ELK-AGRICULTURE CONFLICTS IN THE GREATER RIDING MOUNTAIN ECOSYSTEM:

Building Bridges between the Natural and Social Sciences to Promote Sustainability

by

Ryan K. Brook

A thesis submitted to the Faculty of Graduate Studies of
The University of Manitoba
in partial fulfillment of the degree of

DOCTOR OF PHILOSPHY

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"Complex problems have simple, easy to understand wrong answers."

Grossman's Law

ABSTRACT

Successful mitigation of human-wildlife conflicts requires an approach that incorporates both the ecological aspects of wildlife and the social considerations of the affected stakeholders and these must be considered in an integrated fashion at multiple temporal and spatial scales. In this dissertation, I examine the relationship between farmers around Riding Mountain National Park (RMNP) in southwestern Manitoba and the regional elk (*Cervus elaphus*) population, in order to better understand and resolve these long-standing conflicts more effectively. Local perspectives were documented throughout this study, initially through 40 community meetings in 2000 and 2001 prior to formal data collection, then through a mail-out survey in 2002, and later through participatory mapping exercises from 2003 to 2006. A longitudinal analysis of historical information regarding elk-agriculture conflicts using the interviews and government letter files indicated that diverse types of conflicts have occurred annually for the last 127 years. Issues related to bovine tuberculosis (TB) in elk in the last 15 years have been some of the most intense conflicts ever occurring, but these are based on previous conflicts and they have further undermined the already strained relationship between farmers and RMNP. The most important factor associated with high concern regarding bovine TB was the frequency that farmers observed elk on their land. To examine the biophysical aspects of elk interactions with agriculture, 212 wild elk were captured from 2002-2005 using a net-gun fired from a helicopter and given a GPS satellite collar (n=25) or VHF transmitter (n=187). Overlap in space use between elk and cattle was high in summer and low in winter based on both the collar data and local knowledge, though farmers identified higher levels of overlap throughout the year. During the spring elk

calving period, the home ranges of 73% of the parturient elk remained entirely within protected areas, while 6% were exclusively on farmland, and 21% included both. The proportion of the elk population calving on farmland continues to increase from near zero in the 1970s. Hay yard barrier fences are the most effective and widely accepted management tool in use to mitigate elk-agriculture conflict, but modifications to the process of allocating and monitoring fences are needed. Indeed, all aspects of the management of elk-agriculture interactions require greater levels of communication and collaboration between government agencies and local stakeholders. I also advocate taking an adaptive, science-based approach to managing human-wildlife conflicts that focuses on both the social and natural sciences as mutually contributing to our understanding of the problems and generating meaningful solutions. This is one of few studies that makes use of local knowledge and conventional ecological data together, and demonstrates the contributions of both in better understanding the temporospatial aspects of wildlife-human conflicts and their socioeconomic and conservation implications.

ACKNOWLEDGEMENTS

"The easiest way for me to grow as a person is to surround myself with people smarter than I am." - ***Andy Rooney***

I humbly thank the many, many people that made this project so successful. For some, the contribution was an idea, a bit of advice, or help with securing funding, while others helped with what seemed at times like never ending data collection. To all of you, I give much thanks.

My advisor, Stef McLachlan is a mentor in the very best sense because he teaches with caring and genuine interest, but perhaps more importantly, teaches by example. I have learned through experience that it is one thing to talk in vague terms about the value of working with communities, but it is quite another to really do it well. He has inspired the approach that I have taken in this thesis and will continue to influence the ways that I interact with communities for the rest of my life. His primary role in the evolution of this thesis was acting as a voice of reason, which seemed to be in great demand, particularly in the first year. The chapters of this thesis reflect long discussions we have had over the past five years and his many editorial revisions.

I am truly grateful to my advisory committee, Drs. Paul Paquet, Marc Cattet, and Norm Kenkel for setting the bar high. The patience, kindness, and enthusiasm that Paul radiates represent the very ideal that I consider necessary to be a great scientist and great person. The contribution of Marc has been both as an academic committee member and as the key person overseeing the capture and handling of the elk. For anyone reading this that might mistakenly think that Marc's contribution was minor, please imagine flying in a helicopter with no doors at temperatures below minus thirty and wrestling hundreds of

elk over the course of three years. I thank Marc for his advice in general and for challenging my perspectives on local knowledge. Were it not for Norm, it is unlikely I would have survived my masters, never mind tackling a PhD, so I give many thanks to him for serving on both of my graduate committees and for inspiring me, 'big time'. I also greatly appreciate the input of my external examiner, Dr. Michael Quinn from the University of Calgary for reviewing this dissertation and providing unique and valuable insights.

When I came to Riding Mountain, I was warned that the farmers are 'difficult' to work with, but nothing could be further from the truth. I have worked closely with many local farmers over the last six years and their contribution to all aspects of this thesis and my training as a scientist cannot be overstated and I thank particularly John Whitaker, Ray Armbruster, Calvin Pawluk, and Bengt Schmidt who contributed to this research immeasurably.

More than forty individuals contributed their time and energy into a combined force that conducted over seven thousand hours of data collection, much of which involved long hours spinning in air planes, wrestling elk, freezing fingers at four a.m., stuffing envelopes until their fingers bled, and conducting long and sometimes repetitive interviews. My initial thought was to thank you all generally, but that would not sufficiently recognize the unbelievable contribution that many have made.

My pilots, Patty and Bob Simpson have provided incredible support for this project, making themselves available continuously for the last three years. Their strong commitment has kept the data consistent and accurate, but most importantly, their commitment to safety was extraordinary. I also thank Tom Gibbs who sometimes helped

with the telemetry flights. The primary aerial telemetry crew was composed of Rob Watson, Gord Pylipuik, Tim Sallows, Pat Rousseau, Astrid Vik Stronen, and Glen Schmidt. Unless you have actually done at least a full day of aerial telemetry yourself, you cannot fully appreciate the effort these folks put in. Ground telemetry was conducted by Roger Baird, Greg Boughen, Nicole Lavalee, Ian Kitch, Sean Frey, Paul Friesen, and Murray Lungal. Mortality retrievals were conducted by Pat Rousseau, Tim Sallows, Gord Pylipuik, Sean Frey, Blair Fyten, Paul Friesen, and Greg Boughen. Thank you to "Obi-Wan" Tim Sallows for teaching me a lot about telemetry and life. Also thanks to Bighorn Helicopters for efficient and safe handling of the elk, they too, endured some incredibly tough days while getting the collars onto the elk.

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During this entire process, whenever I ran into a brick wall, I typically turned to one of my "four wise men", Rob Watson, Ken Kingdon, John Whitaker, and Celes Davar, who 'unofficially' were my community science advisors, providing advice, support and often performing the all important role of cheerleading squad. I also appreciate the support and perspectives of Murray Gillespie, who has taught me more than anyone else about managing ecosystems. I also thank Murray for his conceptual and editorial input into this

dissertation. To you all, I thank you for your teachings and your advice, sometimes sought, sometimes not.

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The government agencies involved in managing bovine TB have contributed important insights into the research and I particularly thank Ken Kingdon, Jack Dubois, Shelagh Copeland, Terry Whiting, and Dan Chranowski for working with me. Paul Tarleton was instrumental in helping get this study initiated and Doug Bergeson helped process the funding arrangements with Parks Canada and co-ordinate the fieldwork.

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Music has played an important role in getting me through this project during long midnight drives and all-nighter computer session, so many thanks to Simple Plan, The Tragically Hip, Garth Brooks, the Ramones, Dixie Chicks, and all of you other musicians who kept me awake and kept me sane.

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Finally, I thank my family, all of whom have been wildly supportive throughout my many (many) years at university. I am really done!

"Setting an example is not the main means of influencing others, it is the only means of influencing others." ***-Albert Einstein***

DEDICATION

To Kellie, you make everything possible and bring meaning to everything that I do.

To Evan, my son, you are the future of the world and show me what is really important.

To Mom, because more than any other person, you made me who I am.

To Dad, for teaching me a respect for animals that no other I person that I know has, and for common sense and hard work.

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To Shawn, I wanted to be just like you for as long as I can remember and I like to think that I am, at least a bit.

To Grandpa and Grandma Brook, for putting that chicken egg in the first nest I built when I was four. I wonder how my life would be different if the nest had stayed empty.

"What would you do if you knew you could not fail?" -Author Unknown

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES