

Mad Cow: A Case Study in Canadian-American Relations

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CONTENTS

<i>Executive Summary</i>	/	2
<i>Introduction</i>	/	5
<i>What is Mad Cow disease?</i>	/	6
<i>Mad Cow in Britain and Europe</i>	/	9
<i>BSE as a Global and North American Risk</i>	/	12
<i>International Regulations and BSE</i>	/	14
<i>The Complex Assessment and Management of BSE Risk</i>	/	16
<i>Overview of the Cattle and Beef Market Before BSE</i>	/	19
<i>May 2003: Canada's First Indigenous BSE Case</i>	/	22
<i>December 2003: The Cow that Wrecked the Plan</i>	/	29
<i>The USDA's Challenge After the 2003 BSE Case</i>	/	30
<i>R-CALF Wins the First Court Case</i>	/	32
<i>The Position of Key Lobbies</i>	/	36
<i>Political Factors</i>	/	37
<i>The USDA's Rule Withstands Two Additional BSE Cases</i>	/	38
<i>The Final Rule, Finally</i>	/	39
<i>The Economic Impact of the BSE Crisis</i>	/	42
<i>Conclusions</i>	/	48
<i>Recommendations</i>	/	50
<i>Bibliography</i>	/	52
<i>Acronyms Used in this Paper</i>	/	63
<i>About the Author and Acknowledgments</i>	/	64
<i>About this Publication</i>	/	65
<i>About The Fraser Institute</i>	/	66

Executive Summary

The purpose of this paper is to examine the trade, regulatory, and political relationship between Canada and the United States through the lens of a single case study. This in-depth analysis of Canadian-American trade in live cattle and processed beef and the Mad Cow crisis has found the following:

1. The Canadian export market in cattle and beef products was built on the Canada-United States Free Trade Agreement and the subsequent North American Free Trade Agreement. These accords removed quotas and tariffs from trade in cattle and beef products. As a result, Canadian exports of cattle to the US grew from .5 million head in 1988 to over 1.5 million in 2002. Likewise, beef exports grew from 200,000 metric tons to over 1 million. Free trade has been very good for the Canadian industry. Canada and the United States had established before the outbreak of the disease a free, transparent, and competitive market.
2. When the first indigenous Canadian case of BSE was found in May 2003, both Canada and the United States had risk-reducing measures in place to avert the epidemic that had devastated the British cattle and beef industry in the 1990s. However, because BSE is a complex, protein-based disease that cannot easily be isolated or eliminated, the United States acted in accordance with the US Federal Code and historical precedence to close the border to trade in Canadian cattle and beef products in order to re-assess the risk to the American herd.
3. The United States government did not engage in protectionist or arbitrary actions but acted in short order (four months) to restore trade in beef products, applying international guidelines creatively. It also moved expeditiously with a proposal to re-open the border to cattle in the lowest risk bracket.
4. The first BSE case in the United States (December 2003) from a cow that had been imported two years earlier from Canada provided an opportunity for an American lobby group to slow-down the rule-making process, and legally challenge the United States Department of Agriculture's (USDA) attempts to restore trade. Congress also put pressure on USDA to keep the border closed to trade.

Federal departments in the US, such as the USDA, are legally mandated to allow interest groups and the public an opportunity to challenge proposed rule changes. Given the independent powers the US Constitution bestows on Congress and the Executive, US lobbies have far greater influence in the governmental process than do their counterparts in Parliamentary systems.

5. The US BSE case required the USDA and the Food and Drug Administration to establish an enhanced regime of risk-mitigating measures and a science-based approach to both restore trade with Canada and to convince US beef export markets, especially in Asia, to re-open their borders. This complex legal, regulatory, and international process caused a delay in the border opening to Canadian cattle throughout 2004.
6. The USDA's cautious and science-based process has paid off for Canada as three BSE cases in Canada subsequent to the USDA's final rule in early 2005 have had no impact on trade.
7. The Canadian government's pronouncements in 2004 that the United States government was engaging in protectionist action or condoning such behaviour were inaccurate and appeared politically motivated rather than substantive.
8. While the 2003-2005 BSE crisis inflicted severe monetary losses on Canada's cattle industry, the Canadian beef industry was saved by quick American action for which there is no precedent in the world. By 2004, Canadian beef export values exceeded their value of 2002.
9. Not counting the indigenous US case of BSE found in Texas in 2005, the North American industry has thus far found five BSE cases stemming from Alberta and related to feed milled in Alberta. Yet, it is uncertain whether a total Canadian feed recall in 1997 and stricter compliance could have averted this incidence rate. However, the lesson is now clear that Canadian risk-mitigating measures in the food and feed chain must exceed American measures in order to maintain confidence in Canadian exports.
10. The Mad Cow crisis was not simply a dead loss to Canadian industry. As a result of the border closure, the Canadian meatpacking industry improved its capacity by 20 percent in 2004 and another 5 percent in 2005. When trade in beef and cattle over the age of 30 months resumes—which may be as early as 2006—Canadian industry will be better positioned to compete in a market that will be free, transparent, and competitive.

On the basis of this case study, I offer the following recommendations:

The fact that nearly .5 million cattle under 30 months were exported to the US in the second half of 2005 suggests that the Canadian-American trade in cattle and beef will likely return to its high levels before the BSE crisis struck. Therefore, subsidies introduced during this crisis to Canadian cow and calf producers, feedlots, and other incentives given to the meatpacking industry should be phased out quickly, as they may give rise to

American trade action or complicate the USDA's re-opening of the border to older cattle. New federal or provincial subsidies to the industry for disposing of "specified risk materials" (i.e., organs such as the brain and spinal cord where the highest concentration of the BSE agent is found) should be avoided for the same reason.

Diversifying Canadian beef exports from North America to Asia is difficult and offers limited opportunities. Under NAFTA, Canada and Mexico both have free access to the American beef market (unlike the non-NAFTA countries which face quotas) and this market will again prove to be the most profitable one for Canada.

From 2003 to 2006, both Canada and the US added regulations on meatpacking and animal feed. Canada's regulations are stricter and produce more risk reduction for BSE than the US regulations. Given that contaminated feed and infected cows originating from Alberta still pose a small risk to free trade, it is important for Canada to keep this edge. Canada should follow this development with confidence-building measures such as joint USDA-Canadian Food Inspection Agency monitoring and inspection of Canadian facilities. Canada should ensure that the compliance rate of its feed mills consistently exceeds US rates.

Canada should also apply its efforts to developing a stronger NAFTA working relationship. Working closely with the USDA on practical harmonization steps is a key interest for Canada. Given the renewed closure of the Japanese market to US exporters after a December 2005 incident in which specified risk materials were found in a US shipment to Japan, the US is also keen to establish a stable regulatory regime.

Introduction

In 2003, the discovery of two indigenous cases of Bovine Spongiform Encephalopathy (BSE), commonly called mad cow disease, in Canada and the United States caused a major disruption in a multi-billion dollar industry. The North American cattle and beef market—cattle being the import and export of live cattle, and beef being the import and export of processed derivatives of cattle—had been integrated, competitive, and free. The integration reduced the cost to the consumer of beef products, while increasing the variety of cuts of beef available in local supermarkets. Free trade and market integration benefited everyone—cattlemen, producers, and consumers alike. It appeared in 2003 and 2004 that BSE might unravel this successful integration.

This paper comprehensively describes and analyzes how the BSE crisis affected the industry and the relations between the two countries. First, it describes the animal and human forms of the disease and the complex risks these pose for public health officials. Through the export of infected cows or contaminated feed, the disease spread from Britain, to the European continent, and then to the North American and Asian continents. The paper then discusses how the international community has tried to deal with BSE to help countries protect their domestic herds without imposing undue trade restrictions. The paper examines the outbreak of the disease first in Canada, and then in the United States, and explains how a complex set of regulatory measures were needed to restore trade in both Canadian and American cattle and beef products. Finally, it evaluates the trade impact on both countries, the trade and political lessons learned from the crisis, and what recommendations Canada should consider as a result.

What is Mad Cow disease?

When in 1996 British health officials realized the probable connection between a brain-wasting disease in cattle and a human equivalent acquired by eating infected beef, the world faced a new health and regulatory challenge that is still playing out today. Mad Cow, as it came to be known, is not a bacterial infection such as E-coli or Salmonella that can easily be traced to one animal in a meat plant, or to a single mishandled food item in a restaurant, and then quickly eradicated. Bovine Spongiform Encephalopathy¹ is a degenerative neurological disease affecting the central nervous system in cattle. It has a multiple-year incubation period. BSE was first diagnosed in the UK in 1986 and remains fatal in cattle. It cannot be prevented through immunization, nor is there a test available to see if a cow has or might develop BSE. A cow stricken with BSE will lose the ability to control its movements, and will be unable to stand upright. Hence, cows that have BSE appear to act as though they were “mad,” and often fall down. Most BSE cases have been diagnosed from such “downer” cows. Only an autopsy can conclusively reveal the presence or absence of BSE.

BSE is a virulent and potentially epidemic strain of a rare but naturally occurring disease called Transmissible Spongiform Encephalopathies (TSE). TSE is found in bovine mammals including deer, sheep, elk, and goats, but it has a very low incidence rate. In sheep and goats the TSE agent is called scrapie; in deer and elk it is called chronic wasting disease.² Scientists believed that BSE in cattle originally came from scrapie in sheep and goats.

The infectious agent

The cause of BSE is believed to be related to the prevalence of an abnormal type of protein, called a prion, found in all BSE infected cows. Prions, or proteinaceous infectious particles, embed themselves in nervous and non-nervous tissue, such as the spinal cord, peripheral nerves, small intestine, spleen, lymph nodes, and bone marrow. A protein agent attacks healthy proteins in the brain and begins to eat sponge-like holes in the tissue, causing staggering, loss of mental capacity, and eventually death.

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- 1 BSE takes its prefix from bovinus, Latin for bull. “Spongiform” comes from the description of the sponge-like formation seen on the brains of infected animals. “Encephalopathy” is a classification of diseases that alters brain structure or function.
 - 2 Scrapie got its name from farmers seeing infected animals within the herd scraping against trees and fence posts.

Prion-infected tissue is acquired by ingestion, not contagion. Lab results have shown that very small amounts (as small as 1 milligram of infected material) can be enough to infect a cow. The prion is enormously robust against sterilization and can survive up to 600 degrees Celsius, including on knives and saws that have contacted contaminated tissue in slaughtering plants. The cause of the prion is unknown. There have been natural varieties of the TSE in sheep, deer, cattle, and humans for as long as modern medical science has known about this disease. The likely cause of the spread of the more virulent and potentially epidemic BSE prion has been traced to the practice in Europe, Asia, and North America of recycling dead animals into animal feed as a protein supplement to cereal feed and forage. British officials believe that scrapie most probably infected cattle, and that the recycling of animal parts in so-called Meat and Bone Meal infected a vast amount of the British herd. At its peak, officials in London counted over 30,000 cases of BSE in one year.

Cattle feed, rendering, and Mad Cow risk

Up until the 1950s, in the United States as well as Canada, beef was expensive for the average consumer, so it was consumed infrequently or in small quantities. In the 1950s, Canadian per capita consumption of beef was only 48.3 pounds per year (Gracey, 2003). Starting in the 1970s, however, farmers began to bring their cattle and beef to market more quickly and at lower prices. Large-scale and intensive feeding operations, or feed lots, developed where cattle could be raised and fattened in a short period of time. By 1976, as a result of lower prices, rising quality, and a growing domestic economy, the per capita domestic consumption of beef in Canada had risen to more than 84.2 pounds per year (Gracey, 2003).

Grass and other vegetable feeds are full of nutrients, but do not accelerate growth or reduce the amount of time needed to bring an animal up to slaughtering weight.

Adding grains and animal protein to animal feed is a quick and inexpensive way to produce bigger and fatter animals in a shorter amount of time. The growing demand for beef paralleled the growing knowledge of the benefits of adding animal byproducts to animal feed.

Rendering is the process by which animal products unfit for human consumption or left-over from the slaughtering process are cooked in order to release their fat and protein. Animal products are cooked at temperatures of 115 degrees Celsius in order to kill any bacteria. Purified fats and proteins are sweated out of the carcasses and collected. Some of these fats and proteins find their way into pet food, soaps, cosmetics, and protein and vitamin supplements. Rendered fats and proteins are also turned into what is called meat and bone meal (MBM). Until the Mad Cow crisis in Britain, MBM was commonly

added to animal feed for feeder cattle and for dairy cows. It was not until the Mad Cow epidemic in Britain in the 1980s that scientists discovered that if the BSE prion is present in such materials, it will not be sterilized at such low temperatures and can thus spread through the cattle population.

Tests done in the United States and Europe confirm that the prionic agent congregates in certain areas of the body that were commonly used for rendering. The infectivity rate of tissue is highest in the brain and spinal cord, accounting for 64.1 percent and 25.6 percent of total infectivity respectively (Food and Drug Administration, 2005a). The rest of the infectivity is derived from various nerve tissues including the dorsal root ganglia at 3.8 percent and the trigeminal ganglia at 2.6 percent. The distal ileum (part of the small intestine) accounts for 3.3 at percent (FDA, 2005a).³ These organ tissues are generally referred to as specified risk materials or SRMs. Thus far, the BSE prion has not been found in muscle meat or milk.

The inability to destroy the prion agent was the first of two steps in the proliferation of BSE. The second was the spread of BSE-laden products throughout the cattle and animal feed chains. Cows infected with BSE, neither diagnosed nor known about, were then being rendered and fed back to other cattle. Also, BSE cattle were being fed back to other animals including chickens and hogs. BSE-tainted feed can come from two sources: rendered cattle-to-cattle transference, or rendered cattle-to-other animals, some of whose offal then returns to cattle feed.

The jump from animal to human

It was a decade after scientists discovered BSE in cows before it became clear that the prion agent can be transmitted to humans via contaminated meat consumption and cause new variant Creutzfeldt-Jakob Disease, usually called variant Creutzfeldt-Jacob Disease (vCJD). Before that, scientists were aware of sporadic or naturally occurring CJD. It was known to exist in older (aged 60 to 70) persons (Andonegi, 2005). More than 170 people have died from vCJD. Mysteriously, vCJD strikes young people. The average age of the victims is 28 years. Sporadic CJD has appeared at a steady rate, affecting about one person per million annually, accounting for 300 cases in the United States per year. Sporadic CJD can be inherited, or contracted from corneal transplants or neurosurgical procedures, including the injection of growth hormones (Johnson and Vogt, 2004, p. 30).

3 The dorsal root ganglia is part of the nervous tissue located within the bones of the vertebral column. DRG contain nerve cells that transfer sensory signals from parts of the body to the spinal cord. The distal ileum is the lower portion of the small intestine. The vertebral column is the supporting line of bones that make up the spine and house the spinal cord (Cohen, Joshua T. *et al.*, 2001 (revised 2003), pp. 116-119).

As BSE turned out to be a virulent and epidemic form of TSE in cattle, so variant-CJD was feared to have a new epidemic-like frequency in humans in Britain in the late 1990s. In the early years, British scientists feared that more than 10,000 people could be infected. Since then, these estimates have steadily come down to 300 to 400 in 2005. Autopsies of cattle with BSE and humans with vCJD show similar formations of abnormal sponge-like tissues along the brain stem, indicative of a common prion agent. Further, the symptoms are comparable: a loss of motor skills, and a “degeneration of the neural system” (European Food Information Council, 2005). Consumption of tainted meat has been linked to the deaths of over 170 people, mostly in Britain and continental Europe (Ricketts, 2004, p. 112). There is no known immune system response to this degenerative neurological disease, thus adding to the complex risk management of this disease as we will see below.

Even though many more people have died of E-coli poisoning than of variant Creutzfeldt-Jacob Disease, it is the nature of Mad Cow disease, the difficulty of knowing whether it is stamped out, and the necessity for several layers of protection that have caused public health officials in Europe, Asia, and North America to wrestle with the risks associated with it.

The rogue protein that causes BSE increases steadily throughout much of the animal’s life. It can take many years before it has reached such high numbers that it begins to kill cells. The more infectious prion agent a cow ingests, the earlier the symptoms show up. Cattle as young as 21 months have developed signs of BSE, though the vast majority of cases have been in cattle over four years old. This possible distribution—from 21 months to 11 or 12 years—remains one of largest risk factors in developing a stringent program to prevent BSE cattle from entering the human or animal food chain (AVMA, 2005).

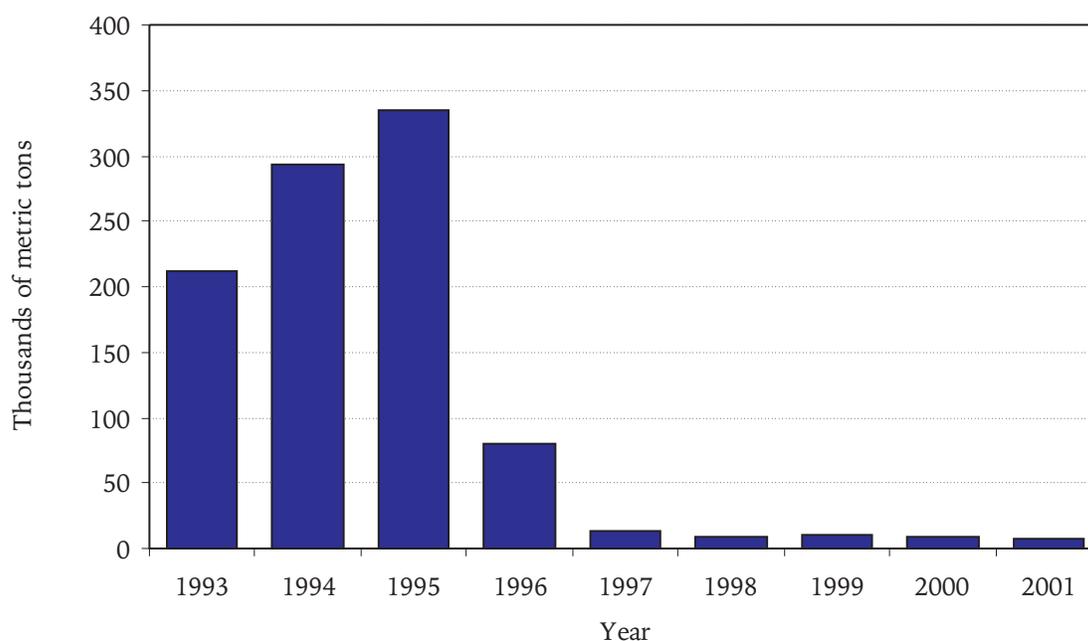
Mad Cow in Britain and Europe

By 1992, BSE had become an epidemic in the UK with more than 1,000 cases being reported each week (APHIS, 2002; Steinhart, 1996). All told, between 1986 and 2003, over 180,000 cases of BSE were reported in British cattle—infesting 60 percent of dairy herds and 15 percent of beef herds (APHIS, 2002; Johnson and Vogt, 2004, p. 33). In an effort to eradicate the disease, officials in the UK destroyed the infected cattle, their birth cohorts (offspring) and the cattle that had had substantial contact with those who had developed BSE. Not aware of the risk to human health, the British government put no warnings or restrictions on beef consumption. In fact, it encouraged Britons to eat meat as it was deemed safe.

When the human risk was discovered, controls were put on slaughterhouses and they were ordered to segregate and dispose of the highly infective parts of the carcass. The specified risk materials were also banned in the feed for all ruminants such as sheep and cattle. Based on their risk assessment of infectivity, British officials eventually prohibited the inclusion of animals more than 30 months old in the human and animal food chains. They also began destroying all animals showing signs of BSE, as well as other animals at high risk of developing the disease, such as downer cows (APHIS, 2002). Further, in 1996 “passports” were issued to all cattle born after July 1 of the same year to track them from the farm to the dinner table. In total, the UK destroyed about 5 million head of cattle (Mathews *et al.*, 2003) at a cost of US\$4 billion (Becker, 2004, p. 45).

The Mad Cow crisis delivered an enormous shock to the British cattle and beef industry. Domestic consumer demand fell by 30 percent. While Britain is not a large exporter of beef products, exports plummeted as foreign markets banned the import of live cattle and beef products in an effort to reduce the chance of BSE infecting their own herds. Canada and the United States ended their imports of all British cattle and beef products in 1989. Exports of live cattle from Britain dropped by 99 percent (Mathews *et al.*, 2003) (see figure 1). In 1996, the European Union imposed a total ban on the importation of British beef.

Figure 1: World Exports of British Beef and Cattle, 1993-2001

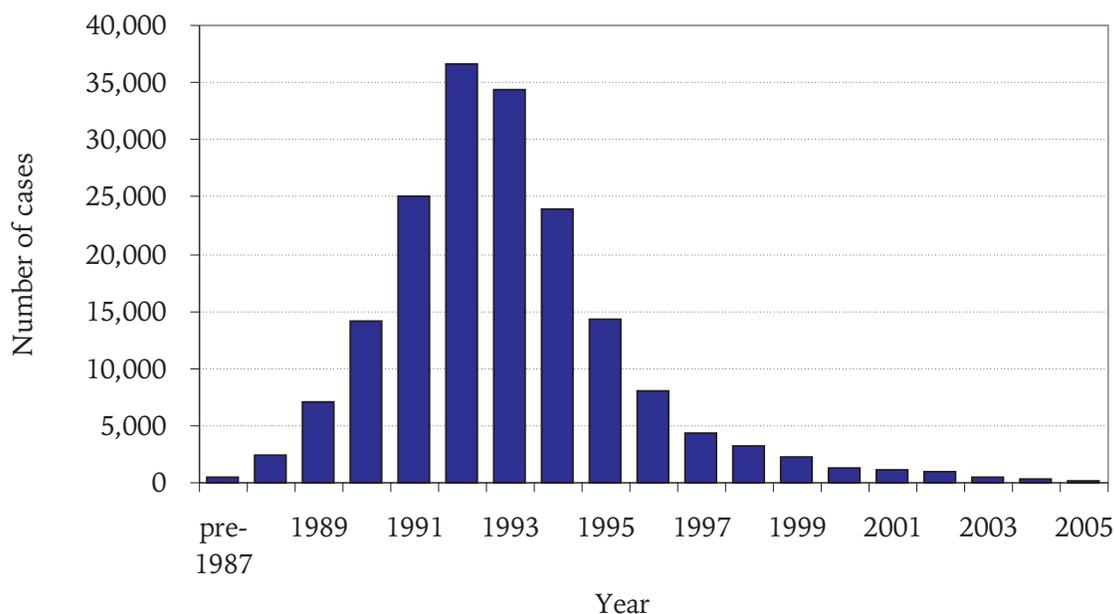


Source: UK Department of the Environment, Fisheries, and Rural Affairs, 2004.

Three years later, the EU lifted some restrictions on British beef, allowing beef from cattle under 30 months to be imported at a member country's discretion. However, by the time a total ban was imposed on British beef and ruminant feed, BSE had spread to many countries in continental Europe through contaminated Meat and Bone Meal. Between 2000 and 2004, France, on average, reported 173 cases of BSE per year, Germany reported an average of 71 cases per year, and Ireland reported an average of 207. From 1986 to 2003, 3,800 Mad Cow cases were reported in Europe, outside of Britain (EUROPA, 2005). The BSE crisis caused European Union domestic beef sales to fall by 20 to 30 percent due to consumer confidence loss, and also caused large losses in the export markets of member states (Segarra and Rawson, 2004, p. 41). Contaminated British MBM was also sold to countries in the Middle East and Asia. Canada and the United States imposed their own feed bans in 1997, prohibiting ruminant protein from entering ruminant feed.

The European Union has taken extensive measures to stop the spread of this disease, including a ban on specified risk materials in human food, animal proteins in cattle feed, and increased testing of older or suspicious cattle. Most analysts now believe that the risk is under control in Europe as fewer cases are reported each year (though dou-

Figure 2: Number of Confirmed Cases of BSE in Great Britain, 1987 to 2005



Source: OIE, 2006.

ble-digit Mad Cow cases continue annually) and as the cases are in older animals, indicating that the rates of exposure to contaminated feed are lower (see figure 2).

Still, as a case study in what one poorly-managed disease can do to animal and human health and to an entire sector of the economy, the lessons are devastating. Consumer demand for beef has never recovered to its pre-1996 levels and cattle and beef exports from Britain and the European Union have never recovered. It was not until September 28, 2005 that the EU accepted the changes that the UK had made to its surveillance and regulatory system and allowed the trade of British beef to re-commence (El Amin, 2005).

As of 2005, in addition to the British cases, another 17 have died from vCJD in the rest of the world, with most deaths occurring in Continental Europe. Every year the estimate of the rate of infection in humans (at one time set around 10,000) drops further and it is now projected to be below 500. At the same time, some medical science very tentatively suggests that there may be yet unknown connections between the BSE agent and the brain-wasting disease in humans. Some researchers suggest that about 10 percent of Alzheimer's disease is in fact an undiagnosed form of BSE (Labresque and Charlebois, 2005, p. 8).

BSE as a Global and North American Risk

Despite the efforts by most countries to keep BSE out of their own herds, it has spread to several continents, though not yet to South America or Oceania. Grass feeding practices in these areas have likely saved the herds from feed contamination. As in Europe, MBM feed contamination is the key suspected factor in the global spread of BSE. In some cases, the feed was re-exported without country-of-origin labeling. By 2000, BSE cases were found in Asia and the Middle East. In August 2001, Japan diagnosed its first case of BSE in a 5-year old Holstein cow. Several more cases were diagnosed in that country in 2002 and 2003. The cost to its cattle and beef industry from the lost export market and depressed consumer demand was estimated at US\$2.76 billion. By the end of 2005, Japan's total number of cases was 21.

A few cases of Mad Cow have come directly from imported animals. In 1993, Canada announced it had its first case in a cow imported from Britain. Agriculture Canada conducted a thorough epidemiological investigation which led to the culling of all cows in the possible birth cohorts (offspring and siblings) of this animal. While most of this animal's cohorts were located and destroyed, the Canadian Food Inspection Agency (CFIA) believes that several carcasses from these animals entered the Canadian animal feed chain before the 1997 ban and most likely started the infection that led to Canada's first indigenous Mad Cow case in 2003. Most of the "at risk" feed was traced to Alberta

(Segarra and Rawson, 2004, p. 42; Mathews *et al.*, 2003). The United States was satisfied with the Canadian action and declared Canada's single case "an import" and not as evidence that BSE had become native to the Canadian herd.

The US response

In 1989, the US Animal and Plant Health Inspection Service (APHIS), a branch of the USDA, banned all imports of live ruminants from countries where BSE exists (Mathews *et al.*, 2003). After the British crisis, the US traced cows imported from Britain, as it did with cattle imported from Europe in the 1990s, and from Japan, which had continued importing cows from Britain until 1996. Though US authorities were not able to trace every cow, and thus could not rule out that some had been slaughtered or gone for rendering and entered the feed chain, the vast majority that was found were ruled out for the BSE agent (USDA, 2001). Since 1990, the US Food and Drug Administration (FDA), which has complementary jurisdiction in the area of food and feed safety, advised manufacturers of drugs and vaccines not to use materials derived from BSE countries (USDA, 2001). By the end of 1997, the United States banned meat imports from the entire European continent, and in August 1997, the FDA prohibited the use of most mammalian protein in ruminant feeds and regulated tighter procedures and control systems for domestic feed manufacturers. Between 1998 and 2001, the FDA inspected 10,000 firms annually, including mills, renderers, and transport facilities to enforce compliance with the new feed regulations. While initial compliance rates were 84 to 90 percent, these rates increased to the high 90 percents after subsequent FDA revisits. By 2002, the USDA had tested nearly 20,000 high-risk animals for BSE (Rawson, 2004, p. 68).

The Canadian response

Canada's response to the threat of BSE generally mirrors the American measures. In 1989, Canadian officials instituted a certificate program for BSE-free imports. By 1990, Canada banned all imports of British cattle and started monitoring for the disease. Like the United States, Canada initiated a ruminant-to-ruminant feed ban in 1997 but added poultry litter and plate waste to the prohibited protein sources. Also in that year, Canada limited the imports of BSE-susceptible materials that use cattle products, such as tallow. In 1997, Canada started monitoring the compliance of its feed mills and rendering plants and increased testing downer cows for symptoms of BSE (Caswell and Sparling, 2004, p. 162). In 2001, Canada also took its first steps toward an animal identification program (CFIA, 2006).

International Regulations and BSE

In the wake of the British BSE crisis, international efforts sprung up to find common standards and agreed-upon methods to stem the spread of the disease. Under the auspices of the World Trade Organization, an agreement on sanitary and phytosanitary (plant) services was reached so that countries could set disease-mitigating measures while keeping trade distortions to a minimum. The Agreement on the Application of Sanitary and Phytosanitary Services (SPS) came into force on January 1, 1995. The SPS states that a country's ability to protect itself from foreign contaminants remains preeminent, but emphasizes that its policies must "not arbitrarily or unjustifiably discriminate between countries where identical or similar conditions prevail" (Sanitary and Phytosanitary Measures, 1998). Moreover, the SPS gives countries "the right to choose the appropriate level of protection and to implement it in the least trade restrictive manner" (Caswell and Sparling, 2004, pp. 142-143). Signatories must use the agreed-upon standards of food and plant safety, but are free to raise the levels if new scientific procedures and verification warrant such an increase in safety. However, measures for protective action against other countries under the SPS agreement must be justified on legitimate scientific grounds and not on protectionism thinly veiled as pseudo-science.

The SPS agreement also gives countries room to make their own risk assessments on other countries to determine acceptable levels of risk potential. Countries are encouraged to adopt harmonization or equivalency with other countries based on their own respective risk assessments. (Harmonization denotes parity between two or more countries, where regulations and standards adopted by both countries are the same. Equivalency refers to an agreed, bilateral set of standards. The standards may not be exactly the same, but based on the risk assessments of both countries, they pose little danger to the other country despite the differences.) The Canada-United States relationship on BSE regulations prior to the 2003 Mad Cow case approximates the equivalency model. The SPS agreement enshrines the concept of national sovereignty; in times of emergency—such as the BSE outbreaks in Canada and Japan—temporary border closures remain an "appropriate level of protection." A country may also opt for a "zero risk level" if it so chooses (Roberts and Unnevehr, 2003, p. 38, box 3.2). But the SPS agreement aims to balance the right to use caution against the need for more information in order to restore trade.

The International Organization for Epizootics (OIE), the Food and Agricultural Organization, and the World Health Organization have coordinated efforts since 2000 to help countries apply science-based and independent advice to "create reliable policy for public health" (OIE, 2002). The OIE is an intergovernmental organization with 167 member countries. It has the task of collecting animal disease and pathogen information from governments and disseminating this information among the other members. It also acts

as an information generator, collecting independently of its members information regarding diseases, and conducting tests and analysis on infectious agents on behalf of its members. Its standards are not binding for member states, but are advisory.

The OIE records BSE cases on an annual basis. It tracks the incidence rates of the disease and categorizes countries in terms of the prevalence of the illness. Before 2005, the OIE used to categorize countries into five groups, depending on the incidence rate of BSE. As of 2005, the OIE designates a country's BSE status as one of three categories based not on incidence alone, but on a risk assessment that takes into account the countermeasures that the country has taken to eradicate the disease. There are three risk levels: "negligible risk," "controlled risk," and "undetermined risk" (OIE, 2005). OIE standards are recognized by the WTO. All countries that export cattle or beef products to Canada and the United States are members of the OIE, including the biggest four: Brazil, Argentina, Australia, and New Zealand. None of these countries as yet (early 2006) have recorded an indigenous case of BSE, and are thus "BSE free" in the old definition of the OIE or "negligible risk" in the new standards. Both Canada and the United States have participated in the international regime on BSE from its beginnings. After all the countermeasures taken by Canada after its import case of BSE in 1993, Canada was about to head back into "BSE free" territory when the May 2003 BSE case was announced. The United States was in the "BSE-free" category until December 2003.

As the incidence rate of BSE goes up in a country, the country is expected to take risk-mitigating measures; exporting countries are permitted to halt or restrict their intake. In practice, as a first impulse, all countries that import cattle and beef products from a country declared infected by BSE close the border. When the BSE case was confirmed in an Alberta cow in May 2003, nearly all importers of Canadian live cattle and beef products closed their borders. When a case was confirmed in a Washington State cow in December 2003, the United States in turn lost all nearly all its exports in cattle and beef.⁴

4 The USDA's Food Safety and Inspection Service (FSIS) is the branch responsible for regulating and monitoring food safety. FSIS uses the Hazard Analysis and Critical Control Point (HACCP) system to identify and analyze risks at each phase of production. The Animal and Plant Health Inspection Service (APHIS) is in charge of controlling and monitoring animal diseases, including import and export provisions. On the Canadian side, the Canadian Food and Inspection Agency (CFIA) was set up in 1997 with the role of safeguarding the Canadian food supply, both animal and plant. CFIA is a quasi-independent agency inside Canada's Agriculture and Agri-Foods Department. Its regulatory powers mirror those of APHIS and FSIS in the US Department of Agriculture.

The Complex Assessment and Management of BSE Risk

The protein (rather than bacterial or viral) nature of Mad Cow combined with the many implications of infectivity (such as the minute amounts of tissue required to pass on the infection on the one hand and robustness against sterilization on the other) in meat and animal feed is one factor making the risk assessment complex. The incomplete medical science on vCJD, including the possibility that other human diseases may be caused by infected beef, add to this risk level. There are no estimates of how many human beings carry the prion or with what probability that infection may lead to vCJD. But all governments are sufficiently worried about the potential risks to have even banned cosmetics and gelatin imports from countries in which Mad Cow is prevalent. Most recently, they have added mammalian blood to the list of possible carriers of the BSE agent. There are also recent concerns that people who are not genetically disposed to the disease may yet be carriers and infect others, for example, through surgical equipment used to remove tonsils, which is a specified risk tissue. The dynamic and evolving nature of this disease adds to the uncertainty about how to mitigate various risks.

Another complicated risk factor in managing the Mad Cow disease is monitoring and tracing the disease. Once the disease is present in an animal herd, officials can take steps to reduce its incidence rate, but eliminating the disease takes very long and may prove impossible. European countries still report many cases per year even though robust risk mitigating measures have been taken. The disease requires complex tracking backward (origins) or forward (offspring/infected meat) to find other high risk material. Affected cows are culled and infected meat destroyed. Still, the best tracing and destroying efforts have never eradicated the disease entirely. Thus there is usually some remaining risk that the disease has spread further. This is especially true for the cases that were found before national animal identification programs were in place. When the disease was found in North America in 2003, and again in 2004 and 2005, the governments of Canada and the United States mounted large investigations to find the birth cohort, and the human food and animal feed distributions of the infected animal. Because both countries had instituted several checks on BSE, and some animal identification programs were in place, they were able to trace the vast majority of the material. That said, neither country could fully account for all the products, leaving a certain amount of risk that undetected infected material is still making its way through the animal feed chain. Moreover, there is always an extra amount of risk in that some dead animals on the farm may not be reported but quietly disposed of. BSE can only be eradicated over a very long period by taking a series of risk-reducing measures.

The extent of the British epidemic and the subsequent human health risk have made countries understandably cautious in dealing with the disease. The British underestimated and mismanaged both the animal and human health portfolios. The resulting

human fatalities, the drop in beef consumption, and the enormous losses to the British cattle and beef industry are reasons enough not to dismiss the Mad Cow problem as minor or merely political.

Because of ruminant feed bans and the ban on imports of cattle from BSE-prevalent countries, as well as more testing of downer cows in the cattle herds, the global BSE risk is now much lower than it was in Britain or Europe—but not negligible. Feed ban compliance in both countries has been good, but not perfect. Indeed, it can never be 100 percent given that there are hundreds of slaughtering plants and feed mills handling various types of animals and animal feed, and hundreds of thousands of on-the-farm feed-mixing operations.

The paradox of Mad Cow and its link to vCJD is that while it causes fewer human deaths than other animal-borne sicknesses such as rabies, it leaves governments and regulatory bodies with a bigger challenge in terms of risk mitigation (World Health Organization, 2003). The fact that animal health regulations can minimize, but not eliminate the risk, that much about the disease is still unknown, that it has a public image as a secretive and sinister killer, and that in its history, it has been spread through exported live cattle, animal feed, and animal products, all make it a politically-charged illness. Put another way: the chances of many people dying from the illness appear very small as the global count of BSE cases per year is now around 500, but the chances of it spreading or recurring in the animal population remain very real. North America has only experienced five cases between 2003 and 2005. These have not affected consumer confidence. If, however, 10 cases were found within a short time span, which is not impossible now that both Canada and the United States have more than tripled their testing levels, one might expect the public to react with more alarm. Even with the very comprehensive risk-reducing measures in place in both countries, there remains significant risk in animal feed. Consider, for example, a case where very small pieces of a ground-up infected cow find their way into a bag of chicken feed. Should a torn bag of the feed be sitting against a farm shed and a loose cow wander by and eat from the contaminated feed, a new potential chain of BSE can arise. The risk from such an incident did not get addressed in Canada and in the United States until 2004, and further regulations are still pending in 2006.

There is another risk that government and industry must deal with: ever since the Mad Cow scare in Britain, all countries have reacted to an outbreak of BSE by shutting their border to imports from the country with the disease, at least until a risk assessment is done to determine if continued imports would pose any new risks. Thus, even if BSE does not kill many humans, it tends to devastate a country's cattle and beef industry, especially if this sector is dependent on trade. The point is that animal disease is an enormous risk to a herd, even when it has no direct impact on human health. Foot and Mouth Disease, blue tongue, and anaplasmosis are other diseases in cattle that have caused the culling of large numbers of cows in the first, and restrictions on imports and exports on

the last two, even though neither affliction poses a known danger to human health. Finally, cattle and beef products are price-sensitive commodities. Slight variations in weather conditions, prices of substitution products (pork, chicken), and animal disease levels tend to produce significant price swings.

Applying risk management: USDA regulations on the eve of the Canadian mad cow incident

In a proactive move, the United States Department of Agriculture went beyond the OIE protocols when in 1998 it initiated a risk analysis of BSE, one year after both Canada and the United States imposed the ruminant-to-ruminant feed ban.

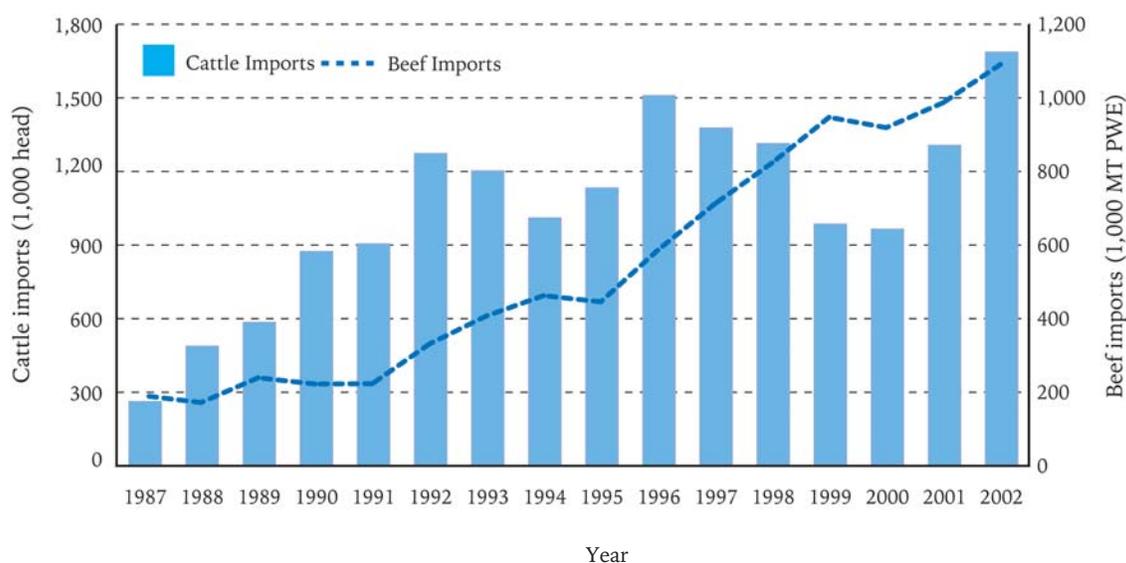
Given both the integrated cattle and beef markets between Canada and the United States, and American reliance on profitable beef exports to Asia, the USDA asked Harvard University's Risk Analysis Center and the Center for Computational Epidemiology at Tuskegee University to perform the risk analysis. The analysis was based on a model in which one or more BSE infected cows were introduced into the American cattle population. The study found that the 1989 ban on imports of cattle and the 1997 feed ban were effective risk reducers. The study concludes:

We recognize that the identification of a single case of BSE in the US would have important ramifications for public opinion, trade and other areas. Yet this analysis demonstrates that even if BSE were somehow to arise in the US, few additional animals would be infected, little infectivity would be available for potential human exposure, and the disease would be eradicated. In short, the US appears very resistant to a BSE challenge, primarily because of the FDA feed ban, which greatly reduces the chance that a sick animal will infect other animals. (Cohen *et al.*, 2001, p. 97)

In terms of risk, the report points to possible weaknesses in the feed ban as the biggest vulnerability. While materials responsible for BSE are not present in the feed for cattle, there is a continuing vulnerability in the fact that such materials are present in other animal feeds. If feed prior to the ban or feed meant for other animals were consumed by cattle, the risk of BSE spreading through the population increases. Mislabelled feed also poses a risk as prohibited products may find their way into cattle feed. Furthermore, spinal cord or dorsal root ganglia not properly removed through Advanced Meat Recovery (AMR) could further increase the risk of BSE infections.⁵ The use of AMR runs a further

5 Advanced Meat Recovery is a technology that removes left-over muscle tissue that is stuck to bones without breaking the bones.

Figure 3: US Cattle and Beef Imports from Canada, 1987-2002



Source: FAS, USDA 2005a.

risk of splitting the spinal column during separation, significantly increasing the chances of contaminated materials not being separated from the meat for human or animal consumption (Cohen *et al.*, 2001, p. 98).

The report is confident that the risk of producing BSE from cattle imported from the UK to the United States in the 1980s and 1990s has been nearly eliminated. The Harvard-Tuskegee study goes on to conclude that the import of 10 infected cattle (the number is based their risk model) into the US poses an animal and human health risk that can be controlled and eventually eliminated (Cohen, *et al.*, 2001: 100).

Overview of the Canadian-American Cattle and Beef Market Before BSE

The Canada-United States Free Trade Agreement of 1989 (CUFTA), followed by the North American Free Trade Agreement (NAFTA) of 1994 removed the quotas and tariffs that existed in both cattle and beef products. It eliminated the quotas on breeding and dairy cattle, as well as the tariffs on feeder and fed cattle⁶, and beef exports. In the

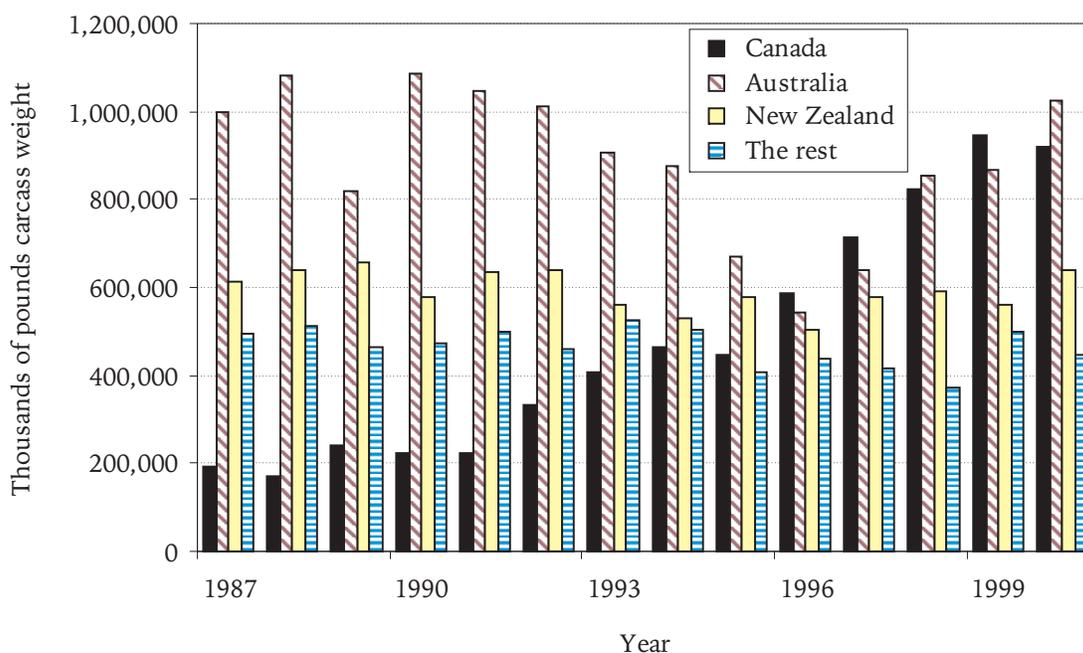
6 Once fed cattle weigh between 1,100 and 1,400 pounds, they are ready for slaughter.

decade prior to CUFTA, Canadian cattle exports were flat, averaging 360,000 per year. As figure 3 illustrates, both cattle and beef exports expanded rapidly after CUFTA took effect. Canadian cattle exports to the United States doubled between 1988 and 1992 and continued to grow throughout the 1990s. Free trade especially benefited the Canadian cattle industry, about half of which is concentrated in Alberta.

Cattle exports to the United States exceeded 1 million head in 1992 and were at 1.5 million in 1996 when the US experienced a drought. Beef exports rose from just under 100,000 metric tons in 1990 to over 300,000 tons in 1999. American exports of high-end beef products to Canada also went up. Although trade was freed between the two countries, both put limits on beef imports from Latin America and Oceania (LeRoy, 2005, p. 6).

NAFTA extended free trade in cattle and beef products to include Mexico. Canadian beef exports to the United States increased by 500 percent from 1989 to 2001, while the Canadian cattle inventory grew from 11 million to 14 million head. Beef became the second largest foreign exchange earner in the Canadian agriculture sector after grain. Meanwhile, the United States more than doubled its beef exports in the same period from 1 to

Figure 4: Top US Beef Suppliers, by Country, 1987-2000



Source: ERS, USDA, 2004a.

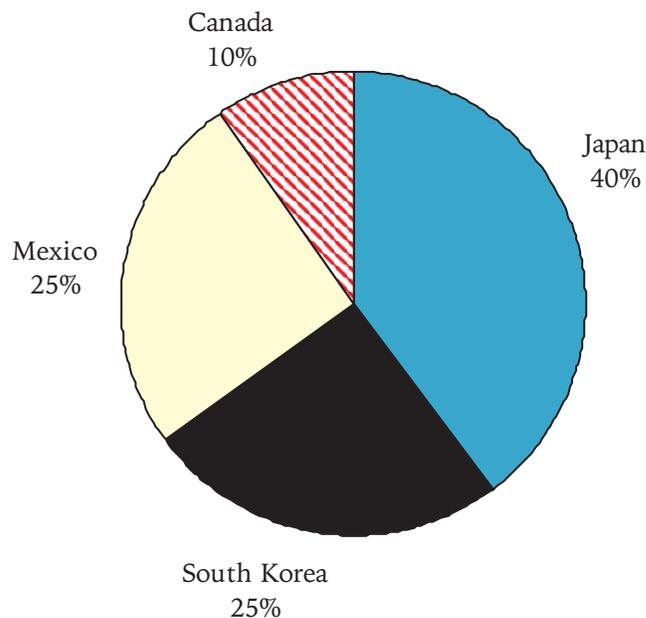
2.3 billion pounds (LeRoy, 2005, p. 10). Canadian farm cash receipts from cattle and calves were Can\$8 billion in 2002 (LeRoy, 2005, p. 11). As figure 4 shows, by 1996, Canada had displaced Australia as the number one exporter of beef to the US.

Three other factors explain the rise in exports of Canadian cattle and beef. The cattle industry is cyclical. A drought in the United States in 1996 coincided with a high point in the US cycle where producers sold a large number of animals. As a result, the American herd declined significantly and Canadian imports filled in a growing portion of the slaughtered cattle in the United States. Second, the falling Canadian dollar throughout most of the 1990s made Canadian products more competitive. Third, strong economic growth in the American economy gave Canadian cattle and beef exporters an opportunity to grow with the rising American consumer demand for beef.

Growth was also fostered by proximity. Western provinces were able to ship live cattle to western US meat packers. American exports of beef products from Midwest plants to eastern Canada also moved quickly and cheaply. Proximity also facilitated greater industry integration. Both Canada and the United States have highly concentrated meat slaughtering industries; the four largest firms do about 80 percent of the slaughter in each country (Caswell and Sparling, 2004, p. 145). The Cargill and Tyson plants in Alberta account for more than 60 percent of the total packing for export of beef from Canada. Large US meatpackers took advantage of CUFTA and low costs of production in Western Canada to fatten up and slaughter cattle in feedlots in Canada and then transport the beef products to the growing US consumer market. The export market in cattle was so profitable that plans Alberta made in the early 1990s to expand its slaughtering capacity did not materialize.

In 1990, 12 percent of Canada's beef production was exported to the US. By 2002, beef exports accounted for 48 percent of Canada's production (Caswell and Sparling, 2004, p. 147, figure 7.1). Canada contributes 5 percent of the US cattle and beef supply (Leroy, 2005, p. 19), about the equivalent of the supply from the state of Texas. The American herd hovers at just under 100 million head. Prior to December 2003, some 35 million cattle were slaughtered every year in the US, or 130,000 per day, of which some 70 percent are under the age of 21 months (Johnson and Vogt, 2004; Becker, 2005, p. 11). Between 1992 and 1998, Canadian cattle exports amounted to 10 percent of the entire Canadian herd population, but this only accounted for 1.2 percent of the US cattle inventory. The Canadian share of US cattle imports was 60 percent in 2002. Thus, given the size difference, the Canadian cattle and beef industry is far more dependent on access to the US market than the beef and cattle industry in the United States is on Canadian supply. The Northern Mexican cattle industry is closely integrated with the American industry and makes up most of the remainder of the US cattle imports.

In 2003, the United States had a US\$3.95 billion annual market in beef exports, mainly in North America and to Asia, dominated by sales to Japan and South Korea (\$2.2 billion).

Figure 5: The US Export Market for Beef in 2003

Source: Becker and Hanrahan, 2005, p. 2.

This export market constituted just under 10 percent of US commercial beef production (Coffey *et al.*, 2005, p. 4). In North America, the United States exports primarily high quality beef cuts for the hotel, restaurant, and institutional markets. In 2003, the value of beef exports to Mexico was \$877 million; to Canada it was \$331 million (see figure 5).

May 2003: Canada's First Indigenous BSE Case

On January 31, 2003, a beef cow... was found recumbent and unable to rise, was hoisted onto a truck and delivered to a provincially inspected abattoir in the Peace River District of Northern Alberta. On the movement manifest provincially required for transport, it was described only as a "black cow," with no additional distinguishing natural or artificial features recorded... The animal qualified for BSE surveillance under the active national program and its head was forwarded to the Province of Alberta for assessment and incineration. The carcass was condemned because of pneumonia. Under Canadian program requirements, any carcass destined for human consumption that is subjected to TSE testing must be held, pending reporting of the test results. Since the carcass was condemned

and it was not allowed to enter the human food chain, the carcass was not held and was instead sent to rendering, where it entered into the animal feed chain. (CFIA, 2003a)

On May 20, 2003, the Canadian Food Inspection Agency had the unenviable task of telling the world that Canada had its first indigenous case of Mad Cow. The likely cause of BSE in the 8-year old Black Angus beef cow was contaminated feed. Thirty-four countries, including Mexico and the US, closed their borders to live cattle and beef products from Canada. Immediately following the announcement, Canadian officials worked to create a “depopulation decision tree” that could trace back the family members of the cow and the cohorts among which it had lived. After mapping the tree, “an additional 25 herds were scrutinized in the tracing-out of single animals or cohorts from the primary line of enquiry, which included the identification and notification of the export of five animals to the US in 1997” (CFIA, 2003a). Some 2,700 cattle were culled, and some 2,000 animals above the age of 24 months were tested. All animals were found negative for BSE (CFIA, 2003a). In addition, CFIA traced the feed that had been produced from the rendered animal. “As many as 1,800 farms (600 recipients of bulk feed and 1200 recipients of bagged feed) may have received animal feed containing MBM made from the infected cow” (CFIA, 2003b). The CFIA was able to account for more than 95 percent of the material thanks to good surveillance and animal identification programs already in existence at the time.

CFIA officials also tried to manage consumer apprehensions about Mad Cow by engaging in a “science-based dialogue with the public” (Labresque and Charlebois, 2005, p. 25). Canadian demand for beef actually went up after BSE case, most likely as a solidarity gesture in reaction to the American border closure.

Canada changes its regulations

On July 2, 2003, the Canadian Food Inspection Agency published its findings on the BSE case in Alberta and its proposed changes to Canada’s regulatory system. The agency decided that all specified risk materials must be removed from animals 30 months and older when they are slaughtered for consumption. Cattle under 30 months do not have to have their SRMs removed as the likelihood of them having a high dose of the prion agent is extremely low. Canada’s science was based on the experience in Britain and from subsequent laboratory tests.

The amount of infectious agent ingested by the cow determines how early it may develop BSE. When British cattle were most exposed to the infectious agent in MBM, the youngest case of BSE was in a 20-month old animal. As the dose of prion decreased after the feed ban, the age at which BSE was diagnosed gradually rose to about 50 months. The

fact that the cow diagnosed in Alberta was 8 years old indicated that it had only been exposed to a low dosage of infected agent most likely from feed available before the 1997 feed ban. Most countries in Europe, followed by Canada and the United States, concluded that BSE in animals under 30 months would be extremely rare. Therefore, meat from them would be safe even without the removal of specified risk materials (CFIA 2003b).

The CFIA also instituted new regulations dictating how an animal could be killed and then butchered. Slaughter houses were to eliminate what is called “stunning,” in which a metal object penetrates the brain at high speed. Although the practice was no longer widespread, physical force stunning could lead to small pieces of cranial tissue or brain matter contaminating meat destined for human consumption. Only electrical or non-invasive techniques were allowed from 2003 onwards. Next, knives and saws used in removing the SRMs in animals over 30 months were to be kept separate and not used in other stages of butchering.

In December 2004, the CFIA also proposed a ban on SRMs in animal feed. Given the significant cost of removing and disposing of this material, this rule evoked considerable reaction from industry. Disposal is a provincial issue, which adds another layer of complexity as it was the federal government seeking the new regulation. The beef industry has lobbied not to have to bear all the cost of disposal by itself. From the early 1990s onward, the Canadian beef industry has lobbied to keep Canadian regulations closely in line with those in the US in order to retain its competitive edge. The new rule was to take effect at the end of February 2005, but was postponed for months as government and industry attempted to resolve disposal and cost issues. As Billy Hewett, CFIA’s policy director, put it, “I know it seems slow, but it is enormously complex” (Roos, 2005). The new rule is now scheduled to take effect in July 2006.

The CFIA opted not to remove downer cows, also called non-ambulatory cows, from the food chain, believing the removal of SRM’s provided enough protection for the animal feed chain. This position was reversed after American officials banned downer cows from entering the food chain in early 2004. On January 13, 2004, the CFIA announced that all downers were to be taken out of meat plants registered to export to the United States.

The American response: closed borders and new rules

On May 29, 2003, the USDA made a decision to ban all Canadian beef and cattle imports on an “emergency basis.”⁷ The department was acting in accordance with the US Federal

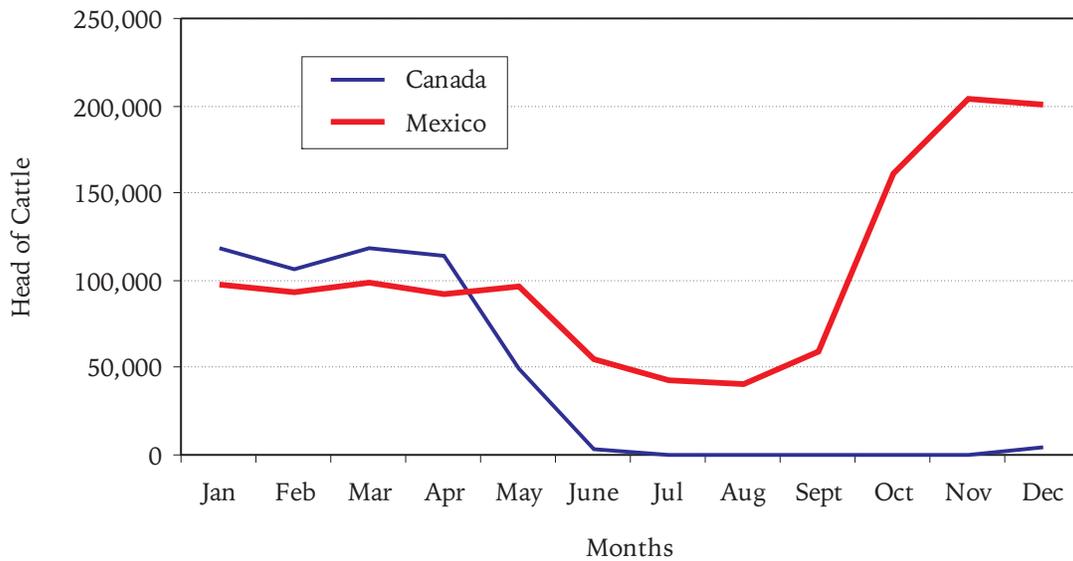
7 The ban also included veal and other ruminants such as sheep, goats, deer, and elk. This study examines only the case of cattle and beef.

Code, which stipulated that only “BSE free” countries could export to the United States. Cattle prices in Canada, which had always been tied to American prices (US price minus the cost of transportation to major US markets), suddenly dropped by 30 percent and in some categories, including older cull cattle, by more than 75 percent. Eastern Canada exported, on average, over 40 percent of its cull cattle to US meat plants (Grier, 2005, p. 62). Moreover, the buildup of cattle north of the border decreased the price of domestic cattle as the cattle supply began to rise with no corresponding rise in demand. As cattle grow beyond a certain age or weight level, their value goes down. By October 2003, Mexican cattle exports to the United States began to replace Canadian cattle exports, which fell to zero in June 2003 (Caswell and Sparling, 2004, p. 156).

Following the discovery of a BSE-infected cow in Canada’s herd, the US government did not simply close the border and throw away the keys. It followed the guidelines of the World Trade Organization’s agreement on Sanitary and Phytosanitary Services quite closely in terms of trying to restore trade, including its provision that “Measures should be chosen so as to minimize distortions to trade and must be no more trade restrictive than necessary to achieve a country’s appropriate level of protection” (Roberts and Unnevehr, 2003, p. 38, box 3.2). As will be argued below, it is erroneous to conclude that American authorities used the Mad Cow case as an opportunity, or worse, an excuse, to stop Canadian imports of cattle and beef products. In fact, thanks to the Harvard-Tuskegee analysis, the US Department of Agriculture was prepared for the scenario of a single outbreak of BSE in Canada. The USDA followed an internationally agreed upon protocol to protect its industry and consumers first, followed by “science-based risk management” (Roberts and Unnevehr, 2003, p. 38, box 3.2) aimed at normalizing trade as soon as possible.

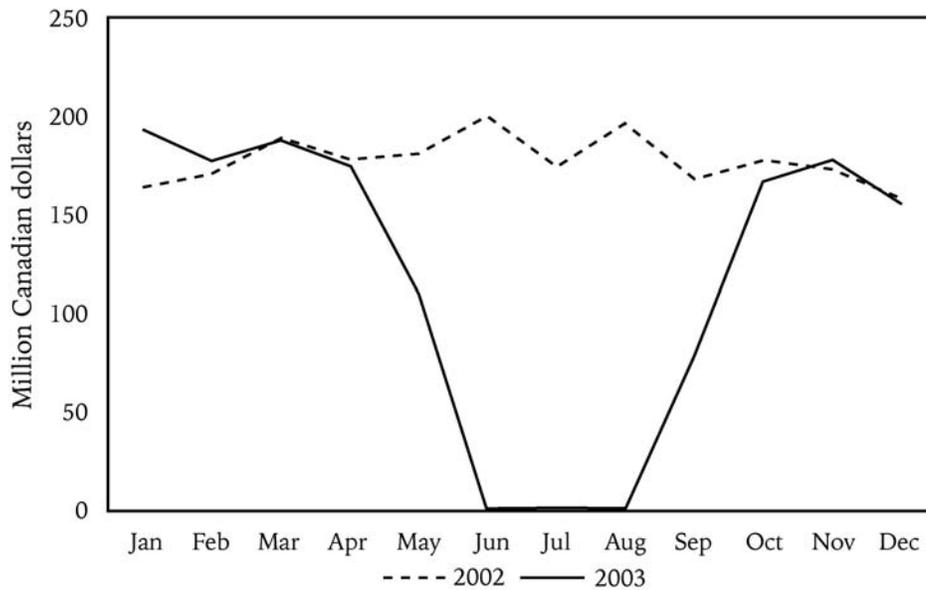
As discussed above, previous risk analyses on the importation of BSE had shown that as many as 10 infected animals would pose little risk to American human or animal health, yet they also predicted that there would be significant disruption in the cattle and beef industry. Why then the border closure? It is important to recall the Sanitary and Phytosanitary Services proviso admitting a country’s right to protect itself from foreign contamination, by, among other measures, closing the border (WTO, 1998). While the 1998 Harvard Tuskegee analysis concluded that the introduction of one BSE case to the American cattle and beef industry posed little threat, the nature of the disease, its history in the UK, and its list of unknown variables create conditions of fear and apprehension when it is discovered. That is why closing the border is still a common first reaction. It should also be noted that the American action to reopen the border quickly was an *atypical* response. Historically, incidences of BSE imported from foreign countries have resulted in import bans from those countries for a period of no less than 7 years (Leroy, 2005, p. 13).

Figure 6a: Live Cattle Imports into to the US from Canada and Mexico in 2003



Source: Caswell and Sparling, 2004, p. 156.

Figure 6b: Canadian Beef Exports, 2002-2003



Source: Caswell and Sparling, 2004, p. 156.

Assess cause and reassess risk

The source of the May 2003 Mad Cow infection in Canada was most likely contaminated feed. The eight-year old animal, born before the 1997 feed ban, either ate contaminated feed before the ban, or left-over feed after, or possibly even poultry or other feed not subject to the ruminant-to-ruminant feed ban. Knowing both the age and rates of infection of European animals and the relatively small amount of potentially infected animal feed still present in North America, the USDA quickly decided that Canadian boneless beef from animals under 30 months of age would carry almost no risk whatsoever. The USDA announced on August 8, 2003, that this segment of the beef imports from Canada could resume immediately. It did not post this decision as a rule or proposed rule change. On August 15, the USDA expanded this list slightly for some veal products. Again on October 22, it added other beef organs to the list, including hearts, kidneys, and tongues.

As figure 6b shows, the sudden loss for Canada of its main beef export market in May 2003 was partially restored from September 2003 onward. In hindsight it is clear that this propitious move by US officials prevented the total collapse of the Canadian cattle industry. As one senior Canadian official put it in a personal interview with the author, “The rapid move by the US was critical to Canada. Without it, we would have been in dire straits. It really saved us.” The quick restoration by the US of trade in boneless beef under 30 months of age also created a domino effect on other importers who followed the US lead. By 2004, the value of Canadian beef exports to the US actually surpassed the value of beef exports in 2002, the last year before the BSE crisis struck. Had it not been for the swift resumption of trade in this part of the industry, Canadian losses would have been much greater. That said, the cattle export business was not so fortunate. It dropped to virtually zero in June 2003 and Mexican cattle imports began to replace Canadian exports as of August 2003 when it became clear that the border would remain closed for a longer period to live cattle than it had to beef.

The USDA asked the Harvard Tuskegee team to reassess their risk estimates in light of the May 2003 case. In September 2003, the team concluded that though BSE was now introduced to the integrated North American herd through Canada, enough risk mitigating measures were in place that “the presence of the disease will continue to diminish with time” (Cohen and Gray, 2003, p. 8).

The USDA promptly went to work to resolve the ban on live cattle. It proposed taking a recommended category within the OIE classification scheme and turning it into a US standard. It used the Harvard-Tuskegee risk study to set up a “Minimal Risk Region,” in which a small amount of BSE is present, but where a well-established system of control measures essentially brings the disease under control. Thus, even if a very few cases are diagnosed, the overall risk-mitigating structure assures that the spread of the disease

among animals remains at very low levels. The USDA proposed that Canada would qualify under this category and that, therefore, the border could reopen to animals under 30 months of age. In the five-year average before the 2003 BSE case, about 75 percent of Canadian cattle exports were in this category, with the bulk coming from Alberta and Saskatchewan.

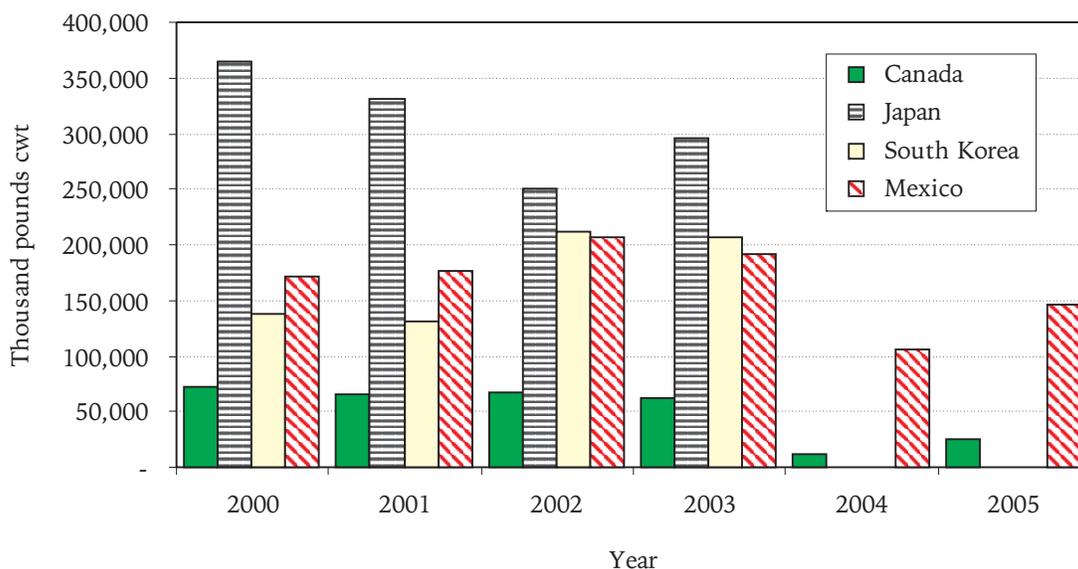
The November 4, 2003 Interim Rule stipulated that Canadian cattle would be ear-tagged and branded with a “CAN” to distinguish them from other cattle with different countries of origin, have all their papers inspected at the border by American veterinary officers, and be trucked in sealed containers directly to slaughter, or be segregated in American feedlots until slaughter. Given the new Canadian regime against BSE, including regulatory measures, expanded testing for BSE of slaughtered animals, the banning of high-risk material in the food chain that began in 2003, the added safety of only allowing in animals 30 months or younger, and the identification, inspection, and segregation measures, the USDA felt that the risk of Canadian imports had been reduced to a negligible level. Trade in the lower-risk categories was set to resume in January 2004.

December 2003: The Cow that Wrecked the Plan

The plan to allow the limited importation of Canadian cattle came to an abrupt halt while it was still in its infancy. On December 25, 2003, a Holstein cow on a farm in Yakima, Washington, was confirmed to have died from BSE. Soon after, it became clear that the cow had been imported in 2001 from the same region in Alberta as the May 2003 case originated from. The presence of a BSE cow on American soil ended America’s standing as a “BSE free” country. It also ended Canada’s and the USDA’s chances of resolving the trade issue quickly.

The trade impact

Within hours of the US announcement, 50 major export markets for American cattle and beef products closed their borders. Except for Mexico and Canada, which restored certain beef imports from animals under 30 months of age in March 2004, the American beef export sector looked moribund in 2004 (see figure 7). When Canada found a BSE case from an imported British animal in 1993, the United States concluded that this was merely an import and not evidence in itself of the native presence of BSE in the Canadian herd. The United States, however, was not afforded this treatment by the importers of its cattle products even though its first case had been imported from Canada two years earlier! The native case of BSE in the US also saw the cessation of US exports of ruminant products, such as cow hides.

Figure 7: US Beef Exports, 2000-2005

Source: ERS, USDA, 2005a; ERS, USDA, 2004a.

On average, prices for US cattle dropped by 15 percent in the weeks after the announcement. The average price of fed steers was in the US\$84 to \$91 per 100 pounds (cwt) range in December 2003 just before the Mad Cow discovery. Prices in 2002 had been lower (about US\$67), but due to a very dry summer that year had gone up considerably. The drop in prices after the Mad Cow case proved temporary. Prices recovered to nearly US\$85 per cwt in early 2004. Consumer demand remained high, and because of the closure of the Canadian border, supply remained tight (Collins, 2005; Becker, 2005, p. 9). A 2005 University of Kansas study concluded that total losses for US beef and bovine products in 2004 amounted to between US \$3.2 and \$4.7 billion. However, due to higher prices, farm cash receipts for cattle and calves were up from 2003 (US \$45.1 billion) in both 2004 (US \$47.3 billion) and 2005 (US \$49.6 billion). While in Canada the BSE crisis hit mainly the farmers and livestock growers, in the US the crisis mainly hit meat packing and beef exporting firms.

Canada's reaction

By April 2004, Canada allowed the importation of selected kinds of cattle and beef products, including cattle destined for immediate slaughter and boneless beef cuts from cattle under 30 months of age. Still, Canadian imports of US beef products in 2004 were down more than 75 percent from 2003 (CBC, 2006).

The USDA's Challenge After the December 2003 BSE Case

Among the first decisions that the USDA made was to suspend the Interim Final Rule that was to re-open the border to Canadian cattle under 30 months. The agency worked very closely with the Canadian Food Inspection Agency to review epidemiological investigations on the Mad Cow case. The fact that the American cow was a dairy cow, while the May 2003 Canadian case was a beef animal, heightened worries about a greater-than-incident feed contamination problem in the Alberta region to which the feed was traced. Both the USDA and the Food and Drug Administration (FDA) now needed to re-assess whether additional regulations were required to ensure the safety of both the food and feed chain. (APHIS, USDA, 2004a). During the five years prior to the BSE outbreak, Canada exported on average about 185,000 tons of feed annually to the United States (Becker, 2005, p. 3). After May 20, 2003, the US did not ban feed imports outright, but instituted strict inspections of each shipment of meat and bone meal for possible feed contaminants.

After a review, the USDA continued to believe that the November 4, 2003 rule was still sufficient to mitigate the risk to both the cattle and beef industry. After all, two cases do not change the risk assessment that allows for the importation of 10 such cases. The USDA re-opened the rule for comments on March 8, 2004.⁸ The USDA actually widened the import categories at this point, arguing that since Canada now removed the specified risk materials from animals over 30 months of age, it would also re-open the border to beef from animals over 30 months of age, as well as other ground beef products and bone-in-beef.

Despite the USDA's efforts, there was now significant concern about BSE and Canadian imports among some sectors of the US cattle industry and among elected officials in the border states with Canada. These pressures raised the burden of proof for USDA. Now that two Canadian-traced cases of BSE had been found in less than one year, American cattle growers felt a direct threat to their herd. At the same time, US beef exports were now lost, showing the vulnerability of the integrated market. The public and political profile of BSE had also been raised.

One reason why US politicians were more interested in BSE was that Japan had closed its market to American beef. The export market to Japan, which was worth over \$1 billion in 2003, fell below \$1 million in 2004. Japan increased the stakes when it announced that it

⁸ Under US law, federal agencies have to post significant rule changes so that the industry and public have an opportunity to comment before the new measures can be implemented. The USDA maintains significant leeway in setting the timeframe for comment periods. Thirty, 60, or 90 days are most common (Interview with Veterinary Services, USDA, January 26, 2006).

had found animals in its herd that tested positive for BSE at just 21 months. The announcement indicated that some of Japan's herd had been fed a very high proportion of infectious material, which was a result of the country's importation in the 1990s of British cattle and large amounts of British Meat and Bone Meal. It was now up to the United States to show that North American cattle were still nearly risk free at 30 months. Japan went further and instituted a rule mandating that every animal slaughtered for Japanese beef consumption must be tested for BSE. The United States argued that the presence of the prion agent in a single 21 month-old animal did not in any way reflect the level of contaminated feed available in North America, and thus Japan's actions should not be reflected in North American measures. The US also argued that testing young animals would be inconclusive, possibly misleading, and overly costly.

On another front, the USDA was about to fight a long and protracted court battle against a well-funded lobby group, the Ranchers-Cattlemen Action Legal Fund or R-CALF, which is the lobbying arm of the United Stockgrowers of America. R-CALF had plausible concerns about the risk associated with importing Canadian animals and with the potentially bigger issue of retaining the public's confidence in beef products. It also had reasonable concerns about feed contamination in Alberta. R-CALF suspected that the USDA was keener about normalizing trade with Canada than in protecting the North American herd from BSE infection. At the same time, R-CALF's concerns coincided with significantly increased cattle prices that the ranchers that R-CALF represented were realizing. Those prices had risen when Alberta's stream of feeder cattle dried up.

American producers of feeder and fed cattle would benefit in the short term from a border closure regardless of the merits of the case. Given that the USDA was proposing to allow in only slaughter and not breeding cattle, and that those slaughter cattle would essentially be quarantined in feedlots, branded by country of origin, and slaughtered in segregated batches, the argument advanced by R-CALF that these imports would endanger the American herd was at best weak, and smacked of protectionism. While the USDA was working within the standards provided by the SPS and OIE to minimize trade distortion, R-CALF began to raise the public and political profile of the Canadian BSE risk to the American herd. It also posted many comments in response to the USDA interim rule and lobbied many Congressmen and state representatives and senators, especially from the Northwest border states.

The USDA now faced a trio of challenges. It had to work closely with Canada to ensure that Canadian and American risk-mitigating measures would complement each other and build the needed layers of risk reduction. This would turn out to be the easy part. Second, it had to make sure that its risk analysis could withstand R-CALF's mounting political and regulatory challenges. Finally, it had to convince Japan that North American risk reduction would satisfy the high level of regulatory control expected in Japan, *and*

that America's science-based approach to BSE risk mitigation would in turn convince Japan to take a similar approach. Japan, the USDA hoped, would be compelled to come up with its own science-based model that would make its position transparent and clarify what measures would be needed for the Japanese border to once again open to American beef exports.

R-CALF Wins the First Court Case

The USDA experienced an early setback when it was forced to postpone the reopening of the American border to beef products from Canada. On March 8, 2004, the USDA reopened the comment period on its proposed rule dating back to November 4, 2003 to allow cattle under 30 months to be again imported into the United States. In July 2003, Canada implemented a new rule calling for all Special Risk Materials such as the skull, brain, spinal cord, various ganglia near that cord, the small intestine, and a few very small organs to be removed from cattle over 30 months slaughtered for human food. Thus, USDA reasoned, such beef products would now meet the lower risk category. As well, Canada had banned Advanced Meat Recovery from animals 30 months and older. Given that about 99 percent of the possible infectious prion is located in this broad definition of these materials, their removal would indeed make that beef much safer. In fact, the United States proposed to institute the same SRM measure in its own food chain as of January 2004.

The efforts to reopen the border to both cattle and more beef products may well have occurred in early 2004 had the USDA not committed a technical error. The department had incrementally expanded the category of beef products permitted for import begun on August 8, 2003 without public notice. The USDA believed that these extra categories were only "refinements" to the permits. On April 19, it added bone-in beef from animals under 30 months to the list of import permits.

On April 23, R-CALF filed for a temporary injunction against this decision in a Montana court and won. The only good trade news was that R-CALF did not win the injunction on the merits of its science.

R-CALF cited several reasons why the border should not be reopened to bone-in beef from animals under 30 months or boneless beef from animals over 30 months. First, it argued that the April 19 action was taken without notice and opportunity for public comment (*R-CALF v. USDA*, 2004a, p. 12). In so doing, it violated the Administrative Procedure Act (Administrative Procedure Act 5 USC. § 706(2)(D)). Second, R-CALF argued that the USDA violated the conclusions it had reached earlier with regard to the acceptable age of meat products entering the US from Canada. R-CALF based this on the

USDA's decision of August 8, 2003, in which the latter concluded that *only* boneless beef under 30 months satisfied the minimal risk category and could thus enter the United States. R-CALF argued that conditions had not sufficiently changed to warrant a change in this position, and that therefore further market expansion would require a USDA rule change. Third, the lobby argued, Canadian "tainted" BSE beef posed a public perception problem which could injure American producers.

In May 2004, an article in the *Washington Post* claimed that the USDA had knowingly allowed some 7 million pounds of Canadian ground beef and other processed beef from animals under 30 months of age to enter the United States between September 2003 and April 2004 (Kaufman, 2004). The August 2003 USDA ruling had allowed only boneless beef under 30 months, but not ground beef or other beef products, including those derived from AMR processes. Thus, it appears that the USDA had been letting these permit "refinements" through, not only without allowing public comment, but in violation of its own rules, and perhaps even without the knowledge of Secretary Ann Veneman (Kaufman 2004). The USDA did not dispute these allegations, which strongly boosted R-CALF's case that USDA was overly eager to normalize trade with Canada.

Judge Richard F. Cebull, presiding over the US District Court for Montana, agreed with R-CALF on the claim that USDA had violated its own procedural guidelines. On April 26, 2004, Judge Cebull imposed a temporary restraining order on the USDA's proposal to expand the list of beef products. On May 4, Judge Cebull's temporary restraining order became a preliminary injunction against the USDA's proposed action. The USDA then settled on a compromise with R-CALF. It would not allow categories of beef beyond the August 8, 2003 level until the proposed rule of March 8 took effect. The USDA agreed to give 45-day updates on its rule-making process on this file.

The USDA would not come out with a final rule for another seven months. The final interim rule was posted by the USDA on December 29, 2004, and entered the Federal Register on January 4, 2005, reopening the border to live cattle under 30 months and beef products from animals of all ages. It was to take effect on March 7, 2005.

The significance of the R-CALF win in the 2004 court case presents another important lesson in understanding the Mad Cow crisis between Canada and the United States. Many Canadian commentators have asked why it took the US government so long to reopen the border to Canadian cattle, and why partial closures for cattle and beef are still in place. One reason is that a committed lobby (R-CALF) exploited a procedural error (by the USDA) to successfully use the court system to stop trade. Many Canadian observers are aware of R-CALF's subsequent 2005 court case, but few realize that by then, R-CALF had already won the first round! With the 2004 win, the burden on the USDA increased further. It had to make its case stand against the international regime,

and against Canada, Japan, *and* had to make it legally air tight, lest it be stopped again by further legal challenges from an American lobby.

Indeed, as discussed below, in early 2005 when the USDA had all its regulations in place and was about to reopen the border, R-CALF again tried the legal route to block it. But unlike R-CALF's 2004 legal victory on procedural law, the debate in the second suit centred entirely on risk mitigation. While Judge Cebull again granted R-CALF a preliminary injunction in early 2005, the Appellate court quickly and decisively ruled that USDA was acting within its mandate.

More rules in 2004

Why did it take the US federal government so long to reopen the border? The answer is tripartite. First, in 2004, the USDA received some 4,000 comments from industry, government, and the public on its proposed rule. It spent considerable time reviewing and addressing these points. The final rule in December 2004 amounted to over 300 pages, most of which were specific responses to challenges raised in the comments. In its response, the USDA had to follow, and had to be seen to be following, correct process. Second, the regulatory arms of the Department of Agriculture and the Food and Drug Administration were busy generating new regulations. In January 2004, the Food Safety Inspection Services branch of the USDA instituted the same SRM ban on animals over 30 months destined for human consumption as Canada had put in place on July 18, 2003. It also put restrictions on the use of modern technology to remove small pieces of meat left on the bones after slaughter. In January, the FDA—whose mandate it is to regulate animal feed—proposed a new rule to ban ruminant blood and blood products, poultry litter, and restaurant plate waste from being rendered into cattle feed.

Furthermore, the USDA assembled an international panel of experts (as Canada had done in 2003) to specifically recommend further measures to limit the risk and spread of Mad Cow (USDA, APHIS, 2004b). The panel particularly recommended removing SRMs from animal carcasses that were to be rendered. The September 2003 Harvard-Tuskegee follow-up study concluded that a prohibition on rendering dead animals and properly disposing of SRMs would reduce the potential for future BSE cases by more than 75 per cent (Cohen *et al.*, 2001, p. 100). Because both the Harvard-Tuskegee study and the International Review team had concluded that cattle in the United States were likely “indigenously infected” through imports of cattle or feed, the Food and Drug Administration moved to tighten controls on the feed and rendering process. In July 2004, the FDA posted its interim rule for banning SRMs from the animal feed chain. In it, SRMs were defined as the skull, brain, eyes, spinal cord, trigeminal ganglia, distal ileum, vertebral column, and dorsal root ganglia, including the tonsils.

The FDA proposal to remove the SRMs caused significant opposition from the slaughtering industry. The industry argued that this measure would have more consequences than the FDA had anticipated and incur costs far above \$100 million. The \$100 million figure is significant because under US law, federal agencies must provide an economic impact analysis of their proposed rules if those rules are expected to cost private industry more than \$100 million per year.

Some 35 million cattle are slaughtered in the United States every year. Removing the entire set of SRMs from animals older than 30 months would produce some 3.5 billion pounds of waste. No disposal plan or environmental impact assessment existed for all the extra material, and the costs for getting rid of it were far in excess of \$100 million per year. A 2005 Kansas University study estimated the extra costs for the slaughtering industry for that year alone to remove SRMs from animals over 30 months of age as well as downer cows at \$200 million (Coffey *et al.*, 2005, p. 4). The same study estimated that the feed ban on SRMs would cost a little over \$2 per fed cow while a complete ban on ruminant protein in animal feed would cost \$14 per fed cow.

In July 2004, the FDA revised its rule, arguing that by going with an “SRM-lite” package in which only the brain and the spinal cord were removed, the amount of waste per animal could be reduced from the estimate of 80 pounds to under 5 pounds. “SRM-lite” would remove 90 percent of the tissue in which the infectious prion could exist, compared with full SRM removal, which would produce only another 9 percent of savings of potentially infectious host tissue (FDA, 2005a). The estimated savings in disposal costs by going from removing full SRMs to “SRM-lite” was \$220 million per year. The FDA decided that this slight increase in risky material was acceptable in addition to the other measures it had proposed under the rule, and would be enough to eliminate almost all risk.

By September 2004, the USDA had begun to implement its proposal to establish a voluntary animal identification system beginning with cattle moving interstate. The voluntary program was supported by a \$19 million federal grant to facilitate cooperation among states. Canada, meanwhile, was implementing a mandatory national identification system on a step-by-step basis.

The USDA spent a total of \$51 million on BSE testing, research, and monitoring in fiscal year 2004 and \$123 million in 2005. Half of these expenditures were on increased testing of slaughtered animals (Becker, 2005, p. 9).

The Position of Key Lobbies

While both the USDA and FDA were working on new regulations and responding to comments on proposed interim rules, as well as responding to other nations besides Canada that were interested in trying to qualify for the minimal risk category, both trade and political factors became part of the public discussion of the Mad Cow problem. R-CALF appeared determined to keep the border closed regardless of the USDA's risk analyses. Meanwhile, a lobby representing meat plants, the American Meat Institute (AMI), was urging the USDA to open the border to cattle of all ages. AMI members were suffering from a drop in supply as both the fed cattle and cull cow supply from Canada was gone. Meat processing plants in the American Northwest, which had relied on dairy cows, had experienced major production losses of up to 12 percent. Plants were running at a loss and several thousand jobs were lost.

At the same time, Canadian meat plants were expanding rapidly to accommodate the supply, which was both abundant and cheap. The big plants in Alberta, who between them accounted for half of the total slaughter in Canada, were investing heavily to increase meatpacking in Canada. Indeed, the AMI ended up taking the USDA to court in December 2004 when it found out that the posted rule would still not allow cattle over 30 months old to enter the US. AMI argued that the proposed new regulations and surveillance on both sides of the border would sufficiently reduce the risk of infected cattle entering the US food and feed chain. The only logical outcome from the post-BSE regulatory structure in the Canadian and American beef and cattle industry, according to the lobby, would be the resumption of the full trade that had existed until May 2003. In March 2005, a federal judge denied AMI's request to stop the USDA from banning cattle over 30 months of age.

The cattle industry's largest and most powerful lobby, the National Cattlemen's Beef Association (NCBA), articulated the need for the US to make its decisions based on science and risk analyses consistent with OIE recommendations. It supported the USDA's reasoning that a minimal risk region for Canada, as the USDA's rule proposed, based on transparent scientific methods would be helpful in convincing Japan that American beef was again safe and that Japan could not continue its total ban much longer. Meanwhile, the USDA proposed to Japan that both countries agree to mediation by the Organization of International Epizootics so the Japanese market could be reopened, but Tokyo declined.

Political Factors

In 2002, President George W. Bush signed the Farm Bill, which extended significant subsidies across the agricultural sector. His agenda contained no other priorities on agricultural issues. Thus, given the controversial war in Iraq and the election campaign, it is fair to say that in 2004, agriculture was not a priority for the Bush administration. Then US ambassador to Canada, Paul Cellucci, writes in his memoirs that Bush strongly supported ending the ban (Cellucci, 2005, p. 127). At the same time, circumstantial evidence, such as Bush's postponement of his trip to Canada in 2003, and other negative signals between Washington and Ottawa, suggests that there was not a strong rapport between the White House and the Prime Minister's Office that might have given Canada extra political capital to advocate its case. After the November 2004 US presidential and congressional election, Bush did visit Canada and Mad Cow was one of the items discussed. The new US Secretary of Agriculture, Mike Johanns from Nebraska, made Mad Cow resolution a priority from the start of his tenure. But relations did not markedly improve after the bilateral meeting. Canadian disappointment over high softwood lumber levies and American disappointment over a Canadian flip-flop on missile defence left the relationship cool.

Both the USDA and the FDA proposed rules or worked on comments that stretched into the summer and fall of 2004. Making these "litigation proof," as one Canadian official observed, greatly added to the time it took for the USDA to re-publish its rule. Given the FDA's decision to go to "SRM-lite" in the summer of 2004, it appeared unlikely that the USDA would be ready to repost the rule until the fall of 2004. It is admittedly speculative to ask whether the White House tried to avoid posting the rule to open the border to more trade in cattle and beef just before the November elections, or whether such a move would indeed risk any Republican seats in the Senate or House in the sensitive border states from Idaho to the Great Lakes.

The USDA had more than R-CALF to keep in mind. Congress was exerting considerable pressure to keep the border closed. Senate Minority Leader Tom Daschle commented in April 2004 that he was "pleased" with Judge Cebull's court order and that the USDA should take a "more deliberative approach" (i.e., go even slower) (*Food and Drink Weekly*, May 10, 2004). Some of the political pressure on the Executive branch is reflected in the move by the US Congress to block the final rule. Shortly after the USDA posted its final rule on January 4, 2005, resolutions were introduced in both the House and Senate to invoke the 1996 Congressional Review Act, which gives Congress the power to stop a federal agency's rule from taking effect. On March 3, 2005, just days before the USDA's final rule was to take effect, the Senate passed such a resolution (S.J. Res. 4) by a vote of 52 to 46 in favour of blocking the USDA's decision to reopen the border to Canadian cattle under 30 months. All the senators from the Western border states, including the four

Republicans from Wyoming and Idaho, and Conrad Burns from Montana, voted with the Democrats to keep the border closed.

In Canada, Prime Minister Paul Martin, who as of June 2004 headed a minority government, repeatedly called on President Bush to resolve the BSE crisis. However, as the evidence above illustrates, the USDA was working hard to resolve the matter, even going as far as to ignore its own regulations by allowing prohibited beef into the US between October 2003 and April 2004. Martin's public comments implied that the US government was not acting quickly enough, or worse, that it condoned protectionist action. Given the USDA and FDA's proactive record on BSE, the prime minister's comments seemed directed more at inflaming public opinion in Canada than at constructively cooperating to resolve the issue.

Even though the cool political relationship did not help the bilateral resolution of the Mad Cow problem, the Canadian Food Inspection Agency and the USDA continued a very close and constructive working relationship. Two senior officials indicated in personal interviews with the author that Canadian and American agencies and departments were often in daily contact and their interaction remained strong and constructive throughout the crisis. One Canadian official described it as "an extremely close working relationship."

The USDA's Rule Withstands Two Additional BSE Cases

That there is no doubt that the US government was committed to resolving this issue was again demonstrated when at last the USDA rule was released in late December 2004. The elaborate risk analysis the agency had built was tested to the limit: just days before the December 29 final rule announcement, a second case of BSE was found in an Alberta cow. On January 11, a third case of Mad Cow was found, again in Alberta. No parts of either animal entered the human food or animal feed chain, but several animals born on the same farm around the same birth date had been exported to the United States. Now there were a total of four BSE cases, all of which had originated in Alberta. Subsequent investigations confirmed that three of the animals were most likely infected by contaminated feed before the 1997 ban, or by using feed made prior to the 1997 ban in violation of the rules. The December cow, a 10-year-old, was born before the 1997 feed ban was in place. However, the January cow was born over two years *after* the feed ban, and thus most likely would have been infected by very old feed still on the farm (well after the 60-day grace period farmers were given in 1997 to use up existing feed), or by contaminated or mislabeled feed that was made after the 1997 ban.

It is suspicious that the Canadian media barely reported on these two Alberta cases of BSE. R-CALF, on the other hand, made good use of these new cases. For R-CALF, Canada's continued assurances that BSE was under control was seemingly repudiated by the quick succession of two new discoveries. It argued that Canada's risk-mitigating measures had proved insufficient. Furthermore, the new cases bolstered R-CALF's argument that there was systemic non-compliance with the feed ban and that the USDA risk calculations for BSE in Canada were too low. An unfortunate and unsubstantiated story in the *Vancouver Sun* of December 16, 2004 was widely cited by R-CALF in its communication with many Congressmen. The article described a series of tests run by the CFIA that appeared to show high incidence of animal protein in what was supposed to be cereal and vegetable-based feed (Skelton, 2004). It took the CFIA until February 2005 to explain that these test samples (half of which were from the United States) were being subjected to a new type of test (microscopy), that this was only an experiment, and that it showed the tests were not very effective. For example, if a single gopher ended up in a combine, traces of animal protein from it would contaminate a large amount of feed. Even a single bovine hair showed up as protein positive.

The question of feed ban compliance in Canada remained an important ingredient in the debate. It was unrealistic of the new Republican senator from South Dakota, John Thune, to demand that the border remain closed until Canadian feed mills could achieve a 100 percent compliance rate. Still, USDA reports do indicate that in recent years, Canadian compliance rates have lagged several percentage points behind those of their American counterparts. That said, the problem is often not in the actual flushing of equipment between feed batches, or in feed labeling, but in the paperwork. The CFIA reported in March 2005 that feed mill compliance was 95 percent while rendering plants were at 93 percent. At the same time, the US Government Accountability Office, a Congressional watchdog that monitors executive branch activities, raised questions about the FDA's own enforcement of its feed rules, citing it for not doing enough re-inspections (Becker, 2005, pp. 6-7). To make matters even more complicated, between them Canada and the United States have hundreds of thousands of on-farm feed mills. Inspecting all of these is simply not feasible.

The Final Rule, Finally

Despite the two new cases of BSE in Alberta, the USDA was prepared substantially and procedurally, and stayed the course. It sent an investigative team to Canada in early 2005 to examine the CFIA's epidemiological investigation and to review all Canadian risk mitigating measures, including on its feed ban. The USDA concluded that Canada was doing a good job, that it exceeded the standards set by the OIE, that compliance rates were

above 90 percent, and that there was no risk of an epidemic or infection of the American herd.

The National Cattlemen's and Beef Association (NCBA) also took a fact-finding trip to Canada between January 17 and January 20, 2005, and concurred with the USDA's conclusions that Canadian safeguards were adequate. The big lobby group had urged the Canadian government to drop its seasonal ban on American cattle exports to Canada for blue tongue, an animal disease with no risks to human health, and in January of 2005, Ottawa agreed to do so for feeder cattle, though as of this writing has not yet done so for breeding cattle.

The USDA's final rule included a risk analysis for up to 11 new cases of BSE coming from Canada. The final rule stated that if, from the Canadian population of cattle 24 months or older, more than 2 per million tested BSE positive in four consecutive years, the border opening would be reversed. The USDA would reopen the border to live cattle under 30 months old with all the added regulations on identification and segregation specified earlier, and it would expand meat products to any age (APHIS, USDA, 2004c).

Just before USDA's rule was to take effect, a possible challenge emerged in the US Congress. While Senate Resolution SJ-4 passed in early March, the House equivalent (H.J. Res. 23) was moribund. Thus a potential political roadblock to USDA's reopening of the border was removed. However, the NCBA and other lobbies then asked Agriculture Secretary Johanns to make one more change (NCBA, 2005, Appendix 2). Under the proposed new rule, live cattle would only be allowed in to the US as long as they were under 30 months of age, while Canadian beef of all ages could now be imported. The US meat processing industry argued that in effect, this would cause a market dislocation that would put the US slaughtering plants at a disadvantage. In this scenario, older Canadian cattle at low prices could be butchered in Canada and their meat sold in the United States, but they could not be butchered in the United States. In other words, US plants could not even compete for the meat processing. Inadvertently, the rule would give the Canadian cattle and beef industry a structural advantage over its American counterpart. There were two options from the industry's point of view: open cattle and beef trade to all ages, or keep the border closed to both cattle and beef products from animals under 30 months. To allow unlimited beef but restricted cattle would impose an artificial disadvantage to US industry.

Because Canada had seen a dramatic rise in its supply of cattle over 30 months as a result of the prolonged border closure, the price of cattle had dropped to record low levels. Cull cattle in Canada could be bought at very low prices. Thus, if the border were to open for beef over 30 months, but not cattle, Canadian meat producers could undercut American

meat plants. Many such meat plants were already struggling as they did not have enough cattle to operate efficiently.

Mike Johanns responded on February 9 by postponing the beef-over-30 months old rule, restricting the source of beef to cattle under 30 months old. He strongly implied that at a future date, both the age limit for cattle and for beef would be removed at the same time to keep the industry's playing field level. He cited as his reason for keeping the border closed to this category the as yet incomplete risk analysis done by the USDA on cattle over 30 months (Johanns, 2005a). Johanns' last-minute intervention appears as a compromise between USDA's insistence on a science-based approach and the beef industry's appeal for a level playing field.

The only obstacle that remained was R-CALF's opposition to the importation of live cattle. Just days before the implementation date, the lobby sought a preliminary injunction in the same court in which it had won in 2004. Judge Cebull granted the injunction on March 2, 2005, and set a hearing for a permanent injunction for July 25. The USDA appealed this decision on March 17. On July 14, the US Ninth Circuit Court of Appeal overturned Cebull's decision, concluding that the USDA had both the authority to set the rule and had followed the proper procedure in so doing. The circuit court found that the district court had "failed to respect the agency's [USDA] judgment and expertise" and instead inserted its own (Court of Appeals for the Ninth Circuit, 2005, p. 25).

Subsequent appeal court rulings solidified this decision leaving R-CALF with only one option left: to appeal its case to the US Supreme Court. However, this option expired at the end of January 2006. On July 18, 2005, the first truck in 26 months carrying Canadian cattle passed across the border in Lewiston, New York.

In June 2005, a 12-year old Texas cow was confirmed with BSE. Investigations showed that it had no pedigree nor feed links to the Canadian herd. Now Mad Cow had become indigenous to the American herd, which slowed down the recommencement of American beef exports to Asia. Like the Canadian cattle industry, the US beef export industry waited a total of two years for Japan to allow a partial reopening of its market in December 2005. South Korea followed Japan's lead in mid-January 2006. In Japan's case, the USDA agreed in October 2004 to remove all SRMs even from cattle under 21 months of age and to add extended age verification measures for each animal.

The Economic Impact of the BSE Crisis

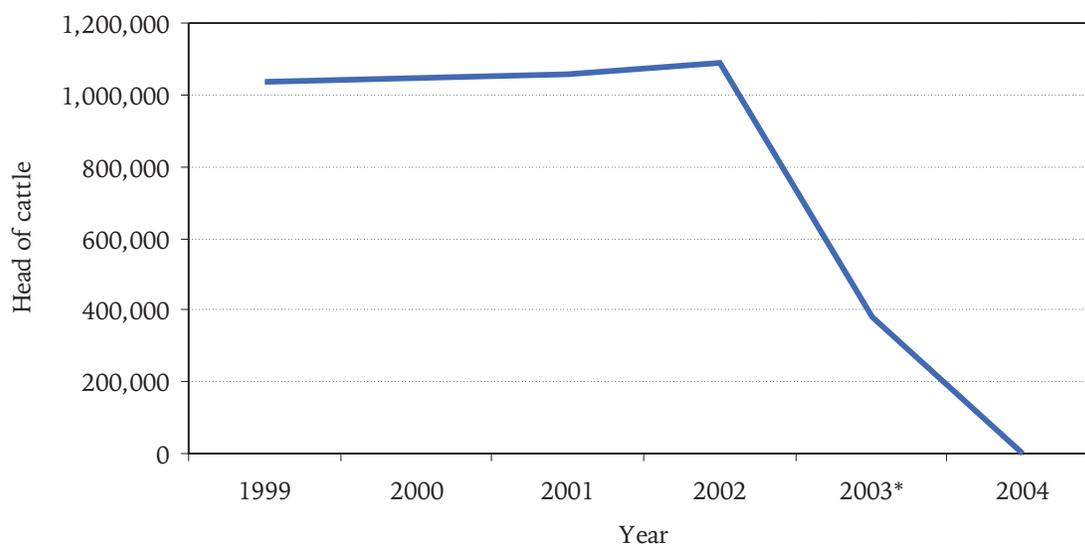
The most devastating economic effect of the Mad Cow outbreak in Canada has been in the live cattle trade. As figure 8 shows, exports of over 1 million head on average per year in the four years prior to the border closure plummeted to near zero in 2004. Canada's share of US cattle imports fell from 60 percent in 2002 to 0.2 percent in 2004.

Total Canadian farm receipts from cattle and calves fell from \$7.7 billion in 2002 to \$5.19 billion in 2003.

However, the outcome of the Mad Cow crisis has not been nearly as negative for beef exports. In 2004, Canada exported 337,000 tonnes of beef to the United States. While this was up 47 percent over 2003, it still was 7 percent behind the total volume of exports to the US in 2002 (CanFax, 2005a, p. 6). However, since the 2004 volume was only boneless beef, while the 2002 volume includes bone-in products as well, the volume of actual beef was equal or higher in 2004 than in 2002.

Further, as table 1 shows, Canadian beef exports in 2004 (US \$1.19 billion) surpassed the value of 2002 exports (US \$1.18 billion). The value of exports for 2005 is estimated at US\$ 1.4 billion. Also, the share of Canadian exports to the United States as a percentage of total exports was largely unchanged, staying in the mid-80 percent range. While

Figure 8: Canadian Exports to US of Slaughter Cattle, 1999-2004



*Note: The border closed on May 20, 2003.

Source: Gervais and Schroeder, 2005.

farmers saw a steep decrease in cash receipts for cattle, the big meat packing plants in Alberta reported strong profits in the last half of 2003 and 2004.

Between 2002 and 2004, the Mad Cow crisis essentially cut the total value of all Canadian beef and cattle exports in half. In 2002, these exports had a total value of Can \$3.9 billion. In 2003, this fell to Can \$2 billion, and in 2004, it dropped a little more to Can \$1.9 billion (Boame *et al.*, 2004).

Total farm cash receipts from cattle and calves was Can \$7.707 billion in 2002. In 2003, it fell to Can \$5.144 billion and dropped again slightly in 2004 to Can \$5.138. In 2005, however, cash receipts for January to September were Can \$5.89 billion, showing a clear recovery (Statistics Canada, 2004a, 2005a, 2005b).

Prices for Canadian cattle remained well below American prices until late in 2005. Up until the May 2003 BSE crisis, prices for Canadian fed cattle closely tracked American prices. But as figure 9 shows, two marked divergences took place in 2003 and 2004.

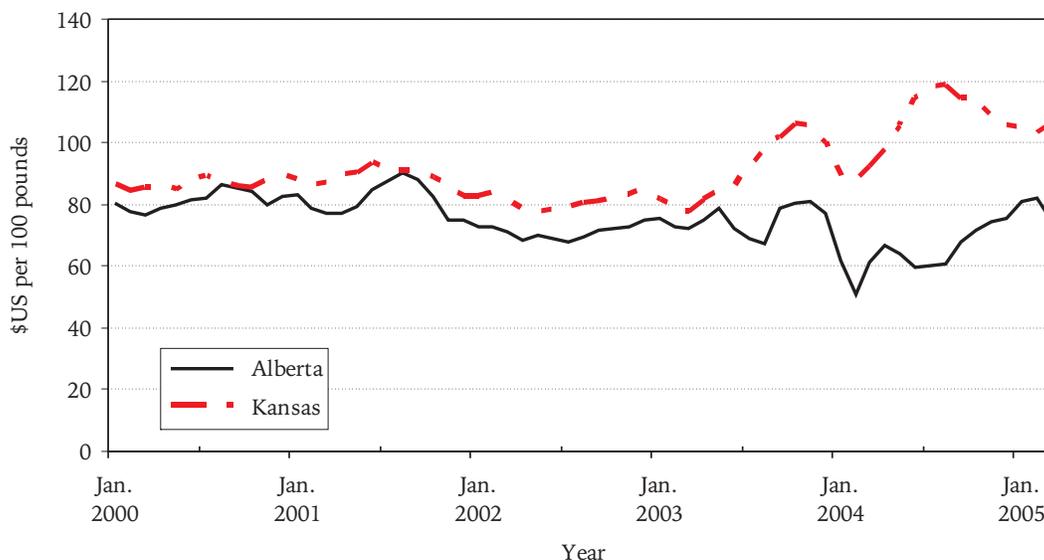
The first divergence took place right after the first Mad Cow announcement (May 2003). Steer prices in Alberta fell by as much as US\$10 cwt. They recovered when the USDA announced in October 2003 that it planned to reopen the border in early 2004. The second divergence came right after the December 2003 BSE case in Washington State. At that point, Alberta steer prices fell some US \$30 cwt. Both times the Alberta prices dropped, the steer prices in Kansas increased significantly. Alberta prices recovered from most of the January 2004 loss, but stayed well below US prices until the border reopened in 2005.

Table 1: Canadian Beef Exports: Before and After Canada's May 2003 BSE Case

	2002	2003	2004	Jan-June 2004	Jan-June 2005	% Change 2004-2005
Quantity total to US (metric tons)	388,500	255,833	356,507	175,321	202,886	16%
Quantity total to Rest of World (metric tons)	80,990	39,252	73,815	37,299	30,322	-19%
Total to the world (metric tons)	469,490	295,085	430,322	212,620	233,208	10%
Share exported to US	83%	87%	83%	82%	87%	
Value totals to US in US\$	\$1,118	\$854	\$1,198	\$581	\$721	24%

Source: FAS, USDA, 2005b, p. 10.

Figure 9: Monthly Average Prices for 700-800 Pound Steers in Kansas and Alberta, January 2000 to March 2005



Source: Gervais and Schroeder, 2005, p. 26.

Table 2 shows that the Canadian cattle inventory continued to rise in the aftermath of the BSE crisis while the American inventory stayed below its 2002 level.

As a result of the border being closed to live cattle, investment (by both new Canadian firms and existing American firms) in Canadian slaughtering facilities increased substantially. Faced with a sudden loss in exports and a quickly growing herd, Canadian slaughter plants increased their capacity by 20 percent from 2003 to 2004. In the first half of 2005, the Canadian slaughter rate was 34 percent above what it was in the same period in 2003. A further 5 percent increase is expected in 2006. At the same time, Canadian imports of beef from non-NAFTA countries dropped sharply as domestic production took its place.

The increased value of Canadian meatpacking is illustrated in a comparison of fed slaughter cattle and boxed beef exports. Canada exported the equivalent of 1.45 million head in boxed beef in 2002. But in 2004, that number went up to the equivalent of 1.77 million head.

When cross-border trade in cattle resumed in July 2005, the flow of Canadian cattle was at first very slow as the new regulations were cumbersome, the Canadian dollar had risen considerably compared to 2003, and the trucking industry needed to make adjust-

Table 2: Canadian and American Cattle Inventories, 2000-2005

	2000	2001	2002	2003	2004	2005
Canada, cattle and calves (thousand head)	14,968	15,424	15,436	15,738	16,758	17,295
USA, cattle and calves (thousand head)	106,300	105,800	105,100	103,900	103,600	104,500

Source: National Agricultural Statistics, 2005.

ments. However, by December 2005, a total of 440,000 head of cattle had been exported, of which 58 percent was fed steers and heifers (CanFax, 2005b). This number indicates not only the large stockpile of Canadian cattle, but also suggests that growth in Canadian beef exports may decline as the live cattle trade picks up again.

Canadian subsidies

Several relief and price support programs were announced in Canada in 2003 to help farmers and feedlots as prices dropped sharply and cattle inventory began to grow. Under the Federal/Provincial BSE Recovery Program, Canadian producers were given a price subsidy to cover some of the price differential that arose between American market values and Canadian prices (Mitura and Pietro, 2004: Appendix A and B). In 2004, the federal government also used the Canadian Farm Income Program and the Transitional Industry Support Program to pay producers up to \$80 per bovine based on their December 2003 herd inventory. The total sum paid out was estimated at nearly \$1 billion. Other programs included set-aside subsidies, some of which gave producers financial support to feed their animals for longer than they would have under normal circumstances, and others which offset losses in cull cattle.

In Alberta between June 2003 and June 2004, 1 million animals and 22,000 enterprises received some form of financial assistance amounting to \$403 million, of which \$149 million came from the federal government (Leroy, 2005, p. 42). The federal government and provinces other than Alberta spent another \$520 million. Over \$100 million was spent in the 2003-2005 period on subsidies and guaranteed loans to help restructure the industry, expand slaughtering facilities, and explore new export opportunities (Leroy, 2005).

When the border reopened to cattle under 30 months, the set-aside program was ended, as were most price support programs for cattle producers. By 2005, the total of government subsidies, loan guarantees, and other producer assistance targeted to the BSE crisis amounted to more than \$1.5 billion.

Cost estimate of the BSE crisis

Canadian media reports have put the total cost of the BSE crisis for the Canadian economy at \$7 billion (Picard, 2006). However, it is complex to assess the overall economic impact of BSE. It has affected many sectors, and while there are obvious losses, there are also some gains, and subsidies have mitigated other losses.

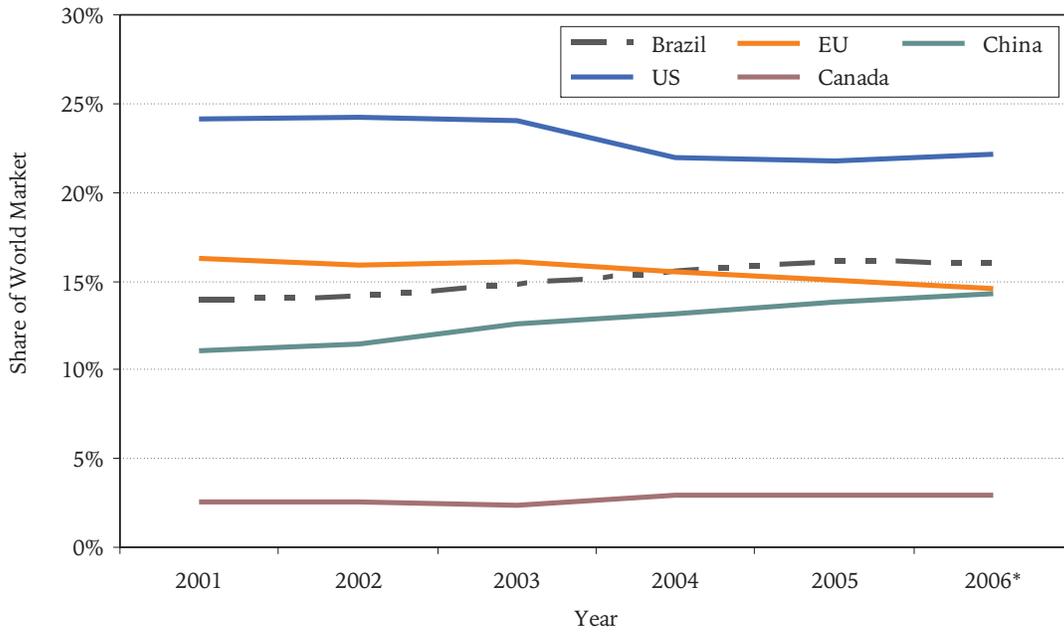
Canadian export earnings from cattle and beef were \$2 billion lower in 2003 than in 2002 (TD Economics, 2004, p. 2). Farm cash receipts for cattle and calves were down \$2.5 billion per year in both 2003 and 2004. More than 160,000 tonnes of beef exports were lost in 2003, of which about 80 percent would have been to the US. Prices for cattle and calves remained below their five-year averages until the fall of 2005. The meatpacking and rendering industry faced extra costs for removing specified risk materials. These costs are estimated to be between \$25 and \$50 per head (Grier, 2005, p. 83). A report commissioned by the Canadian Animal Health Coalition, an umbrella group of various stakeholders and agencies involved in animal health issues, estimated the total economic cost of BSE for 2003, including equity losses and labour losses, at \$6.3 billion (*Economic Implications of BSE in Canada*, 2003).

However, this report does not factor in offsetting gains. Farmers who decided to get one or two more calves out of breeding or dairy stock rather than culling these animals will see some returns. Canadian consumer demand for beef rose in 2003 and the Canadian government did not give permits to non-NAFTA beef importers above Canada's annual quota. As a result, some 76,000 tonnes of beef imports from outside NAFTA (about 8 percent of Canadian beef production) were substituted with increased domestic beef production in 2004. New slaughtering capacity with better economies of scale and higher value beef from animals under 30 months increased the value of beef products. Meatpacking plants reaped "exceptional profits" from "depressed" cattle prices in Canada while beef product prices in the United States remained stable (Grier, 2005, p. 5). As a result of greater meatpacking capacity, projected beef exports to the US in 2005 were nearly 10 percent above 2002 levels, recouping some of the losses sustained in 2003. While dairy farmers have suffered from extremely low prices for their cull cattle, the Canadian Dairy Commission authorized a 1.66 cent per kilogram increase in industrial milk to offset the cost (Canadian Dairy Commission, 2004).

World market trends in the beef trade

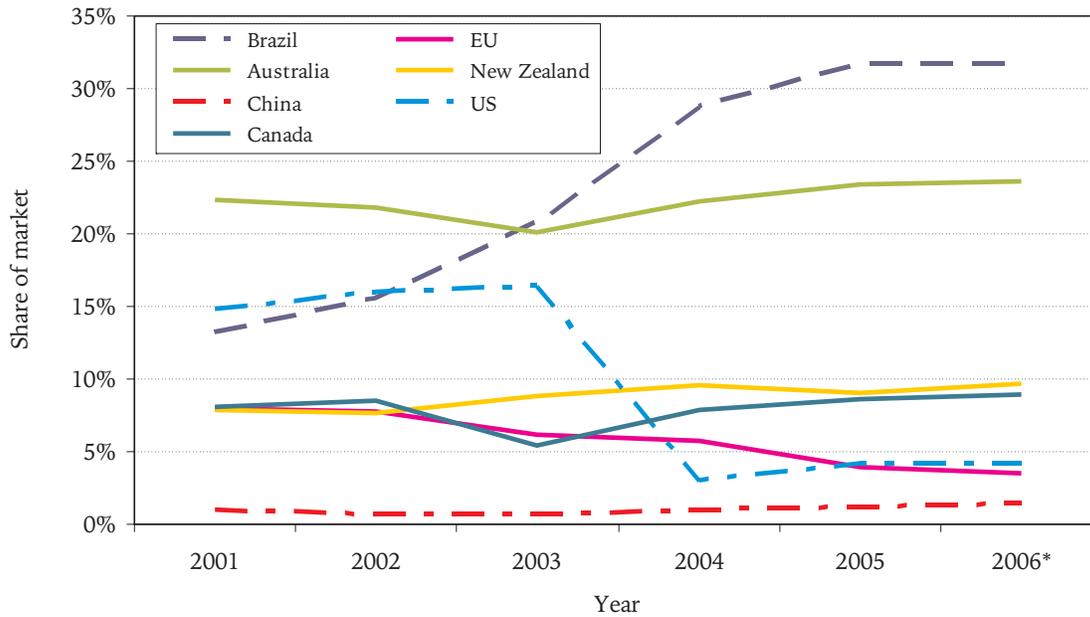
In terms of the world production and world trading share in beef, it appears that the BSE crisis hit the American beef sector more severely than the Canadian one. As figure 10 shows, after the May and December 2003 BSE cases, America's share of production

Figure 10: Market Share of World Beef Production, 2000-2006*



*2006 is a forecast.
Source: FAS, USDA, 2005c.

Figure 11: Market Shares of Seven Largest Beef Exporters, 2001-2006*



*2006 is a forecast.
Source: FAS, USDA, 2005c.

dropped by nearly 4 percent, while Canada's share held steady, and Brazil's and China's shares grew strongly. However, the US only exports about 10 percent of its beef, and while its share of world production dropped, its prices remained high.

Figure 11 shows the even more dramatic impact of the BSE crisis on the world market share in beef exports. From 2001-2006, the US share of beef exports dropped by 15 percent with Brazil picking up half of the gains. Canada's share dropped, too, but also recovered quickly to near pre-BSE levels. Most of the recovery was in exports to the United States, with a small margin to new export destinations such as Hong Kong and Macau for a total of \$54 million in 2005 (CanFax, 2005b).

Conclusions

The sudden border closure as a result of an indigenous Canadian BSE case dealt a devastating blow to Canada's cattle industry, and especially to the three Prairie provinces, which contain over 80 percent of Canada's cow and calf producers and feedlot operators. Alberta has about 50 percent of this industry. As a result of a second case of BSE in December 2003 in a US cow which had been imported from Canada in 2001, it took the USDA an extra year of procedural changes and legal wrangling to re-open the border to Canadian cattle under 30 months.

The US border closure was not a political or protectionist move. In fact it was the opposite. Reducing the risk of spreading the disease and establishing new rules to remove specified risk materials from the food and feed chain required time. It was not only necessary to safeguard the American herd, but it was imperative to persuade Asian markets, which knew the integrated nature of the Canadian-US cattle market, that US beef would be safe. The fact that the US found its own first non-import BSE case in June 2005 in Texas complicated the US attempt to restore its export markets.

Both Canada and the United States suffered multi-billion dollar losses from the crisis, but given the difference in market size, the losses had a much greater impact in Canada. Exact cost estimates for the Canadian industry are difficult to make, but total losses in farm cash receipts for cattle and calves are believed to be in the Can \$6 to \$7 billion range in the 2003-2005 period. American beef exports losses amount to US \$5 billion over the same time period.

The USDA designated Canada as the only country in the world in which BSE was present *and* which could continue to export beef products to the United States. This was a rule-based, pro-free trade action. Canada's science-based and comprehensive approach

to controlling the disease from the early 1990s onward was a critical ingredient for the USDA to reach this decision.

The USDA's decision to allow boneless beef cuts from animals under the age of 30 months (an internationally recognized low-risk age group) back into the United States as early as September 2003 saved the Canadian beef industry and allowed it to eventually sell a higher value of beef products in 2004 and 2005 than it had in 2002.

Given the independent powers the US Constitution bestows on Congress and the Executive, US lobbies have far greater influence in the governmental process than do their counterparts in Parliamentary systems. Federal departments, such as the USDA and the FDA, are mandated by law to allow interest groups, the public, and politicians an opportunity to challenge or comment on proposed rules. R-CALF's successful legal challenge of USDA procedures in April 2004 made it impossible for the federal government to re-open the border in 2004.

Despite a US Senate vote to halt the USDA's plan and another court challenge by R-CALF, the USDA was able to re-open the border to live cattle in mid 2005 when a US Appeals court overturned R-CALF's temporary injunction. The US government acted in good faith and it was disingenuous on the part of some high-level politicians in Canada to suggest that the US condoned protectionism in this case.

The BSE crisis has caused a partial restructuring of the cattle and beef trading relationship between Canada and the US. Canada has expanded its meatpacking capacity by 25 percent while still building up its cattle inventory. The extra value-added that the Canadian beef industry is gaining by exporting beef rather than cattle has a positive impact on the industry and offsets some of the losses it suffered.

The USDA's careful and robust rule-making does benefit Canada. Three BSE cases in Canada since December 2004 have not changed the USDA's designation of Canada as a low-risk region. Under the USDA's current rule, Canada could have some 13 cases of BSE per year in its cattle over 24 months of age and still be able to ship across the border.

In January 2006 another case of Mad Cow was found in Alberta (*Globe and Mail*, 2006). US officials immediately indicated that there would be no trade disruption. At the same time, the breeding cow was only 6 years old, meaning that it was born three years after the 1997 feed ban took effect in Canada, and thus contributes to the argument that the Canadian feed problem has persisted well beyond the 1997 ban. Still, it is not certain whether a total recall of feed prior to 1997 at the time of the ban or a stricter compliance regime would have removed this weak link in the Canadian chain.

There are good prospects that in 2006, the US will propose a rule to open the border to Canadian cattle and beef over 30 months, effectively bringing the market back to its free, transparent, and competitive position.

Recommendations

Given that Canadian beef exports have exceeded their pre BSE values, *and* that cattle prices returned to their pre-BSE levels in 2005, Canadian governments should end whatever subsidies remain lest they provoke trade action requests by American lobbies. Neither the Canadian government nor the provinces should subsidize industry in the process of removing specified risk materials as this may also invite US trade action.

Canadians should not assume that the extra beef produced in Canada can easily be sold in the overseas (Asian) market, as this market is very competitive with several large exporters vying for a market segment. Under NAFTA, Canada and Mexico both have free access to the American beef market (unlike the non-NAFTA countries, which face quotas). This market will again prove to be the most profitable one for Canada. The Canadian government should pursue the restoration of complete free trade in cattle and beef products of all ages as a higher priority than export diversification.

Historically, the Canadian cattle and beef industry demanded that Canadian regulations be kept in harmony with American rules lest extra costs make the Canadian product less competitive. As a result of the BSE crisis, Canada is ahead of, or slightly more restrictive than the United States in regulations on meat processing and animal feed rendering. Canada has also started a national identification program for all cattle. Given that contaminated feed and infected cows originating from the Alberta region still pose a small risk to free trade, it is important for Canada to keep this edge. To add to this advantage, Canada should consider confidence building measures, such as joint US-Canadian inspections of Canadian facilities. The fact that two of the Canadian BSE cases were cows that had been born after the 1997 feed ban took effect has raised questions how strictly this ban was adhered to or enforced. Even though Canada's compliance rates are very high, Canada should work on its compliance rates for feed mills, so that these rates consistently exceed American rates.

There is another reason for this recommendation: Both Canada and the US have quadrupled their monitoring and inspection levels for BSE. Canada now inspects more than 40,000 animals per year and the US more than 400,000. There is still a small risk that with the higher inspection levels a number of new BSE cases will be found in Canada in a short time frame and that American lobbies will again try to pry open the debate about

Canadian feed mill regulations and compliance. Canadian industry members have filed a class action lawsuit against the Canadian government and against the Canadian subsidiary of a US feed mill for negligence in feed compliance and enforcement. Whether successful or not, this suit may bring to light historical shortcomings in Canadian practices and become ammunition for a US lobby. A proactive approach by the Canadian government to these problems that show further risk-mitigating measures have been taken is well advised.

Efforts to create a stronger international regime to guide countries dealing with BSE have shown little progress. Rather than emphasizing this international route, Canada should apply its efforts to a stronger NAFTA working relationship. Building on earlier efforts, Canada, Mexico, and the United States should continue to work on common risk assessments and risk mitigating measures in the North American market. As of March 2005, the United States, Canada, and Mexico have begun to explore the harmonization of North American standards for trade in beef and cattle (Becker, 2005). Working closely with the USDA on practical harmonization steps is a key interest for Canada. Given the renewed closure of the Japanese market to US exporters after a December 2005 incident in which SRM materials were found in a US shipment to Japan, the US is also keen to establish a stable regulatory regime.

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Acronyms Used in this Paper

AMI: American Meat Institute

AMR: advanced meat recovery

APHIS: Animal and Plant Health Inspection Service (US)

BSE: Bovine Spongiform Encephalopathy

CDC: Center for Disease Control and Prevention (US)

CFIA: Canadian Food Inspection Agency

CUFTA: Canada-United States Free Trade Agreement

CWT: Cattle weight of one hundred pounds

FDA: Food and Drug Administration (US)

FSIS: Food Safety and Inspection Service (US)

NCBA: National Cattlemen's Beef Association

NAFTA: North American Free Trade Agreement

OIE: Organization of International Epizootics

R-CALF: Ranchers-Cattlemen Action Legal Fund (US)

SPS: Sanitary and Phytosanitary Services Agreement

SRMs: specified risk material(s)

TSE: Transmissible Spongiform Encephalopathies

USDA: United States Department of Agriculture

vCJD: variant-Creutzfeldt Jacob Disease

WTO: World Trade Organization

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