Research News

To The Members of The West-Central Alberta Caribou Standing Committee

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The Empirical Basis of Modeling Caribou Population Dynamics

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The WC research sub-committee has numerous on-going monitoring programs. A number of government and industry-sponsored programs have been implemented, each with the intent of answering a specific question on habitat use, recruitment, natural mortality and predator behaviour. In all cases the direction of the research has been guided by an integrated vision of answering the ultimate questions 1) "How does it all fit together?" and 2) "What can we do?". This has been the focus of my PhD thesis, with particular attention to additional data collection that would be necessary to infer important characteristics of WC system dynamics. What follows is a description of the progress of that work and some of it's preliminary findings.

The history and theory surrounding wolf-ungulate research is impressive. Detailed reports span four decades and cover almost entire ranges of species identified in WC systems. A broad range of hypotheses emerge from this legacy of research, each with management implications that may be relevant to WC AB ecology. The conventional views are that populations of ungulates and their predators persist either at stable equilibrium populations, exhibit periodic fluctuations due to random disturbances, or are prone to varying in a cyclic pattern.

To address alternative views of the caribou/moose/wolf system characteristic of the Redrock Prairie Creek caribou herd, models have been constructed to describe distinct behavioural interactions between industrial activities, habitat, recruitment, mortality, predation and ungulate harvest. Many of the models predict cyclic behaviour, a phenomenon that appears quite feasible given theoretical and historical evidence. If population cycling is evident, questions should then consider the time scale of cycles and ask whether or not conditions causing cycles are human induced. Theory suggests cycles can be induced by changes in productivity or search efficiency of predators. Interesting management implications arise from this. Preliminary findings suggest that exploring the effects of moose harvest in controlling future predation rates on caribou is a productive avenue to pursue.

My models' predictions have been compared to relative abundance indices (1989-1998) and calf-at-heel data (1983-1996). Additionally, VHF relocation data was used to estimate the natural mortality rate of adult caribou. Model calibration was generally successful, however given that the data only cover a decade, it is impossible to confirm periodic behaviour over longer time scales. Also, the time series only provide information on growth trends and survival of juvenile and adult caribou, making it difficult to substantiate trophic relationships. Current efforts are focused on identifying the type of

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2003 Caribou and Wolf Collaring Program And Collar Status

In March 2003, 10 caribou were fitted with GPS collars in the Little Smoky Herd (LSM), for a total of 11 GPS and 14 VHF collared caribou. Since that time, 3 caribou have died (2 GPS and 1 VHF). In addition, a wolf study was initiated in the LSM with 6 wolves collared in a total of 3 packs. Also, 2 collars were collected from the Highway 40 caribou.

In the Redrock-Prairie Creek (RPC) and A la Peche (ALP), there are 10 and 2 caribou with GPS collars, respectively, as well as an additional 20 VHF collars on each herd. In Fall 2003, 5 of the RPC GPS collars will be collected and replaced. The ALP GPS collars will not be collected until October 2004.

J. Saher

Caribou Decline and Wolves in the Little Smoky Range

By Layla Neufeld, M.Sc. Candidate, University of Alberta, Supervised by Dr. F. Schmiegelow

The Little Smoky (LSM) caribou herd, unlike others in west-central Alberta, ranges year-round in a landscape influenced by timber harvesting, oil and gas development, and recreation. Among the west-central caribou, the LSM herd has experienced the most serious declines and lowest recruitment in recent years. Past recruitment surveys have indicated that caribou calf loss during the summer months is a significant contributor to dwindling caribou numbers, however, identifying causes of calf mortality is logistically challenging and very expensive.

Wolves have long been theorized as important factors in caribou population limitation. Understanding predator ecology during critical summer months could help us identify the mechanisms of caribou decline. For example, quantifying how wolves use the landscape during their denning period – which coincides with caribou calving – can provide insightful information regarding predation risk to caribou calves. To date, there has been no attempt to closely examine this predator-prey system during summer and data to quantify summer wolf ecology and diet are insufficient.

This summer, I am initiating research to identify particular interactions between wolf and caribou populations in the LSM during summer. My specific research objectives are to: (1) quantify wolf-caribou spatial overlap in habitat use during caribou calving and through the summer; (2) examine wolf summer diet composition; (3) identify the importance of linear features to wolf travel to and from den-sites; and (4) characterize wolf den- and rendezvous-site habitat selection.

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Collared wolf released in the LSM, Mar 2003.

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data and the length of time it would need to be collected to resolve these uncertainties. Results indicate that key predation parameters cannot be estimated from relative abundance and calf-at-heel data alone and would require monitoring kill rates and diet composition.

A promising part of the thesis involves estimating the uncertainty in parameters as reflected in the data. Markov Chain Monte Carlo simulations provide ranges and levels of uncertainty for each parameter. Using the range of uncertainty we can estimate the frequency with which simulations predict cycles vs. stability. In this fashion, simulations can predict extinction probabilities and rates of population decline. This strategy characterizes the type of population viability analysis that is currently being developed as a target product of the thesis. The next phase of the analysis will be to consider the extent to which predictions are improved with the addition of spatially explicit behaviour.

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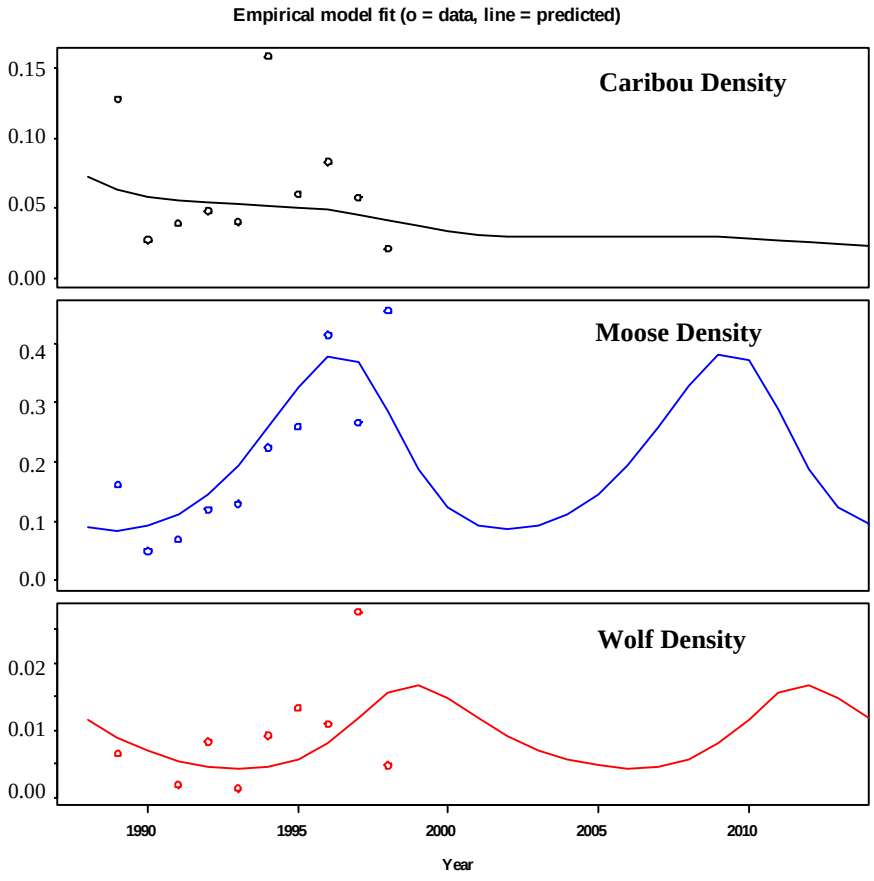

Predicted and projected population trends

'Research News' is intended to update members of the West-Central Alberta Caribou Standing Committee (WCACSC) about recent highlights of supported research, that are being prepared for final products. All results are preliminary and for information purposes only, and cannot be used without permission by the authors. For enquiries regarding the newsletter, contact Kim Lisgo (editor) at kim.lisgo@ualberta.ca.