin at the University of Alberta, Baily is studying the effects of human disturbance on the carnivores of the boreal forest. She holds a Bachelor of Science in Ecology from the University of Toronto.

Ecological Compromise: Can alternative beaver management maintain biodiversity?

Glynnis A. Hood, Anne C.S. McIntosh, and Glen T. Hvenegaard

Habitat modifications by various species can positively influence numerous other taxa; however, the effects of these modifications can be confounded by management actions within these environments. Beavers are recognized for their positive influence on aquatic biodiversity, yet beaver ponds near human infrastructure are often drained to mitigate associated flooding. We present findings from a 3-year study in Miquelon Lake Provincial Park (MLPP), Alberta that identified factors influencing the composition and distribution of aquatic macroinvertebrates in 16 shallow-water wetlands that had either current (active) or past (inactive) occupancy by beavers. We then

compared these results to those from 14 additional active beaver ponds that were of management concern relative to flooding of infrastructure in nearby Beaver County. Over a 4-year period in the County, we sampled aquatic macroinvertebrate communities prior to and one year following the installation of pond-levelling devices intended to mitigate human-beaver interactions. Within MLPP, active beaver ponds had the highest biodiversity, with some taxa found exclusively within these ponds. Unique niches, such as beaver channels, served as "hunting hotspots" for some predaceous invertebrates. In Beaver County, sampling from ponds where pond levelers were installed resulted in 195,000 individuals from 90 taxa. As with MLPP, there were within-pond differences in distributions of aquatic invertebrate taxa. There was also a shift in community composition one year following pond leveler installation (mean Jaccard Similarly Index = 43.1%, SD 14.5%). Assessing natural and anthropogenic influences on ecological communities provides important insights into how management actions might affect community-wide interactions.

Biosketch: Glynnis A. Hood is a Professor of Environmental Science at the University of Alberta's Augustana Campus in Camrose, Alberta. She is the author of The Beaver Manifesto and a new book, Semi-aquatic Mammals: Ecology and Biology. She specializes in aquatic and wildlife ecology.

Species Reintroductions and Population Bottlenecks: Conservation genetics of Roosevelt elk in southwest British Columbia

Ian Gazeley, Brendan A. Graham, Darryl M. Reynolds, and Theresa M. Burg

Species reintroductions have long been undertaken to establish populations in areas of historic distribution and viable habitat. Only recently has genetic diversity, and its role in population viability, been considered in the long-term survival of these often isolated and bottlenecked reintroduced populations. Provincially 'blue-listed' Roosevelt Elk (*Cervus elaphus roosevelti*) were initially reintroduced to the British Columbia mainland over a 10-year period from 1987 to 1996, with the translocation of 29 animals from Vancouver Island. Beginning in 2001, a 15-year translocation project was initiated to re-establish viable Roosevelt Elk populations throughout much of their historic range, resulting in more than 32 new populations with unknown connectivity. The existing Vancouver Island elk population has low genetic diversity relative to other elk subspecies, raising concerns about the genetic health of South Coast Region elk populations as notably, all are descendants of 29 founding individuals. To identify changes in genetic diversity, we genotyped 305 Roosevelt elk, using various DNA sources including blood, tissue, hair and faecal samples at 10 microsatellite loci. Genetic diversity was quantified for the source population on Vancouver Island and the reintroduced populations. Results suggest that Vancouver Island Roosevelt elk form two distinct subpopulations with limited connectivity and some reintroduced populations show reduced genetic diversity, indicative of secondary bottlenecks and isolation.

Biosketch: As an RRM student at Lethbridge College, Ian received the Robert (Bob) K. Goddard Memorial Scholarship (2005). After earning his diploma, he completed a BSc Environmental Science and is completing an MSc Biology at the University of Lethbridge. Ian is presently looking for an interesting PhD opportunity.