University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

LEONARD SIELECKI

MSc (University of Saskatchewan, 1988)
BSc (University of Victoria, 1983)

"The Deer-Vehicle Collision Phenomena in the United States"

Department of Geography

Monday, December 19, 2016
11:00AM
David Turpin Building
Room A137

Supervisory Committee:
Dr. Daniel Smith, Department of Geography, University of Victoria (Supervisor)
Dr. Olaf Niemann, Department of Geography, UVic (Member)
Dr. Holly Tuokko, Department of Psychology, UVic (Outside Member)

External Examiner:
Dr. Tom Langen, Department of Biology & Psychology, Clarkson University

Chair of Oral Examination:
Dr. Gary MacGillivray, Department of Mathematics & Statistics, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Deer-vehicle collisions in the United States (US) have increased dramatically over the last 50 years. Over one million deer-vehicle collisions are estimated to occur throughout the nation annually. These collisions result in hundreds of human deaths, thousands of human injuries, and billions of dollars in motor vehicle damage and health care costs. The increase in deer-vehicle collisions is partly the result of a growing deer population, caused largely by human manipulation of natural ecosystems. Awareness of the hazard deer pose is essential for drivers. Deer represent a dynamic, spatial and temporal hazard. Driver knowledge about deer at any time is critical for hazard awareness. State driver licensing agencies and state departments of transportation are the primary sources of information regarding driving hazards for most drivers. Through driver manuals, driver licensing agencies advise new drivers of hazards and provide strategies for dealing effectively with the hazards. Using nationally standardized warning signs, state departments of transportation advise drivers of potential hazards found along state highway systems. The first extensive nation-wide historical retrospective of the state driver manuals was conducted. The study assessed how new drivers have been informed of the hazard deer pose as this hazard has evolved. The assessment shows, although generally increasing in content, the information provided by state driver licensing agencies has been inconsistent from decade to decade, and from state to state. This inconsistency has left potentially millions of US drivers without fundamental knowledge of the growing deer hazard and/or strategies for dealing with the hazard. Recommendations on improving driver manuals are provided. The first historical retrospective of the standardized warning signs used by state departments of transportation was conducted to assess the effectiveness of these signs for advising drivers of deer hazards. The assessment shows standard deer warning signs used by state departments of transportation provide little temporal information for drivers. The paradigm shifting, risk matrix-based, colour-coded, Wildlife Hazard Rating System® (WildHAZ®) was developed to augment and transform conventional standard static deer warning signs into variable message signs that provide drivers with more consistent and comprehensive warnings about the deer hazard. The results of a web-based questionnaire survey regarding the WildHAZ® system demonstrated the majority of drivers who responded to the survey understand the system and would respond in a manner that should reduce their potential for a wildlife-related motor vehicle collision and/or the potential severity of such a collision. The majority of the survey respondents indicated that they would prefer a system like WildHAZ® to be used on roads and highways. Simulations of the effect of the WildHAZ® system on mean vehicle speeds were conducted. The results of the simulations suggest WildHAZ® system augmented deer warning signs could lead to fewer and less severe deer-vehicle collisions, if mean vehicle speeds were reduced at high risk periods. The risk matrix-based, colour-coded concept incorporated in the WildHAZ® system may have the potential to warn drivers of other spatially and temporally dynamic hazards, such as fog, ice, avalanches and rockfalls.