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RURAL ECONOMY

Research on Socioeconomic Impacts of Chronic Wasting Disease (CWD) in Alberta

W.L. Adamowicz, C. Arnot, P. Boxall, C. Dridi, E. Goddard,
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Project Report #10-03

Project Report



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Abstract

This report summarizes a series of projects undertaken by staff and students in the Department of Rural Economy which examine various socio-economic aspects of chronic wasting disease and its effect on a range of stakeholders in Alberta. The four projects included exploring impacts on the cervid farming industry, hunters, the general Albertan public, and certain Aboriginal groups. General results from these studies are presented with references that provide a more thorough analysis and discussion.

JEL codes: Q12, Q26, Q28

What is CWD?

Chronic wasting disease (CWD) is part of a family of diseases known as prion diseases. They are transmitted through infectious proteins and affect the brain and neural tissue of infected animals. A more common form of a prion disease is BSE or “mad cow” disease. Once infected, there is no cure (Prusiner 1998).

CWD affects those animals in the deer family including moose and elk (Williams 2005). It is the only prion disease that is known to exist in the wild. To date, there has been no known transmission to humans (Miller et al. 2000).



Figure 1. Mule deer doe with CWD in Wyoming. Photo from Wyoming Fish and Game Department.

Where is CWD found?

Currently, it is found in the Canada, the United States, and North Korea. In Canada, CWD is endemic to Saskatchewan and Alberta. Although the exact method of transmission is unknown, it originally moved to Alberta through elk and deer farming but has since spread to the wild populations of deer through transmission from Saskatchewan. Zones of infection, within Alberta, are located along the eastern border ranging from above Lloydminster to below Empress.

As of April 12, 2010, there have been 78 reported cases of CWD in Alberta: 1 farmed elk, 2 farmed deer and 75 wild deer (Government of Alberta 2010).

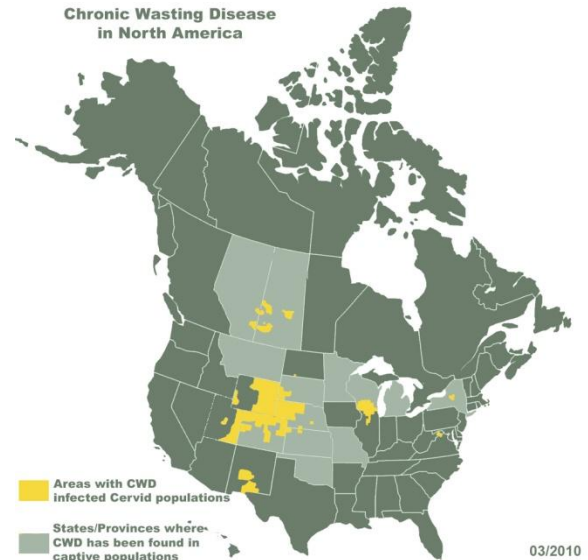


Figure 2. Areas of CWD infection within North America. Photo courtesy of Chronic Wasting Disease Alliance (www.cwd-info.org).

What research is being done?

There are a variety of ongoing research projects related to this disease and its' effects. This report will describe a series of economic research projects initiated by staff and students at the University of Alberta in the Department of Rural Economy which analyze the socioeconomic impact of CWD on a variety of stakeholders. Research related to biological aspects of CWD is not contained in this report.

There were 4 main projects undertaken to determine the impact of CWD in Alberta and they will be discussed below.

CWD and Potential Economic Impact on Cervid Farming in Alberta

C. Arnot, E. Laate, J. Unterschultz, and W. Adamowicz

Elk and deer farming in Alberta generate revenue through the sale of meat, breeding stock, stock for hunt farms, and, in the case of elk, velvet from their antlers. Disease free herds are imperative to the continuance of the economic viability of these farms. Data collected from the 2001 and 2006 Canadian census were utilized to estimate the economic impacts

of CWD spread in Alberta. Two scenarios were examined: 1) construction of a second perimeter fence around each deer and elk game farm in Alberta to keep the disease from spreading either into the farm or out of it; and 2) if spread/prevalence became too large, the deer/elk farms would need to be removed and the government of Canada would provide some sort of indemnity payment to farmers.

Analysis for the double fencing scenario indicated that, regardless of being effective from a biological standpoint or not, it would be difficult if not impossible for the farms to generate enough cash flow to be able to pay for the cost of fencing. This suggests that extra fencing would not be a feasible solution. Total province wide costs ranged from \$12 – \$17 million. The cost of depopulating the elk/deer farms, although assumed to be largely borne by the federal government, is much greater than the cost of fencing (\$47 – \$341 million). It was concluded that it may be more cost-effective for the government to help support double fencing or containment strategies rather than allow the disease to progress to the point of farm depopulation. With all these numbers, there is a high degree of uncertainty.

Economic Impacts of Chronic Wasting Disease (CWD) and Bovine Spongiform Encephalopathy (BSE) in Alberta's Cervid and Cattle Industries: An Input-Output Analysis

M. Petigara and, C. Dridi

This research is focused on assessing the economic impacts on all industry sectors directly and indirectly associated with the farmed cervid and cattle sectors in Alberta and in Canada. We use input-output (I-O) analysis to simulate various shocks to the two sectors. The shocks applied to the working models will be determined using theoretical economic circumstances, such as Federal Government indemnity payments, construction of second perimeter fencing around cervid farms, or shifts in market supply and demand schedules. The data

used to construct these models is derived from Statistics Canada's industrial accounts.

A \$1.00 change in final demand to the cervid and cattle sectors in Alberta will generate a total economic impact of \$1.003 and \$1.89, respectively. A \$1.00 change in final demand to the cervid and cattle sectors in Canada will generate a total economic impact of \$1.008 and \$3.08, respectively. The most impacted industries in the Alberta model are manufacturing, household sector, and finance, insurance, real estate, and rental and leasing. The most impacted industries in the Canada model are the household sector, crop production, and animal food manufacturing. Because of the small size of the cervid farming industry, all impacts are dwarfed in comparison to the large and established cattle industry.

The Economic Impact of CWD on Hunting in Alberta

N. Zimmer, W. Adamowicz, and P. Boxall

This study attempted to determine the economic impacts of CWD on resident hunters in Alberta, within a study region located along Alberta's Eastern and South-Eastern border. Hunter participants were asked to complete an internet survey which collected information on their hunting history, opinions regarding CWD and its management in Alberta, and demographic information. Also included were some questions on their actual hunting trips and hunting trips they would take under various hypothetical CWD situations. These last questions allowed the calculation of economic impact measures (in dollar amounts) which help to understand how much the disease would affect hunters.

Overall, the risk perception of CWD by hunters was not large. Much of their hunting behaviour appears to have remained unchanged with current CWD levels and management programs. The majority are hunting in the same areas and feel there is little risk of the disease to humans. Hunters are largely supportive of current actions taken to control the disease, although

this support tends to vary with urban or rural residence. As for the economic impact on hunters, without continued disease management, they could be quite large. To avoid a situation of high CWD spread and prevalence, hunters in that region would be willing to pay \$9.68 per trip each to keep CWD at current levels. This translates into just under half a million dollars for the province in 2009. Although this may not seem high in comparison to other provincial activities, when aggregated over many years, the impact could be substantial.

What value do Albertans place on containing CWD?

K. Forbes, W. Adamowicz, and P. Boxall

This study examined the general public's knowledge and perception of CWD. A separate survey tailored for the general population was created to determine what support there would be for control programs with specific disease containment outcomes. The control programs were described as being funded through potential increases in household taxes over a 10 year period to make it appear like a realistic program. The survey also consisted of demographic questions and rating or agreement type questions.

Overall management of the disease has been well received. Most of the respondents want efforts taken to eliminate the disease. Support was found for continued monitoring of the disease and education efforts targeted towards hunters as well as all Albertans. Results indicate that the general Albertan population places a high value on containing CWD and that they are particularly concerned with decreasing prevalence. For the largest change in CWD scenarios (moving from low spread and prevalence to high spread and prevalence), people would be willing to pay \$117.00/year for a management program that keeps both at low levels. As with the hunting study, taken on its own, the value may not appear to be extremely large but when aggregated over the population of Alberta, there is substantial interest in CWD control.

Aboriginal Community Perceptions of Animal Health in Northern Alberta: A Study of Aboriginal Sensitivity to CWD

B. Parlee, E. Goddard, K. Myshaniuk, and M. Jordan

Because wild meat is an important part of their community foods, Aboriginal people were a vital part of determining the effects of CWD. In person interviews were done with members of Treaty 8 First Nations of Alberta regarding their consumption and hunting of deer and moose. Respondents were also asked about their opinions regarding herd health and CWD. Twenty-one semi-structured interviews were conducted by students from the Faculty of Native Studies at the University of Alberta.

The harvest and consumption of deer and moose within the communities was significant, with moose being of much higher proportion of the meat consumed. Meat consumption was not only important for food but signified their connection with the land, was part of their culture, and was important in exercising their treaty rights. Sport hunting was largely frowned upon by those interviewed. Herd health was monitored through animal body conditions both before and after being killed.

There appears to be high levels of concern for herd health, especially moose. High consumption levels, along with meat sharing, make exposure to CWD higher than originally anticipated. Some knowledge of CWD is present in the communities and most are willing to help with monitoring and management of the disease. A final concern is that with dwindling populations, an increase in this disease could have very significant negative impacts upon Aboriginal communities affecting not only today's people but future generations as well.

Conclusion

The effects of CWD can be far reaching and involve many members of society. Those effects are also not limited to the disease itself but also can be instigated

by the management programs put in place to control the disease. It appears that the majority of Albertans, whether they hunt or not, feel that something should be done to control the spread and prevalence of CWD and most hunters are willing to participate in any programs put in place. Aboriginal populations are concerned about herd health and would also be willing to participate in monitoring and management.

The cost to the province of increased infection, especially in farmed herds, could be significant. Both the hunter survey and the general public survey provide evidence of a willingness to pay for programs that keep the spread and prevalence levels of CWD low. The measures of the economic impacts of CWD spread and prevalence can be used to assess investments in CWD control as they provide indications of the benefits that would arise from such programs.

Further research is currently underway. Resident hunters' preferences were surveyed in the succeeding year to examine any further changes in their responses to the disease. There is also opportunity for research to include non-resident hunter preferences as well as a continuation of risk perception of the major stakeholders (i.e. hunters, the general Alberta public, and Aboriginal people).

Due to the ease of CWD transmission between animals and its persistence in adverse weather conditions, this disease is very hard to control and therefore hard to manage. Despite this the Government of Alberta has instituted a variety of programs to proactively cope with CWD in the wild. Although eradication of the disease is improbable, the levels of concern surrounding it (by many stakeholders throughout the province) support continued management efforts and research. Since this problem is not limited to direct meat consumption but also to wildlife health, Aboriginal communities, hunting and farming economies, and sustainable deer/elk populations for future generations, integration of all these aspects is important and must

continue to be respected in any future management of CWD.

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