

**Regulatory Impact Analysis and
Final Regulatory Flexibility Analysis**

Final Rule

**Bovine Spongiform Encephalopathy; Minimal-Risk Regions; Importation of Live
Bovines and Products Derived from Bovines
(Docket No. APHIS 2006-0041)**

**U.S. Department of Agriculture
Animal and Plant Health Inspection Service**

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Summary

On January 4, 2005, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS or the Agency) published a final rule entitled “Bovine Spongiform Encephalopathy; Minimal-Risk Regions and Importation of Commodities,” referred to as the BSE minimal-risk regions rule. It established a category of regions that present a minimal risk of introducing BSE into the United States through importation, under certain conditions, of live ruminants and ruminant products and byproducts from such regions, and named Canada as a BSE minimal-risk region. This regulatory impact analysis (RIA) and final regulatory flexibility analysis are for a rule that will amend the BSE minimal-risk regions rule.

The purpose of the rule is to remove certain restrictions on the importation of certain bovine commodities from BSE minimal-risk regions. APHIS has determined that the restrictions are not warranted by scientific research and evidence, and that they are unnecessary for maintaining a negligible risk (i.e., the likelihood of establishment and the potential impacts of cases that may occur even without establishment) to the United States via imports of live bovines and bovine products from such regions.

The rule will allow the following commodities to be imported from Canada, as a BSE minimal-risk region, under specified conditions (in addition to commodities currently allowed to be imported from BSE minimal-risk regions):

- Live bovines that were born on or after March 1, 1999;
- Bovine small intestines, minus the distal ileum;
- Bovine casings; and
- Bovine blood and blood products.

Additionally, this rule removes the delay of applicability of provisions of the BSE minimal-risk regions rule regarding the importation of meat, meat products, and meat byproducts derived from bovines in Canada that were 30 months of age or older when slaughtered.

This RIA addresses expected economic effects of allowing resumption of imports from Canada of the above commodities. Expected benefits and costs are examined in accordance with Executive Order 12866. Expected economic impacts for small entities are also evaluated, as required by the Regulatory Flexibility Act. Our analysis indicates that benefits of the rule will exceed costs overall. Effects for Canadian and other foreign entities are not addressed in this analysis. However, the Agency expects reestablished access to U.S. markets to benefit Canadian producers and suppliers of commodities included in the rule.

Analytical Approach

The approach and models used in this analysis are the same as were applied in the preliminary RIA that we prepared for the proposed rule. Impacts for cattle for feeding or for immediate slaughter and impacts for beef are quantitatively modeled. Impacts for other affected commodities—breeding cattle including dairy, vealers and slaughter calves, bison, bovine casings and small intestine products, and bovine blood and blood products—are examined largely qualitatively. For the modeled cattle and beef, we project a 5-year baseline, 2008-2012, against which we measure expected price and welfare effects of projected levels of cattle and beef imports from Canada. We evaluate price and welfare effects for the three scenarios that were considered in the preliminary RIA, as follows:

- Scenario 1: Allow imports of Canadian cattle born on or after March 1, 1999;
- Scenario 2: Allow imports of Canadian cattle unrestricted by date of birth; and

- Scenario 3: The same as scenario 1, with the addition of the resumption of imports of beef from Canadian cattle slaughtered at 30 months or older (called OTM, or over-30-month, beef).

As a fourth scenario, we consider imports of Canadian cattle unrestricted by date of birth and the resumption of OTM beef imports. Projected imports under this scenario 4 are described, but the expected impacts are not evaluated, for reasons explained below.

Beginning with baseline quantities and prices, we compute effects of the projected changes in imports from Canada for four commodity categories: Cull cattle/processing beef, feeder cattle, fed cattle, and fed beef. The resumption of cull cattle imports is expected to affect the slaughter mix in Canada, and that change in the slaughter mix will be reflected in changes in the mix of exports to the United States.

As part of this adjustment, for example, we expect that more fed steers and heifers will be slaughtered in Canada and fewer will be exported to the United States than if cull cattle imports were not reestablished. Canada's cattle inventory increased rapidly following the May 2003 BSE discovery and its loss of export markets for cattle and beef. In response, Canada's slaughter capacity expanded. Beginning in July 2005, with the resumption of imports by the United States of Canadian feeder cattle and fed cattle, some Canadian plants continued to utilize their expanded slaughter capacity by shifting to increased cull cattle slaughter. Canadian cull cattle slaughter would likely continue to expand if the United States were to remain closed to imports of Canadian cull cattle. However, with this rule, we can expect some substitution in Canada of cull cattle slaughter by fed cattle slaughter.

Importation of fewer fed cattle from Canada, all things equal, will cause the price of fed cattle in the United States to rise. We estimate the expected increase in price and, because of the

price rise, the decrease in the quantity of fed cattle demanded by U.S. slaughter and packing establishments and the increase in the quantity of fed cattle supplied by U.S. feedlots. The analysis yields measures of welfare change, which in this example are in terms of surplus losses for U.S. buyers and surplus gains for U.S. sellers of fed cattle.

For each of the first three scenarios, we compute impacts for the modeled commodities using the Baseline Analysis System (BAS) model.¹ Impacts are also summed for each scenario. The BAS model is a net trade, non-spatial partial equilibrium model. Partial equilibrium means that the model results are based on maintaining a commodity-price equilibrium in a limited portion of an overall economy. Commodities not explicitly included in the model are assumed to have a negligible influence on the results. The simple summation of the separate partial equilibrium results using the BAS model does not take into account market dynamics, but does provide a reasonable approximation of the combined welfare effects for each scenario.

We also examine impacts more broadly using a multi-sector model that takes into account substitution among livestock products in response to relative price changes.² This model maps interactions among the grain, animal, and animal products industries. It takes into account substitution among livestock products in response to relative price changes, incorporates foreign trade, and yields expected price and revenue effects. The simulated multi-sector impacts tend to

¹ A complete description of the model is provided in: Forsythe, K.W. "An Economic Model for Routine Analysis of the Welfare Effects of Regulatory Changes." V3.00. U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, Centers for Epidemiology and Animal Health. April 20, 2005 (draft). http://www.aphis.usda.gov/peer_review/content/printable_version/bas_model_econOnly_apr20.pdf

² Four examples of studies based on this type of model are: Paarlberg, P.L., A.H. Seitzinger, and J.G. Lee, "Economic Impacts of Regionalization of a Highly Pathogenic Avian Influenza Outbreak in the United States," *Journal of Agricultural and Applied Economics*, forthcoming. Paarlberg, P.L. "Agricultural Export Subsidies and Intermediate Goods Trade," *American Journal of Agricultural Economics*. 77, 1(1995): 119 - 128. Paarlberg, P.L., J.G. Lee, and A.H. Seitzinger. "Potential Revenue Impact of an Outbreak of Foot-and-Mouth Disease in the United States," *Journal of the American Veterinary Medical Association*. 220, 7(April 1, 2002): 988 - 992. Sanyal, K.K. and R.W. Jones. "The Theory of Trade in Middle Products," *American Economic Review*. 72(1982): 16 - 31.

be smaller than the BAS model results because the model linkages specified between the livestock production and processing sectors capture at least some of the flexibility that industry enterprises exhibit when adjusting to supply shocks. These results support our expectation that broader impacts of the rule will be limited.

Baseline quantities and prices and imports from Canada have been projected by staff of USDA ERS, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch, based on their expert knowledge and reference to “USDA Agricultural Baseline Projections to 2016,” United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007.³

Projected Imports from Canada

Scenario 1. Table A shows the projected changes in cattle and fed beef imports from Canada under scenario 1 (allow imports of Canadian cattle born on or after March 1, 1999). Under this scenario, cull cattle imports from Canada are projected to total 104,000 head in 2008 and average 147,800 head over the 5-year period of analysis. These import numbers are considerably smaller than were projected in the preliminary RIA because we now have a better understanding of the extent to which the birth-date restriction and age-verification requirement may limit the number of cull cattle eligible for import. Annual declines in feeder cattle and fed cattle imports are projected to average 6,800 head and 56,800 head, respectively. These declines correspond to projected changes in the overall Canadian cattle inventory, with the import volumes for fed cattle further adjusted downward to reflect greater competition from Canadian packers due to the resumption of U.S. imports of cull cattle. Yearly fed beef imports are projected to increase by an average of 45.8 million pounds, carcass weight equivalent.

³http://www.usda.gov/oce/commodity/ag_baseline.htm

All of the changes under scenario 1 are small when compared to the commodities' projected U.S. baseline supplies. The changes in imports for feeder cattle, fed cattle, and fed beef imports, in particular, are projected to be only fractions of 1 percent of baseline supplies. Under scenario 1, the number of cull cattle projected to be imported in 2008 is less than 2 percent of projected U.S. baseline cull cattle slaughter quantities. Over the period of analysis, cull cattle imports are projected to average 2.5 percent of baseline quantities. Cull cattle imports are projected to increase in the latter years of the analysis, and even more so in subsequent years, as higher percentages of Canada's cull cattle inventory are able to be verified as having been born on or after March 1, 1999. A relative increase in the number of cull cattle imported over time is projected to be associated with, in turn, a relative decrease in the quantity of fed cattle imports and a relative increase in the quantity of fed beef imports.

Baseline projections over the 5-year period, 2008-2012, show the United States importing a little over 40 percent of its supply of processing beef. A share of the cull cattle imported from Canada will yield processing beef that will substitute for processing beef that otherwise would be imported from other countries, while a share of the imported cull cattle will yield processing beef that will replace a quantity of processing beef that would otherwise be domestically supplied, as U.S. producers respond to lower prices. The remaining share of cull cattle imports will yield processing beef that will represent a net increase in U.S. processing beef supplies.

We use 25 percent as the percentage of cull cattle imports from Canada projected to displace U.S. processing beef imports from elsewhere. The 25 percent share is estimated using the multi-sector model and takes into account the interactions of the beef processing sector with the beef cattle and dairy cattle sectors. For comparison, we also compute price and welfare

effects assuming (i) 50 percent of cull cattle imported from Canada displace processing beef imports, and (ii) none of the imported cull cattle displaces processing beef imports.

Scenario 2. In Table B, we show the projected changes in cattle and fed beef imports from Canada under scenario 2 (allow imports of Canadian cattle unrestricted by birth date). Under this scenario, imports of cull cattle and changes in imports of fed cattle and fed beef are all projected to be much larger than in scenario 1. Feeder cattle imports are projected to be the same under all of the scenarios. Projected cull cattle imports in scenario 2 average 459,800 head per year over the period of analysis, or 7.8 percent of U.S. baseline slaughter quantities. This amount is more than three times cull cattle imports projected in scenario 1. The fed cattle and fed beef changes remain a fraction of 1 percent of the U.S. baseline supplies, but are also larger. The increased number of cull cattle imported in this scenario is projected to be associated with larger declines in fed cattle imports and larger increases in the fed beef imports. We again estimate that 25 percent of cull cattle imports from Canada under this scenario displace processing beef imports from other sources. Price and welfare analyses assuming 50 percent of the imported cull cattle displace processing beef imports and none of the cull cattle displaces processing beef imports are also again presented.

Scenario 3. Table C shows the projected changes in cattle and beef imports from Canada under scenario 3 (allow imports of Canadian cattle born on or after March 1, 1999, and resume imports of OTM beef). In scenario 3, impacts derive from the resumption of OTM beef imports as well as the cull cattle imports from Canada. Projected cull cattle imports are lower than in scenario 1 (averaging 106,000 head per year over the 5-year period, compared to 147,800 head) because of the entry of OTM beef. Similarly, changes in projected fed cattle and fed beef imports are somewhat smaller than the changes projected in scenario 1. Processing beef imports

from Canada under scenario 3 are projected to average 254.6 million pounds per year, carcass weight equivalent, or about 4.1 percent of the U.S. baseline supply. The quantity of processing beef imported is projected to decline and the quantity of cull cattle imported is projected to increase in the latter years of the 5-year period, as an increasing number of cull cattle become eligible for importation, that is, are able to be verified as having been born on or after March 1, 1999. Under scenario 3, and considering imports of cull cattle (based on the cattle's processing beef equivalence) and processing beef as a single market, 77 percent of cull cattle and processing beef imports from Canada are projected to enter the United States as OTM beef, while 23 percent of these imports are projected to enter as cull cattle, over the 5-year period of analysis. Consistent with scenarios 1 and 2, we use 25 percent as the share of the cull cattle and OTM beef imports from Canada that displaces processing beef imports from other countries. We also present the price and welfare effects assuming that either 50 percent or none of the cull cattle and OTM beef imports from Canada displace processing beef imports from elsewhere.

Scenario 4. In Table D, we show the projected changes in cattle and fed beef imports from Canada under scenario 4 (allow imports of Canadian cattle unrestricted by birth date and resume imports of OTM beef). As in scenario 2, imports of cull cattle and changes in imports of fed cattle and fed beef are all projected to be larger than in scenarios 1 and 3. Projected cull cattle imports in scenario 4 average 328,200 head per year over the period of analysis, or 5.5 percent of U.S. baseline slaughter quantities. The fed cattle and fed beef changes remain a fraction of 1 percent of the U.S. baseline supplies.

Table A. Projected changes in imports of cull cattle, feeder cattle, fed cattle, fed beef, and processing beef from Canada under scenario 1, and projected changes in imports from Canada as a percentage of the projected U.S. baseline supplies, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Projected changes in imports from Canada					
Cull cattle (thousand head)	104	110	113	187	225
Feeder cattle (thousand head)	-1	9	-5	-16	-21
Fed cattle (thousand head)	-30	-4	-43	-93	-114
Fed beef (million pounds, carcass weight equivalent)	24	3	35	75	92
Processing beef (million pounds, carcass weight equivalent)	0	0	0	0	0
Projected changes in imports from Canada as a percentage of the projected U.S. baseline supply					
Cull cattle	1.8%	1.9%	1.9%	3.1%	3.7%
Feeder cattle	nil	nil	nil	nil	-0.1
Fed cattle	-0.1%	nil	-0.1%	-0.3%	-0.4%
Fed beef	0.1%	nil	0.2%	0.3%	0.4%
Processing beef	0	0	0	0	0

Table B. Projected changes in imports of cull cattle, feeder cattle, fed cattle, fed beef, and processing beef from Canada under scenario 2, and projected changes in imports from Canada as a percentage of the projected U.S. baseline supplies, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Projected changes in imports from Canada					
Cull cattle (thousand head)	459	459	459	460	462
Feeder cattle (thousand head)	-1	9	-5	-16	-21
Fed cattle (thousand head)	-119	-91	-129	-161	-173
Fed beef (million pounds, carcass weight equivalent)	96	74	105	131	140
Processing beef (million pounds, carcass weight equivalent)	0	0	0	0	0
Projected changes in imports from Canada as a percentage of the projected U.S. baseline supply					
Cull cattle	8.2%	7.8%	7.6%	7.6%	7.6%
Feeder cattle	nil	nil	nil	nil	-0.1
Fed cattle	-0.4%	-0.3%	-0.4%	-0.5%	-0.6%
Fed beef	0.4%	0.3%	0.5%	0.6%	0.6%
Processing beef	0	0	0	0	0

Table C. Projected changes in imports of cull cattle, feeder cattle, fed cattle, fed beef, and processing beef from Canada under scenario 3 and projected changes in imports from Canada as a percentage of the projected U.S. baseline supplies, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Projected changes in imports from Canada					
Cull cattle (thousand head)	75	79	81	134	161
Feeder cattle (thousand head)	-1	9	-5	-16	-21
Fed cattle (thousand head)	-23	4	-34	-80	-98
Fed beef (million pounds, carcass weight equivalent)	18	-3	28	65	79
Processing beef (million pounds, carcass weight equivalent)	277	273	272	234	217
Projected changes in imports from Canada as a percentage of the projected U.S. baseline supply					
Cull cattle	1.3%	1.3%	1.3%	2.2%	2.7%
Feeder cattle	nil	nil	nil	nil	-0.1
Fed cattle	-0.1%	nil	-0.1%	-0.3%	-0.3%
Fed beef	0.1%	nil	0.1%	0.3%	0.3%
Processing beef	4.7%	4.5%	4.4%	3.7%	3.4%

Table D. Projected changes in imports of cull cattle, feeder cattle, fed cattle, fed beef, and processing beef from Canada under scenario 4, and projected changes in imports from Canada as a percentage of the projected U.S. baseline supplies, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Projected changes in imports from Canada					
Cull cattle (thousand head)	328	328	327	328	330
Feeder cattle (thousand head)	-1	9	-5	-16	-21
Fed cattle (thousand head)	-86	-58	-96	-129	-140
Fed beef (million pounds, carcass weight equivalent)	70	47	78	104	114
Processing beef (million pounds, carcass weight equivalent)	94	94	94	94	95
Projected changes in imports from Canada as a percentage of the projected U.S. baseline supply					
Cull cattle	5.8%	5.6%	5.4%	5.4%	5.4%
Feeder cattle	nil	nil	nil	nil	-0.1
Fed cattle	-0.3%	-0.2%	-0.3%	-0.4%	-0.5%
Fed beef	0.3%	0.2%	0.3%	0.5%	0.5%
Processing beef	1.6%	1.5%	1.5%	1.5%	1.5%

Effects for Commodities Not Analyzed Using the BAS Model

Five categories of commodities that will be affected by this rule have not been included in the modeled quantitative analysis described above. They are: breeding cattle, including dairy; vealers and slaughter calves; bison; bovine casings and small intestine products; and bovine blood and blood products. Projected imports of breeding cattle including dairy, and projected changes in imports of vealers, slaughter calves, and bison, are relatively small, suggesting that impacts for affected U.S. entities will not be significant. For bovine casings, small intestine products, and blood and blood products, the analysis is constrained by a scarcity of information about the quantities that would be imported and levels of U.S. production and consumption.

With regard to dairy producers, we do not expect imports of dairy cattle from Canada to add significantly to the U.S. herd, but rather to serve as an additional source of replacement animals. From 1992 to 2002, U.S. producers annually raised about 4.1 million dairy replacement heifers and about 5.9 million beef replacement heifers. The average number of Canadian breeding cattle imported during that period (including bulls) totaled only 0.5 percent of these combined quantities. The breeding cattle imports from Canada during this period represented about 1.1 percent of dairy heifer replacements and less than 0.1 percent of beef heifer replacements. Imports of dairy cows and heifers from Canada are projected to be similar to their historic levels, 1992-2002, averaging 47,800 head per year over the period of analysis in all of the scenarios.

Analysis using the multi-sector model indicates that, in scenario 3, dairy producers may experience price declines of 1.3 to 1.7 percent for dairy cattle due to the small number projected to be imported from Canada. These imports translate into an increase in U.S. milk production of

0.1 percent or less, and a decline in the price of milk and increase in consumer surplus of less than 0.1 percent. As sellers of cull cattle, dairy producers as well as beef producers are expected to be negatively affected by the price decline for cull cattle due to the rule.

We expect market effects for vealers and slaughter calves to be insignificant, given the small change in the number projected to be imported from Canada. The decline in imports is projected to average only 6 percent, or 3,000 head per year, in scenario 3.

A larger number of bison are projected to be imported than was projected in the preliminary RIA. Reestablished imports of Canadian breeding bison will be the principal impact of this rule for that industry. Yearly imports of breeding bison are projected to average 1,200 head, and are expected to represent about 1 percent of U.S. breeding bison, assuming the composition of the national bison herd is similar to that of the national cattle herd.

This rule may affect the U.S. supply of bovine casings and small intestine products directly through resumption of imports from Canada, and indirectly, through changes in U.S. cattle slaughter numbers and the reestablished importation of Canadian bovine small intestines, minus the distal ileum. For scenario 3, the annual supply of bovine casings produced from additional U.S. cattle slaughter is projected to increase on average over the period of analysis by less than 0.2 percent. .

Fetal bovine serum (FBS) is the most important blood product that will be affected by this rule. Resumption of commercial imports of FBS from Canada, directly as serum and indirectly through increased U.S. pregnant cow slaughter, is expected to benefit FBS users, given current strong demand for this blood product in the United States.

Expected Impacts for Modeled Commodities

In this summary, prices and welfare impacts are expressed in 2007 dollars; price and quantity averages and percentage averages are over the 5-year period of analysis, 2008-2012; annualized values are discounted at 3 percent; and beef prices and quantities are in carcass weight equivalent. Percentage changes in prices and estimated welfare effects are shown in Table E.

Scenario 1. In this scenario, buyers of cull cattle and processing beef can be expected to benefit from welfare gains and sellers of cull cattle and processing beef can be expected to bear welfare losses due to the cull cattle imports. For this commodity, the estimated annualized consumer gains are \$90.3 million, producer losses are \$53.2 million, and net benefits are \$37.1 million.

Welfare changes for the cull cattle/processing beef category dominate the modeled effects in all of the scenarios. The relatively large impacts are not unexpected, given that this is the one modeled commodity category for which imports from Canada would be newly reestablished and projected changes from the baseline are much larger than for the other commodities. The numbers of cull cattle projected to be imported in scenario 1, averaging 124,800 cows and 23,000 bulls and stags per year, are much larger than the projected average annual declines in imports of Canadian fed cattle (56,800 head) and feeder cattle (6,800 head).

Another reason the welfare effects computed for the cull cattle/processing beef category are large is because of the inelastic demand (-0.40), compared to the price elasticities of demand for the other modeled commodities (feeder cattle, -0.88; fed cattle, -0.76; fed beef, -0.60). In the preliminary RIA, we examined the significance of processing beef's more inelastic demand by considering welfare changes for the cull cattle/processing beef category when a price elasticity of

demand of -0.60 is used, that is, the same elasticity as for fed beef. This exercise found that all impacts—consumer gains, producer losses, net benefits, and price declines—are reduced by nearly one-fifth when a price elasticity of demand of -0.60 is used in place of -0.40. The price elasticity of demand, that is, buyers’ responsiveness to changes in price, is an important determinant of the magnitude of welfare and price changes for the cull cattle/processing beef category.

Lastly, the large difference between consumer welfare gains and producer welfare losses for the cull cattle/processing beef category can be attributed to the fact that the United States is projected to import about 40 percent of its supply of processing beef over the period of analysis. In modeling the welfare effects, demand (defined as U.S. consumption) is much larger than supply (defined as U.S. production minus exports). Consequently the change in consumer surplus is large compared to the change in producer surplus because the effects are estimated only for U.S. entities.

Slightly fewer feeder cattle are projected to be imported from Canada in scenario 1 than would otherwise enter, and the analysis indicates small gains in producer welfare (higher prices and less competition from Canadian suppliers) and small losses in consumer welfare for this commodity (higher prices and fewer feeder cattle available for purchase). Estimated annualized values are producer gains of \$3.6 million, consumer losses of \$3.8 million, and net losses of \$0.2 million.

As with feeder cattle, fewer fed cattle are projected to be imported under scenario 1 than would otherwise be imported. Once again, producers (sellers of fed cattle for slaughter) would benefit from welfare gains and consumers (buyers of fed cattle for slaughter) would bear welfare

losses. Estimated annualized values are producer gains of \$43.6 million, consumer losses of \$44.7 million, and net losses of about \$1.1 million.

Scenario 1 is projected to result in increased imports of Canadian fed beef ranging from an additional 3 million pounds in 2009 to 92 million pounds in 2012. Estimated annualized values are consumer gains of \$48.8 million, producer losses of \$46.8 million, and net gains of \$2 million.

The analysis shows annualized combined welfare changes under scenario 1 as consumer gains of \$90.6 million and producer losses of \$52.7 million, yielding net benefits of \$37.9 million. As can be seen in table E, the combined annualized values of consumer welfare losses for feeder cattle and fed cattle are similar to the consumer welfare gains for fed beef. Combined consumer welfare gains are very similar to the consumer welfare gains estimated for the cull cattle/processing beef category. A similar but opposite outcome is evident with respect to producer welfare changes, with combined gains for feeder cattle and fed cattle somewhat larger than the producer welfare losses for fed beef. The result is combined producer welfare losses that are close to the producer welfare losses estimated for cull cattle/processing beef. Under scenario 1, the combined annualized net welfare benefits, \$37.9 million, are only slightly more than the \$37.1 million in net benefits estimated for cull cattle/processing beef.

Table E. Comparison of percentage price changes and annualized welfare effects for scenarios 1, 2, and 3 by commodity category, 2008-2012, discounted at 3 percent, 2007 dollars

<u>Commodity</u> <u>Category</u>	<u>Scenario</u>	<u>Percentage</u> <u>Change in</u> <u>Price</u>	<u>Change in</u> <u>Consumer</u> <u>Welfare</u>	<u>Change in</u> <u>Producer</u> <u>Welfare</u>	<u>Net Welfare</u> <u>Change</u>
-----Thousand Dollars-----					
Cull cattle/ Processing beef					
	1	-1.4%	90,307	-53,207	37,100
	2	-4.5%	286,936	-165,615	121,320
	3	-4.5%	286,912	-165,603	121,308
Feeder cattle					
	1	Nil	-3,795	3,605	-190
	2	Nil	-3,795	3,605	-190
	3	Nil	-3,795	3,605	-190
Fed cattle					
	1	0.1%	-44,703	43,636	-1,066
	2	0.3%	-107,513	105,101	-2,412
	3	0.1%	-36,263	35,388	-874
Fed beef					
	1	-0.1%	48,800	-46,757	2,044
	2	-0.3%	117,459	-112,426	5,033
	3	-0.1%	39,791	-38,131	1,660
Categories combined					
	1		90,609	-52,723	37,888
	2		293,087	-169,335	123,751
	3		286,645	-164,741	121,904

The three import scenarios considered in this table are (1) Canadian cattle born on or after March 1, 1999; (2) Canadian cattle unrestricted by date of birth; and (3) Canadian cattle born on or after March 1, 1999, plus resumption of imports of meat from Canadian cattle slaughtered at 30 months or older. The percentage change in price is the average annual change over the 5-year period. Welfare changes may not sum due to rounding.

Scenario 2. Because of the significantly larger number of cull cattle projected to be imported in scenario 2, the estimated price and welfare effects are also much larger than for scenario 1. Table E shows these differences, with the percentage changes in price about three times greater in all cases (other than for feeder cattle, for which imports are projected to be the same in all scenarios). Whereas the combined net benefit in scenario 1 is estimated to be an annualized \$37.9 million, in scenario 2 it is \$123.8 million.

As described in the risk assessment, transmission of BSE requires that bovines ingest feed that contains the infectious agent. The World Organization for Animal Health (OIE) establishes standards for the international trade in animals and animal products. It recommends that cattle be imported from a controlled risk region for BSE only if the cattle selected for export were born after that date from which a ban on the feeding of ruminants with meat-and-bone meal and greaves (the residue left after animal fat or tallow has been rendered) derived from ruminants had been effectively enforced. In May 2007, the OIE classified both the United States and Canada as BSE controlled risk regions.

On August 4, 1997, Canada issued regulations prohibiting the use of mammalian protein in ruminant feeds. Implementation of the feed ban was a gradual process, with producers, feed mills, retailers, and feed manufacturers given grace periods before they were required to be in full compliance with the regulations. It is believed that this implementation period may have lasted 6 months, making February 1998 a more realistic date on which the ban can be considered to have gone into effect. APHIS considers that a period of 1 year following the full implementation of the feed ban allows sufficient time for the measures taken by Canada to have their desired effect. Therefore, APHIS concludes that there is an extremely low likelihood that

cattle born in Canada on or after March 1, 1999, will have been exposed to the BSE agent via feed. Therefore, these animals have an extremely low likelihood of being infected, and thus can be imported into the United States for any purpose.

We do not have a quantitative estimate of the additional risk posed by importation of Canadian cattle born before March 1, 1999. The importance of a feed ban as a risk mitigation measure is demonstrated in science and experience, and is incorporated into the OIE guidelines. We conclude that there could be some degree of increased likelihood of BSE infectivity entering the United States via imports of live bovines from Canada under scenario 2, compared to the extremely low likelihood posed in scenario 1, because of the greater likelihood of cattle born prior to the implementation of an effective feed ban having been exposed to infectivity.

Scenario 3. The price and welfare effects under scenario 3 are similar to the effects under scenario 2 for cull cattle/processing beef, but more like the scenario 1 effects for fed cattle and fed beef (Table E). This outcome is expected because scenario 3 includes reestablishment of OTM beef imports from Canada. Combined net welfare benefits for scenarios 2 and 3 are very similar, with the projected cull cattle imports in scenario 2 and the projected imports of cull cattle and OTM beef in scenario 3 both based on cattle and beef import quantities prior to May 2003. The additional quantities of cull cattle/processing beef in scenarios 2 and 3 are essentially the same, entering as live cattle in scenario 2 and as beef in scenario 3.

The BSE risk mitigations under scenario 3 are comparable to those under scenario 1. The restriction on live bovine imports by date of birth, age verification, and other safeguard measures are the same in both cases. Consequently, as in scenario 1, the likelihood of BSE infectivity entering the United States via imports of live bovines from Canada in this scenario is extremely

low. Resumption of OTM beef imports from Canada will not affect the likelihood of BSE infectivity entering the United States because SRMs will be removed and disposed of in Canada.

Scenario 4. A fourth scenario, as indicated above, would be to allow entry of Canadian cattle unrestricted by birth date, along with resumption of OTM beef imports from Canada. A quantitative analysis of expected price and welfare effects for this particular scenario was not performed. When we compare projected imports under this scenario with those projected for scenario 3, we find the differences in combined cattle and beef imports to be very small; we conclude that the welfare effects for this scenario would be very similar to the effects of scenario 3.

Cull cattle imports from Canada are projected to average about 328,000 head per year under scenario 4, compared to 106,000 head per year under scenario 3. Conversely, annual processing beef imports under scenario 4 are projected to average 94 million pounds, carcass weight equivalent, compared to 255 million pounds for scenario 3.

Similar differences between the two scenarios are projected for fed cattle and fed beef imports. The larger number of cull cattle that would be imported from Canada under scenario 4 could be expected to be associated with increased fed cattle slaughter in Canada, with fewer fed cattle and more fed beef exported to the United States. Under scenario 4, fed cattle imports from Canada are projected to average about 624,000 head per year, compared to 679,000 head per year under scenario 3. Annual fed beef imports under scenario 4 are projected to average 992 million pounds, compared to 947 million pounds for scenario 3.

The average annual net difference between scenarios 3 and 4 in projected cull cattle and processing beef imports from Canada, after converting the cull cattle to processing beef, is about 700,000 pounds (330.8 million pounds in scenario 3, and 330.1 million pounds in scenario 4).

This amount represents about 0.2 percent of projected cull cattle/processing beef imports under scenario 3. For fed cattle and fed beef imports from Canada, the average annual net difference between scenarios 3 and 4 after converting the fed cattle to fed beef, is about 1.3 million pounds (1,483.7 million pounds in scenario 3, and 1,485.0 million pounds in scenario 4). This amount represents about 0.1 percent of the projected fed cattle and fed beef imports under scenario 3. Hence, we conclude that the overall welfare effects of scenario 4 would be very similar to those for scenario 3.

Effects on Small Entities

There were no significant issues raised in public comment on the initial regulatory flexibility analysis (RFA) for this rulemaking. However, as described below, the majority of businesses that may be affected by this rule are small entities. Therefore, while none of the comments received on the proposed rule raised specific issues regarding the initial RFA, comments on the preliminary RIA can be inferred to express small-entity concerns.

Topics that received public comment and that concerned the estimated economic impacts of the proposed rule included modeling issues; the timing of the rule's implementation; consequences of a BSE occurrence; and impacts of the rule for consumers, cow-calf producers, the dairy industry, and the packing industry, and on beef exports. These comments are addressed in the Agency's responses that are included as part of the final rule.

Small entities comprise the majority of the establishments engaged in the production, processing, and sale of the commodities affected by this rule. These small entities number at least in the hundreds of thousands, with cow-calf and dairy producers comprising the largest single industry sector share. The entities are classified within the following industries according to the North American Industry Classification System: Beef Cattle Ranching and Farming

(NAICS 112111), Dairy Cattle and Milk Production (NAICS 112120), All Other Animal Production (NAICS 112990), Cattle Feedlots (NAICS 112112), Animal (except Poultry) Slaughtering (NAICS 311611), Meat Processed from Carcasses (NAICS 311612), Meat and Meat Product Merchant Wholesalers (NAICS 424470), Supermarkets and Other Grocery (except Convenience) Stores (NAICS 445110), Meat Markets (NAICS 445210), In-Vitro Diagnostic Substance Manufacturing (NAICS 325413), and Biological Product (except Diagnostic) Manufacturing (NAICS 325414).

We are unable to determine the extent to which cull cattle prices may fall because of the rule. Assuming that the price decline for cull cattle is proportional to the estimated price decline for processing beef, cow-calf and dairy producers in scenario 3 may experience a fall in price for cull cattle of 4.7 percent in 2008, and an average price decline of 4.5 percent (\$4.61 per cwt). To place this average price decline in perspective, we consider the effect it may have on gross earnings of small-entity cow-calf operations. Based on data from the 2002 Census of Agriculture, the average value of cattle and calves sold by small-entity beef cow operations was about \$26,600.⁴ The projected 2008 price for a culled cow is \$54.19 per cwt.⁵ Assuming the cow weighs 1,100 pounds, its price in 2008 would be \$596.09 per head. A 4.7 percent decline would result in a price of \$568.07. Presumably, most of a cow-calf operation's revenue is earned from the sale of calves. If one-half of an operation's revenue were to derive from the sale of cull cattle, the reduction in revenue attributable to the decline in the price of cull cattle in scenario 3 would total about \$625 for the year.⁶

⁴ USDA, NASS. 2002 Census of Agriculture, Volume 1, Chapter 1, Table 16. The \$26,000 average is for operations with fewer than 1,000 head. http://www.nass.usda.gov/Census_of_Agriculture/index.asp

⁵ Boning utility cow (Sioux Falls) nominal price.

⁶ $(\$26,600 / 2) (0.047) = \625.10 .

For dairy enterprises, the expected price decline for cull cattle because of imports from Canada is expected to have a small effect on their incomes because most revenue (over 86 percent in 2002) is earned from the sale of milk and other dairy products.⁷ The average per animal value of cattle and calves sold by small-entity dairy cow operations in 2002 was about \$453. A price decline of 4.7 percent, notwithstanding the fact that not all of the animals sold would be cull cattle, would mean a decrease in annual revenue for the average small-entity dairy operation of about \$1,040, assuming no change in the number of cattle sold.⁸ This forgone income would represent a decline in average revenue of about 0.6 percent.⁹

The scenario 3 analysis indicates that decreases in the price of fed beef due to increased fed beef imports from Canada are expected to be very small, resulting in a loss for the average meat packing and processing establishment of less than 0.2 percent of average revenue (18 cents per cwt, with projected baseline fed beef prices averaging \$151.80 per cwt). Effects for those packers and processors that utilize processing beef will be larger, due to the resumption of cull cattle and OTM beef imports from Canada. Annual prices of processing beef are expected to fall by an average of \$4.61 per cwt in scenario 3. This decline in price will benefit establishments that use processing beef to produce ground beef for the wholesale market. Conversely, establishments that sell processing beef will be negatively affected by the expected price decline.

In response to public comments on the preliminary RIA, we include an evaluation of welfare effects by industry sector for scenario 3. While this evaluation is admittedly broad, it provides an indication of the extent to which major sectors of the cattle and beef industries may

⁷ USDA, NASS, 2002 Census of Agriculture, Volume 1, Chapter 1, Table 17. For small-entity producers, revenue from cattle and calf sales totaled \$1.7 billion and revenue from dairy product sales totaled \$11.2 billion. http://www.nass.usda.gov/Census_of_Agriculture/index.asp

⁸ In 2002, the average revenue from cattle sales for small-entity dairy operations was \$22,197 (\$453 per head multiplied by 49 head). $(\$22,197)(0.047) = \$1,043.26$.

⁹ \$1,043 divided by \$175,912 (average income for small dairy farms from combined dairy product and cattle sales) equals 0.59 percent.

be affected. We group the entities that we expect to be directly affected into four generalized categories: cow-calf and dairy producers, feedlot establishments, slaughter and packing establishments, and wholesaler and successive establishments. Admittedly, this simple categorization does not capture the many complexities of the cattle and beef industries, but it does provide a level of specification sufficient for examining expected effects for the industries' principal stages of economic activity. In reality, businesses combine the slaughter, packing, processing, and wholesaling functions in various ways. This consideration of sector-level effects indicates that cow-calf and dairy producers and slaughter and packing establishments are expected to incur net welfare losses, while feedlots and wholesalers are expected to accrue net welfare gains.

Currently, bovines imported from Canada are restricted to animals that are slaughtered at less than 30 months of age. Bovines not imported for immediate slaughter must be moved from the port of entry to a feedlot in a sealed means of conveyance and from the feedlot to a recognized slaughtering establishment again in a sealed means of conveyance. The animals may not be moved to more than one feedlot. With this rule, these movement restrictions will no longer be imposed. Canadian bovines imported other than for immediate slaughter will be able to be moved any number of times to any destinations in unsealed means of conveyance.

Under this rule, feeder bovines imported from BSE minimal-risk regions will not need to be accompanied by APHIS Form VS 17-130, which currently is used to identify the feedlot of destination. (The name of the individual responsible for the movement of an imported animal and individual identification of the animal will still be required information on the accompanying health certificate.) APHIS estimates that the time saved by entities no longer needing to acquire

APHIS Form VS 17-130 will total approximately 40,000 hours per year.¹⁰ Also under this rule, bovines of Canadian origin moved from a U.S. feedlot to a slaughtering establishment will not need to be accompanied by APHIS Form VS 1-27. APHIS estimates the same total time savings by entities no longer needing to acquire APHIS Form VS 1-27: 40,000 hours per year.

Removal of these movement and paperwork requirements will benefit buyers and sellers of Canadian-origin bovines. Many of the beneficiaries are likely to be small entities, given their predominance among beef and dairy operations and feedlot establishments. Affected businesses will be able to take advantage of a broader range of transactional opportunities than previously. For example, the sale of a young steer first for backgrounding, then for confined feeding at one or more facilities, and finally for slaughter may enable the original and subsequent owners of the animal to better maximize returns compared to current marketing possibilities. While we are not able to quantify impacts of removing current movement restrictions on Canadian cattle imports, we expect their removal will benefit the cattle industry across-the-board.

The Agency has identified alternatives to the rule and analyzed them in this RIA. We have found that the chosen alternative (scenario 3) best strikes the balance of continuing to provide an acceptable level of protection against BSE infectivity entering the United States via imports of live bovine and bovine product imports, while removing unnecessary prohibitions on the importation of certain commodities from Canada. Without this rule, restrictions on U.S. importation of certain Canadian bovine commodities that are without scientific merit would continue. With this rule, importation of these Canadian commodities will be allowed to resume under certain conditions with a negligible BSE risk (i.e., the likelihood of establishment and the potential impacts of cases that may occur even without establishment) to the United States..

¹⁰ This approximation is based on 1,000 entities filling out Form VS 17-130 on 20 occasions per year, with each form requiring two hours. The estimated total time saved by not having to complete Form VS 1-27 is calculated on this same basis.

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**Regulatory Impact Analysis and
Final Regulatory Flexibility Analysis**

Final Rule

**Bovine Spongiform Encephalopathy; Minimal-Risk Regions;
Importation of Live Bovines and Products Derived from Bovines
(Docket No. APHIS 2006-0041)**

September 2007

1. Introduction

Bovine spongiform encephalopathy (BSE) is a progressive, fatal neurological disorder of cattle, bison, and certain other bovines. It is spread through bovine consumption of feed that contains the infective agent. There is no treatment or vaccine available for BSE. Included in Title 9 of the Code of Federal Regulations (CFR), Parts 93-96, are regulations that prohibit the importation of ruminants and most ruminant products (meat and certain other products and byproducts) from regions where BSE exists and regions that present an undue risk of introducing BSE into the United States because of import requirements less restrictive than those that would be acceptable for import into the United States or because of inadequate surveillance.

On January 4, 2005, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS or the Agency) published a final rule entitled “Bovine Spongiform Encephalopathy; Minimal-Risk Regions and Importation of Commodities,” referred to as the BSE minimal-risk regions rule.¹¹ It established a category of regions that present a minimal risk of introducing BSE into the United States through importation, under certain conditions, of live ruminants and

¹¹ “Bovine Spongiform Encephalopathy; Minimal-Risk Regions and Importation of Commodities,” Final Rule. *Federal Register*, Vol. 70, No. 2; January 4, 2005, 460-553.
http://www.access.gpo.gov/su_docs/fedreg/a050104c.html

ruminant products and byproducts from such regions, and named Canada as a BSE minimal-risk region.¹² This regulatory impact analysis (RIA) and final regulatory flexibility analysis are for a rule that will amend the BSE minimal-risk regions rule.

The Rule and this Analysis

The purpose of the rule is to remove certain restrictions on the importation of certain bovine commodities from BSE minimal-risk regions. APHIS has determined that the restrictions are not warranted by scientific research and evidence, and that they are unnecessary for maintaining a negligible risk (i.e., the likelihood of establishment and the potential impacts of cases that may occur even without establishment) to the United States via imports of live bovines and bovine products from such regions. The rule will allow the following commodities to be imported from Canada, as a BSE minimal-risk region, under specified conditions (in addition to commodities currently allowed to be imported from BSE minimal-risk regions):

- Live bovines that were born on or after March 1, 1999;
- Bovine small intestines, minus the distal ileum;
- Bovine casings; and
- Bovine blood and blood products.

Additionally, this rule removes the delay of applicability of provisions of the BSE minimal-risk regions rule regarding the importation of meat, meat products, and meat byproducts derived from bovines in Canada that were 30 months of age or older when slaughtered.

¹² Canada had been added to the list of countries where BSE exists in May 2003. “Change of Disease Status of Canada Because of BSE;” Interim Rule. *Federal Register*, Vol. 68, No.103; May 29, 2003, 31939-31940).
http://www.access.gpo.gov/su_docs/fedreg/a030529c.html

This RIA addresses expected economic effects of allowing resumption of imports from Canada of the above commodities. Expected benefits and costs are examined in accordance with Executive Order 12866.¹³ Expected economic impacts for small entities are also evaluated, as required by the Regulatory Flexibility Act.¹⁴ Our analysis indicates that benefits of the rule will exceed costs overall. Effects for Canadian and other foreign entities are not addressed in this analysis. However, the Agency expects reestablished access to U.S. markets to benefit Canadian producers and suppliers of commodities included in the rule.

The approach and models used in this analysis are the same as were applied in the preliminary RIA that we prepared for the proposed rule. Impacts for cattle for feeding or for immediate slaughter and impacts for beef are quantitatively modeled. Impacts for other affected commodities—breeding cattle including dairy, vealers and slaughter calves, bison, bovine casings and small intestine products, and bovine blood and blood products—are examined largely qualitatively. For the modeled cattle and beef, we project a 5-year baseline, 2008-2012, against which we measure expected price and welfare effects of projected levels of cattle and beef imports from Canada. We evaluate price and welfare effects for the three scenarios that were considered in the preliminary RIA, as follows:

- Scenario 1: Allow imports of Canadian cattle born on or after March 1, 1999;
- Scenario 2: Allow imports of Canadian cattle unrestricted by date of birth; and

¹³ <http://www.whitehouse.gov/omb/inforeg/eo12866.pdf>

¹⁴ <http://www.sba.gov/advo/laws/regflex.html>

- Scenario 3: The same as scenario 1, with the addition of the resumption of imports of beef from Canadian cattle slaughtered at 30 months or older (called OTM, or over-30-month, beef).

As a fourth scenario, we consider imports of Canadian cattle unrestricted by date of birth and resumption of OTM beef imports. Projected imports under this scenario 4 are described, but the price and welfare impacts are not evaluated.

Organization of this Document

Six sections follow in this analysis of expected economic impacts. In section 2, we describe our approach and identify the principal and secondary commodities that will be affected, including certain commodities that are currently allowed entry from Canada. We discuss the methods used to analyze expected impacts. For commodities that are quantitatively modeled (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef), we describe the model and baseline parameters, and set forth quantities of cattle and beef projected to be imported from Canada. In section 2, we also discuss the displacement of processing beef imports from other countries by cull cattle/processing beef imports from Canada. For the other commodities (breeding cattle including dairy, vealers and slaughter calves, bison, bovine casings and small intestine products, and bovine blood and blood products), we explain why the impacts are evaluated less rigorously.

We address in section 3 the expected effects for these other commodities. The discussion of likely impacts is largely qualitative using available data.

In section 4, we present expected price and quantity effects and welfare impacts under scenario 1 for the modeled commodities. We also describe expected price and welfare changes when the amount of processing beef imports displaced by cull cattle

imported from Canada differs from the estimated quantity. We include an assessment of multi-sector impacts and estimated effects at the retail level and for dairy producers, two areas of concern in comments received on the preliminary RIA. The section concludes with a discussion of BSE risk, and reference to the likely economic consequences of a BSE occurrence as presented in the risk assessment.

In sections 5 and 6, we consider price and welfare effects that would be expected under scenarios 2 and 3, respectively. The format of these sections is the same as that of section 4, but each also includes a comparison of expected effects with those estimated for scenario 1. At the end of section 6, we compare import projections under scenarios 3 and 4, and explain why impacts for scenario 4 are not evaluated.

A final regulatory flexibility analysis is presented in section 7. We draw from the results of the RIA in addressing expected impacts for small entities under scenario 3. We also describe possible welfare effects for major sectors of the cattle and beef industries, and consider likely effects of changes in compliance requirements.

The U.S. and Canadian Markets for Cull Cattle and Processing Beef

The cattle and beef industries in the United States and Canada have a long history of trade. In 2002, prior to the discovery of indigenous BSE in Canada, the United States imported 1.7 million live bovines from Canada, valued at more than \$1.1 billion. They accounted for more than two-thirds of U.S. total bovine imports. That same year, the United States imported 382,110 metric tons (MT) of Canadian bovine meat, also valued at \$1.1 billion, which comprised about 44 percent of bovine meat imports from all

sources.¹⁵ Historically, the trade in live bovines has been principally characterized by the slaughter (and to a lesser extent, feeding) of Canadian cattle at U.S. facilities.

The primary impacts of this rule will derive from the resumption of U.S. imports of Canadian cattle born on or after March 1, 1999, and resumption of OTM beef imports from Canada, as set forth in scenario 3. The cull cattle supplied prior to May 2003 represented about 25 percent of all cattle imports from Canada, 1998 through 2002. Projected cull cattle imports from Canada will help meet U.S. demand for processing beef.

As used in this RIA, the term processing beef refers to lean, boneless beef that is mixed with trimmings from grain-fed cattle to produce ground beef, thereby complementing the domestic production of fed beef.¹⁶ The demand for cull cattle is derived from the strong demand for processing beef as reflected in robust ground beef sales. The United States is a large importer of processing beef, with Australia, New Zealand, and Uruguay our major sources. Over the five years, 1998 through 2002, the United States annually imported an average of 3 billion pounds of all types of beef and veal. Processing beef accounted for approximately two-thirds of that total, while domestic production of processing beef averaged about 3.75 billion pounds. Cull cattle imports from Canada during this same period, when converted to their processing beef equivalent, totaled about 185 million pounds.¹⁷ This quantity represented about 8 percent of average annual U.S. imports and about 3 percent of average annual U.S. supply.

¹⁵ Source: Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics.
<http://www.fas.usda.gov/ustrade/>

¹⁶ Processing beef should not be confused with processed beef, that is, cooked, canned, or preserved meat. By this terminology, some processing beef is used for processed products.

¹⁷ This approximation is based on the following carcass weight equivalent conversion rates: cows, 576 pounds per animal; bulls and stags, 888 pounds per animal. We recognize that these rates may overestimate the carcass weight equivalent of the cull cattle from the earlier time period due to the long-term trend toward heavier per animal weights.

Under scenario 3, the percentage shares coming from Canada are projected to be smaller, especially during the first years of the rule's implementation due to the requirement that the cattle be verified as having been born on or after March 1, 1999.

U.S.-Canadian cattle and beef trade changed dramatically following Canada's May 2003 BSE discovery. Canada's cattle inventory increased rapidly following the loss of export markets for its cattle and beef. There was a record total of over 14.6 million head of Canadian cattle on January 1, 2004, which was exceeded by a new record of 15.1 million head on January 1, 2005.¹⁸ The previous peak in Canadian cattle inventories had occurred in 1975.

Canada's slaughter capacity increased, and by January 1, 2006, the Canadian cattle inventory had fallen to 14.8 million head, a decline of about 2 percent from the previous year. However, Canada's cow population remained essentially the same during this period, decreasing only marginally from a record 6.36 million head on January 1, 2005, to 6.31 million head on January 1, 2006. By January 1, 2007, the Canadian cattle inventory had declined to 14.3 million head and the cow inventory had fallen to 6.04 million head.

These inventory declines reflect the increase in Canadian cow slaughter since resumption in July 2005 of U.S. imports of Canadian feeder cattle and fed cattle for slaughter at less than 30 months of age. While some of the Canadian plants utilized their expanded slaughter capacity by shifting to increased cow slaughter, others reduced hours of operation or closed. On July 1, 2006, Canada's producers were holding 690,300 cull cows, or 11 percent of the total cow inventory. The January 1, 2007 cattle inventory

¹⁸ Canadian cattle inventory statistics in this and the following paragraph are from <http://www.statcan.ca/english/freepub/23-012-XIE/23-012-XIE2005002.pdf>

included 632,800 cull cows, which was 10.5 percent of the total cow inventory. This trend of expanding cow slaughter would likely continue if the United States were to remain closed to imports of Canadian cull cattle.

In the United States, the cattle inventory was 96.7 million head on January 1, 2006, and by January 1, 2007, stood at 97.0 million head.¹⁹ The national herd has begun a period of expansion. The last cyclical peak of 103.5 million head was recorded on January 1, 1996. Notwithstanding cyclical expansion, cow slaughter was large in 2006 due to an extended drought and has remained high in the first two quarters of 2007. However, good pasture conditions prevail for most of the country at present, and USDA's current expectation for the rest of 2007 is for cow slaughter to return to lower cyclical levels, as long as good weather and forage conditions continue.

A factor that may slow herd expansion, however, is the projected growth of bio-fuel production. This expanded use of grain will have an increasingly significant effect on the livestock sector in the United States, Canada, and elsewhere by raising grain prices and hence feeding costs. Already, higher-than-expected grain prices are dampening USDA's herd expansion projections.²⁰

Canada's excess cow population and the strong U.S. demand for cull cattle/processing beef underlie projected imports of Canadian cull cattle. Relative prices highlight the difference in markets for Canadian and U.S. cull cattle. The Ontario, Canada, price for Cutter and Utility slaughter cows averaged US\$44.21 per cwt (hundredweight, or 100 pounds) from mid-April to mid-May 2007, compared to an

¹⁹ <http://usda.mannlib.cornell.edu/reports/nassr/livestock/pct-bb/>

²⁰ "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007. http://www.usda.gov/oce/commodity/ag_baseline.htm

average Sioux Falls, South Dakota, price over the same period for Boning Utility cows of \$53.66 per cwt.²¹ In September 2006, the price for the Ontario cows averaged US\$35.19 per cwt, and the price for the Sioux Falls cows averaged \$50.25 per cwt, illustrating the extent to which the price differential has narrowed in recent months.

We expect U.S. packers to bid competitively with Canadian packers for Canadian cull cattle, and the cattle trade to again include slaughter of Canadian cull cattle at U.S. plants. Canadian plants will compete strongly for a declining supply, with the rise of Canadian prices toward U.S. levels slowing the movement of cull cattle to the United States. With this rulemaking, Canadian cattle inventories are expected to remain below 13.9 million head, closer to the range observed prior to May 2003.

²¹ Source of U.S. prices: USDA Agricultural Marketing Service, Market News. Source of Canadian prices: http://www.ams.usda.gov/mnreports/WA_LS718.txt.

2. Analytical Approach, Baselines, and Projected Imports

The rule will impact U.S. markets for several bovine commodities. Ideally, the various effects would be considered as a whole by examining linkages among commodities and between the cattle and other livestock industries and the rest of the U.S. economy in a general equilibrium framework. This approach would require economy-wide production, consumption, and price information, plus the capability to compute the rule's various simultaneous effects—knowledge and resource requirements beyond those available to APHIS.

As a next-best course, we follow two methodologies: First, using partial equilibrium models, we compute expected impacts for those commodities for which U.S. baselines and quantities supplied by Canada have been projected. Second, for commodities for which baseline and import data are not projected or for which the effects of the rule clearly will not be significant, we qualitatively assess likely impacts using available information.

We begin this section with descriptions of the main model used to examine price, quantity, and welfare impacts under scenarios 1, 2, and 3; and of a second model used to simulate effects more broadly, including at the retail level and for the dairy sector. We then present the baselines for the principal commodity category, cull cattle/processing beef, and for the commodities expected to be affected secondarily: feeder cattle, fed cattle, and fed beef. Projected changes in imports from Canada for the four commodity categories are reported for each scenario. We conclude the section by identifying the affected commodities that are not quantitatively modeled.

The Models

The BAS model. A model called the Baseline Analysis System (BAS) model is used to compute impacts under scenarios 1, 2, and 3.²² The model is currently completing peer review.²³ It has been designed to meet a number of analytical needs in a timely manner, including provision of estimates of the efficiency impacts of alternative policies, as measured by changes in net social surplus (welfare impacts); provision of estimates of the distributional effects of policies, i.e., the effects on consumers, producers, and producer subgroups; and application of readily available data and parameters commonly presented in economic literature.

Consistent with requirements of the Office of Management and Budget for benefit-cost analysis as described in Circular A-4, Regulatory Analysis, we use the BAS model to examine benefits and costs over a 5-year period, 2008-2012.²⁴ The benefits and costs are computed as present and annualized values discounted at 3 and 7 percent. Results of the analysis are reported in 2007 and 2001 dollars.

²² A complete description of the model is provided in: Forsythe, K.W. "An Economic Model for Routine Analysis of the Welfare Effects of Regulatory Changes." V3.00. U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, Centers for Epidemiology and Animal Health. April 20, 2005 (draft).

http://www.aphis.usda.gov/peer_review/content/printable_version/bas_model_econOnly_apr20.pdf

The BAS economic model is based on methodology described in the following studies: Ebel, E.D., R.H. Hornbaker, and C.H. Nelson, "Welfare Effects of the National Pseudorabies Eradication Program." *Amer. J. Agr. Econ.* 74(August 1992):638-45; Forsythe, K.W., and B.A. Corso, "Welfare Effects of the National Pseudorabies Eradication Program: Comment." *Amer. J. Agr. Econ.* 76(November 1994):968-71; and Lichtenberg, E., D. D. Parker, and D. Zilberman, "Marginal Analysis of Welfare Cost of Environmental Policies: The Case of Pesticide Regulation." *Amer. J. Agr. Econ.* 70(November 1988):867-74.

²³ The BAS model is being peer reviewed as an Influential Scientific Information document, as called for by OMB's Peer Review Bulletin (*Federal Register*, January 14, 2005, 2664-2677), and in accordance with USDA's Peer Review Implementation Guidelines of June 2005,

http://www.ocio.usda.gov/qi_guide/doc/FINAL_Peer_Review_Guidelines.doc.

The peer review plan is available at:

http://www.aphis.usda.gov/peer_review/content/printable_version/PeerReviewPlanBAS_Model122006.pdf

²⁴ <http://www.whitehouse.gov/omb/circulars/a004/a-4.html> Circular A-4 provides guidance for agencies on the analysis of economically significant rulemakings as defined by Executive Order 12866.

The BAS model is a net trade, non-spatial partial equilibrium model. Net trade is the difference between exports and imports. Non-spatial means that price and quantity effects resulting from differences in market locations are not specified. Price and quantity effects derived using the model are assumed to be the average of effects across geographically separated markets. Partial equilibrium means that the model results are based on maintaining a commodity-price equilibrium in a limited portion of an overall economy. Commodities not explicitly included in the model are assumed to have a negligible influence on the results.

Welfare impacts refer to gains and losses to society as measured by changes in consumer and producer surplus. Consumer surplus is the difference between what a consumer pays for a unit of a good and the maximum amount that the consumer would be willing to pay for that unit. Producer surplus is the difference between the amount a producer is paid for a unit of a good and the minimum amount that the producer would accept to supply that unit.

The consumer and producer surplus equations in the model are derived based on the assumption that demand and supply functions are approximately linear near the initial equilibrium point. For small shifts, this assumption results in reasonably accurate estimates of consumer and producer surplus change. Parallel shifts in the demand and supply functions are assumed. In addition to domestic demand and supply functions, an import supply function is included in the model to evaluate changes in imports.

Beginning with baseline quantities and prices, we compute effects of the projected changes in imports from Canada for the four modeled commodity categories: cull cattle/processing beef, feeder cattle, fed cattle, and fed beef. The resumption of cull

cattle imports is expected to affect the slaughter mix in Canada, and that change in the slaughter mix will be reflected in changes in the mix of exports to the United States. As part of this adjustment, for example, we expect that more fed steers and heifers will be slaughtered in Canada and fewer will be exported to the United States than if cull cattle imports were not reestablished.

As explained in section 1 of this RIA, Canada's cattle inventory increased rapidly following the May 2003 BSE discovery and its loss of export markets for cattle and beef. In response, Canada's slaughter capacity expanded. Beginning in July 2005, with the resumption of imports by the United States of Canadian feeder cattle and fed cattle, some Canadian plants continued to utilize their expanded slaughter capacity by shifting to increased cull cattle slaughter. Canadian cull cattle slaughter would likely continue to expand if the United States were to remain closed to imports of Canadian cull cattle. However, with this rule, we can expect some substitution in Canada of cull cattle slaughter by fed cattle slaughter.

Importation of fewer fed cattle from Canada, all things equal, will cause the price of fed cattle in the United States to rise. The BAS model is used to compute the expected increase in price and, because of the price rise, the decrease in the quantity of fed cattle demanded by U.S. slaughter and packing establishments and the increase in the quantity of fed cattle supplied by U.S. feedlots. The model yields measures of welfare change, which in this example are in terms of surplus losses for U.S. buyers and gains for U.S. sellers of fed cattle.

In sections 4, 5, and 6, we report expected impacts for the modeled commodities under scenarios 1, 2, and 3. For each scenario, we present the impacts individually and

combined. The simple summation of the separate partial equilibrium results does not take into account market dynamics, but does provide a reasonable approximation of the combined welfare effects for each scenario.

The multi-sector model. Our simple use of the BAS model (without delineation of commodity inputs and substitutes) is appropriate because effects are expected to be largely commodity-specific. That said, we also examine impacts of the scenarios more broadly using a second partial equilibrium model that we can call the multi-sector model.²⁵ This model maps interactions among the grain, animal, and animal products industries. It takes into account substitution among livestock products in response to relative price changes, incorporates foreign trade, and yields expected price and revenue effects. Consumer welfare changes are computed using the multi-sector model according to the traditional consumer surplus definition. Producer welfare changes are captured as changes in returns to capital and management. Results are measured against a 2006 baseline, reported on a quarterly basis, and expressed as ranges of percentage change; the end-points of the ranges reflect the lowest and highest quarterly changes.

The simulated multi-sector impacts tend to be smaller than the BAS model results because the model linkages specified between the livestock production and processing sectors capture at least some of the flexibility that industry enterprises exhibit when

²⁵ Four examples of studies based on this type of model are: Paarlberg, P.L., A.H. Seitzinger, and J.G. Lee, "Economic Impacts of Regionalization of a Highly Pathogenic Avian Influenza Outbreak in the United States," *Journal of Agricultural and Applied Economics*, forthcoming. Paarlberg, P.L. "Agricultural Export Subsidies and Intermediate Goods Trade," *American Journal of Agricultural Economics*. 77, 1(1995): 119 - 128. Paarlberg, P.L., J.G. Lee, and A.H. Seitzinger. "Potential Revenue Impact of an Outbreak of Foot-and-Mouth Disease in the United States," *Journal of the American Veterinary Medical Association*. 220, 7(April 1, 2002): 988 - 992. Sanyal, K.K. and R.W. Jones. "The Theory of Trade in Middle Products," *American Economic Review*. 72(1982): 16 - 31.

adjusting to supply shocks. These results support our expectation that broader impacts of the rule will be limited.

Baselines for the Modeled Commodities

The BAS model requires specification of U.S. baseline quantities (production, consumption, imports, and exports), baseline prices, and own-price elasticities of supply and demand for each year of the period of analysis, 2008-2012. Consumption is assumed to equal production plus imports minus exports (net of beginning and ending cold storage stocks for processing and fed beef). Baseline quantities and prices have been projected by staff of the USDA Economic Research Service (ERS), Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch, based on their expert knowledge and reference to “USDA Agricultural Baseline Projections to 2016,” United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007.²⁶ The price elasticities are based on consultation with Animal Products, Grains, and Oil Seeds Branch staff, and fall within a reasonable range of elasticities estimated or used in published research.

Four categories of commodities are formally modeled: cull cattle/processing beef, the commodity category expected to be principally impacted; and commodities for which we expect there to be secondary effects: feeder cattle, fed cattle, and fed beef. Cull cattle are cows, bulls, and stags sold for slaughter. They are generally breeding stock for which the present slaughter value exceeds their expected future net value as breeding animals (plus future slaughter value), and are the main source of processing beef. Feeder cattle are weaned steers and heifers (about 9 months of age) and yearlings (mostly 12 to 15 months of age) that are fed at a feedlot for several months before slaughter. This

²⁶ http://www.usda.gov/oce/commodity/ag_baseline.htm

category also includes cattle called stockers that are backgrounded (grazed on pasture and/or fed for growth) for several months before being transported for confined feeding for slaughter. Fed cattle are steers and heifers that have been grain-fed at feedlots, with most ready for slaughter at between 16 and 24 months of age. Fed beef refers to meat derived from fed cattle.

Processing beef is a term that can also include trimmings produced from fed cattle. These trimmings, with their higher fat content, are combined with the leaner meat taken from culled cattle to manufacture ground beef. For our purposes, we use the term processing beef to refer only to the leaner beef from cull cattle.

Primary commodity: cull cattle/processing beef. Cull cattle and processing beef are combined into a single commodity category, with quantities expressed in million pounds of processing beef, carcass weight equivalent. The demand for cull cattle is derived from the demand for processing beef, and only a small portion of the U.S. supply of processing beef will come from imported Canadian cull cattle. Canada historically has been our only foreign source of cull cattle. Table 1 shows the projected baseline quantities, prices, and elasticities for cull cattle/processing beef. No cull cattle or processing beef imports from Canada are included in the baseline.

Secondary commodities: feeder cattle, fed cattle, and fed beef. A relative increase in the number of cull cattle imported over time is projected to be associated with, in turn, a relative decrease in the quantity of fed cattle imports and a relative increase in the quantity of fed beef imports. The baselines shown in tables 2, 3, and 4 are used in the analysis to evaluate the impacts of these changes in imports.

Table 1. Baseline data for cull cattle/processing beef, 2008-2012, with quantities in million pounds carcass weight equivalent

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Consumption	5,893	6,081	6,240	6,281	6,337
Production	3,427	3,597	3,736	3,758	3,793
Imports	2,466	2,484	2,504	2,523	2,544
Exports	0	0	0	0	0
Price (\$ per cwt in 2007 dollars)	\$100	\$103	\$105	\$105	\$102
Price elasticity of supply	0.84	0.84	0.84	0.84	0.84
Price elasticity of demand	-0.40	-0.40	-0.40	-0.40	-0.40

Source: USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007. http://www.usda.gov/oce/commodity/ag_baseline.htm

Notes: Consumption is defined as processing beef purchased by U.S. entities at the wholesale level. Production is defined as U.S.-produced processing beef sold at the wholesale level. Quantities of U.S.-produced processing beef are based on cull cow, bull, and stag slaughter projections, as shown in Appendix Table 2. Imports and exports are quantities of processing beef imported and exported by the United States. Projected processing beef prices in this table are real prices expressed in 2007 dollars per cwt. They are nominal processing beef prices that have been deflated using GDP projections (Appendix Table 1). The nominal prices are based on 90 percent lean prices derived by multiplying projected Boning Utility Cow, Sioux Falls, prices per cwt (2008, \$54.19; 2009, \$57.38; 2010, \$59.39; 2011, \$60.49; and 2012, \$59.88) by a factor of 2.56. The nominal prices are estimated using regression-based model parameters and feeder cattle prices and fed cattle prices from "USDA Agricultural Baseline Projections to 2016," The 90 percent lean prices are converted to carcass weight equivalent prices by dividing by a factor of 1.36.

Table 2. Baseline data for feeder cattle, 2008-2012, with quantities in thousand head

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Consumption	31,840	32,664	32,674	32,621	32,502
Production	30,475	31,315	31,323	31,239	31,105
Imports	1,615	1,599	1,601	1,632	1,647
Exports	250	250	250	250	250
Price (\$ per head in 2007 dollars)	\$725	\$716	\$727	\$748	\$735
Price elasticity of supply	0.40	0.40	0.40	0.40	0.40
Price elasticity of demand	-0.88	-0.88	-0.88	-0.88	-0.88

Source: USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007. http://www.usda.gov/oce/commodity/ag_baseline.htm

Notes to Table 2: Consumption is defined as cattle purchased for U.S. feedlot feeding. Production is defined as U.S.-raised cattle sold for U.S. feedlot feeding. Imports and exports are quantities of cattle imported and exported by the United States for feedlot feeding. Imports include stockers from Mexico, although they are not considered direct substitutes for feeder cattle imported from Canada. Projected feeder cattle prices in this table are real prices expressed in 2007 dollars. They are nominal feeder cattle prices that have been deflated using GDP projections (Appendix Table 1). The nominal prices are based on a 750-pound animal and the following projections of Oklahoma City prices per cwt for 750-800 pound steers: 2008, \$98.74; 2009, \$99.64; 2010, \$103.36; 2011, \$108.51; and 2012, \$108.82 (“USDA Agricultural Baseline Projections to 2016”).

Table 3. Baseline data for fed cattle, 2008-2012, with quantities in thousand head

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Consumption	28,946	29,694	29,703	29,655	29,547
Production	28,237	29,013	28,984	28,903	28,780
Imports	709	681	719	752	767
Exports	0	0	0	0	0
Price (\$ per head in 2007 dollars)	\$1,049	\$1,103	\$1,125	\$1,124	\$1,095
Price elasticity of supply	0.62	0.62	0.62	0.62	0.62
Price elasticity of demand	-0.76	-0.76	-0.76	-0.76	-0.76

Source: USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on “USDA Agricultural Baseline Projections to 2016,” United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007. http://www.usda.gov/oce/commodity/ag_baseline.htm

Notes: Consumption is defined as fed cattle purchased for U.S. slaughter. Production is defined as U.S.-sourced fed cattle sold for U.S. slaughter. Imports and exports are quantities of fed cattle imported and exported by the United States for slaughter. Projected fed cattle prices in this table are real prices expressed in 2007 dollars. They are nominal fed cattle prices that have been deflated using GDP projections (Appendix Table 1). The nominal prices are based on projected average carcass weights (pounds) for the five years of 781, 786, 791, 795, and 800, divided by an average dressing percentage of 0.63, and multiplied by the following projections of Nebraska, Direct, 1100-1300 pounds fed steer prices per cwt: 2008, \$86.44; 2009, \$92.28; 2010, \$95.53; 2011, \$96.93; and 2012, \$95.75 (“USDA Agricultural Baseline Projections to 2016”).

Table 4. Baseline data for fed beef, 2008-2012, with quantities in million pounds carcass weight equivalent

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Consumption	21,951	22,612	22,693	22,701	22,691
Production	22,607	23,340	23,495	23,576	23,638
Imports	900	905	909	914	918
Exports	1,556	1,633	1,711	1,789	1,865
Price (\$ per cwt in 2007 dollars)	\$143	\$150	\$155	\$157	\$154
Price elasticity of supply	0.84	0.84	0.84	0.84	0.84
Price elasticity of demand	-0.60	-0.60	-0.60	-0.60	-0.60

Source: USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007. http://www.usda.gov/oce/commodity/ag_baseline.htm

Notes: Consumption is defined as fed beef purchased by U.S. entities at the wholesale level. Production is defined as U.S.-produced fed beef sold at the wholesale level. Quantities of fed beef produced are equal to quantities of fed cattle consumed (Table 3), converted from thousand head to million pounds carcass weight equivalent by multiplying by the following yield ratios: 2008, 0.781; 2009, 0.786; 2010, 0.791; 2011, 0.795; and 2012, 0.800. Imports and exports are quantities of fed beef imported and exported by the United States. Imports are assumed to come entirely from Canada, and include trimmings (approximately 15 to 20 percent, by weight) that are mixed with processing beef in the production of ground beef. Projected fed beef prices in this table are real prices expressed in 2007 dollars per cwt. They are nominal fed beef prices that have been deflated using GDP projections (Appendix Table 1). The nominal prices are based on projected choice boxed beef prices per cwt carcass weight equivalent ("USDA Agricultural Baseline Projections to 2016").

Projected Imports from Canada for the Modeled Commodities

Imports of Canadian cattle born on or after March 1, 1999 (scenario 1). Table 5 shows the projected changes in cattle and fed beef imports from Canada in scenario 1 (not including breeding cattle). Cull cattle imports from Canada are projected to total 104,000 head in 2008 and average 147,800 head over the 5-year period. These import numbers are considerably smaller than was projected in the preliminary RIA because we now have a better understanding of the extent to which the birth-date restriction and age-verification requirement may limit the number of cull cattle eligible for import.

Annual declines in feeder cattle and fed cattle imports over the five years are projected to average 6,800 head and 56,800 head, respectively, in scenario 1. These declines correspond to projected changes in the overall Canadian cattle inventory, with the import volumes for fed cattle further adjusted downward to reflect greater competition from Canadian packers due to the resumption of U.S. imports of cull cattle. Yearly fed beef imports are projected to increase by an average of 45.8 million pounds, carcass weight equivalent, over the period of analysis.

All of the changes are small when compared to the commodities' projected U.S. baseline supplies. The changes in imports for feeder cattle, fed cattle, and fed beef imports, in particular, are projected to be only fractions of 1 percent of their baselines. For cull cattle, the number projected to be imported in 2008 is less than 2 percent of projected U.S. baseline cull cattle slaughter quantities. Over the period of analysis, cull cattle imports are projected to equal 2.5 percent of the baseline quantities. The extent to which the cull cattle imports could cause U.S. domestic production of processing beef to fall and U.S. consumption of processing beef to rise is presented in section 4.

Cull cattle imports are projected to increase in the latter years of the analysis, and even more so in subsequent years, as higher percentages of Canada's cull cattle inventory are able to be verified as having been born on or after March 1, 1999. Increasing numbers of cull cattle imported over time would be associated with, in turn, decreasing quantities of fed cattle imports and increasing quantities of fed beef imports, as the slaughter mix in Canada shifts toward higher numbers of fed cattle.

Table 5. Projected changes in imports of cull cattle, feeder cattle, fed cattle, fed beef, and processing beef from Canada in scenario 1, and projected changes in imports from Canada as a percentage of the projected U.S. baseline supplies, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Projected Changes in Imports from Canada					
Cull cattle (thousand head)	104	110	113	187	225
Feeder cattle (thousand head)	-1	9	-5	-16	-21
Fed cattle (thousand head)	-30	-4	-43	-93	-114
Fed beef (million pounds, carcass weight equivalent)	24	3	35	75	92
Processing beef (million pounds, carcass weight equivalent)	0	0	0	0	0
Projected Changes in Imports from Canada as a Percentage of the Projected U.S. Baseline Supply					
Cull cattle	1.8%	1.9%	1.9%	3.1%	3.7%
Feeder cattle	nil	nil	nil	nil	-0.1
Fed cattle	-0.1%	nil	-0.1%	-0.3%	-0.4%
Fed beef	0.1%	nil	0.2%	0.3%	0.4%
Processing beef	0	0	0	0	0

Notes: Changes in cattle and beef imports from Canada for scenario 1 are taken from Appendix Tables 3 and 6. The percentage changes to the baseline are computed (i) for cull cattle, using projected baseline cull cattle slaughter shown in Appendix Table 2; (ii) for feeder cattle, using projected baseline feeder cattle consumption shown in Table 2; (iii) for fed cattle, using projected baseline fed cattle consumption shown in Table 3; and (iv) for fed beef, using projected baseline fed beef consumption shown in Table 4.

Baseline projections over the 5-year period, 2008-2012, show the United States importing a little over 40 percent of its supply of processing beef (Table 1). A share of the cull cattle imported from Canada will yield processing beef that will substitute for processing beef that otherwise would be imported from other countries, while a share of the imported cull cattle will yield processing beef that will replace a quantity of processing beef that would otherwise be domestically supplied, as U.S. producers respond to lower prices. The remaining share of cull cattle imports will yield processing beef that will represent a net increase in U.S. processing beef supplies. We estimate 25 percent as the portion of cull cattle imports from Canada that will displace U.S. processing beef imports from elsewhere.

The estimate of 25 percent comes from simulations of the multi-sector model and takes into account interactions of the processing beef sector with the beef cattle and dairy cattle sectors. The model allows cattle prices to adjust to an increase in beef imports from one source (in this case, cull cattle imports from Canada), spreading the market response across both beef and cattle. This interaction dampens the beef price decline and reduces the amount of displacement below that which would be expected to occur by only considering the market for processing beef.

For comparison, we also compute price and welfare effects assuming (i) 50 percent of the cull cattle imported from Canada displace processing beef imports, and (ii) none of the imported cull cattle displaces processing beef imports. These results are presented in Appendix 2 and Appendix 3, respectively.

Imports of Canadian cattle unrestricted by date of birth (scenario 2). In Table 6, we show the projected changes in cattle and fed beef imports from Canada if imports of

Canadian cull cattle are unrestricted by birth date. Imports of cull cattle and changes in imports of fed cattle and fed beef are all projected to be much larger than in scenario 1. Feeder cattle imports are projected to be the same under all three scenarios. Projected cull cattle imports in this scenario average 459,800 head per year over the period of analysis, or 7.8 percent of U.S. baseline slaughter quantities. This amount is more than three times projected cull cattle imports in scenario 1. The fed cattle and fed beef changes remain a fraction of 1 percent of the U.S. baseline supplies, but are also larger. The increased number of cull cattle imported in this scenario is projected to be associated with larger declines in fed cattle imports and larger increases in fed beef imports.

As in scenario 1, we estimate that 25 percent of cull cattle imports from Canada displace processing beef imports from other sources. We also again include analyses assuming that 50 percent and none of the cull cattle imports displace processing beef imports.

Imports of Canadian cattle born on or after March 1, 1999, and imports of OTM beef from Canada (scenario 3). Table 7 shows the projected changes in cattle and beef imports from Canada under the third scenario. Projected cull cattle imports are lower than in scenario 1 (averaging 106,000 head per year over the 5-year period, compared to 147,800 head) because of the entry of OTM beef. Similarly, changes in projected fed cattle and fed beef imports are somewhat smaller than the changes projected in scenario 1. Processing beef imports from Canada under scenario 3 are projected to average 254.6 million pounds per year, carcass weight equivalent, or about 4.1 percent of the U.S. baseline supply. The quantity imported is projected to decline in the latter years of the 5-year period, as an increasing number of cull cattle become eligible for importation, that

is, are able to be verified as having been born on or after March 1, 1999. We estimate that 25 percent of the cull cattle and OTM beef imports from Canada under this scenario displace processing beef imports from other countries. We also present the price and welfare effects assuming that either 50 percent or none of the cull cattle and OTM beef imports from Canada displace processing beef imports from elsewhere.

Table 6. Projected changes in imports of cull cattle, feeder cattle, fed cattle, fed beef, and processing beef from Canada in scenario 2, and projected changes in imports from Canada as a percentage of the projected U.S. baseline supplies, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Projected Changes in Imports from Canada					
Cull cattle (thousand head)	459	459	459	460	462
Feeder cattle (thousand head)	-1	9	-5	-16	-21
Fed cattle (thousand head)	-119	-91	-129	-161	-173
Fed beef (million pounds, carcass weight equivalent)	96	74	105	131	140
Processing beef (million pounds, carcass weight equivalent)	0	0	0	0	0
Projected Changes in Imports from Canada as a Percentage of the Projected U.S. Baseline Supply					
Cull cattle	8.2%	7.8%	7.6%	7.6%	7.6%
Feeder cattle	nil	nil	nil	nil	-0.1
Fed cattle	-0.4%	-0.3%	-0.4%	-0.5%	-0.6%
Fed beef	0.4%	0.3%	0.5%	0.6%	0.6%
Processing beef	0	0	0	0	0

Notes: Changes in cattle and beef imports from Canada for scenario 2 are taken from Appendix Tables 4 and 7. The percentage changes to the baseline are computed (i) for cull cattle, using projected baseline cull cattle slaughter shown in Appendix Table 2; (ii) for feeder cattle, using projected baseline feeder cattle consumption shown in Table 2; (iii) for fed cattle, using projected baseline fed cattle consumption shown in Table 3; and (iv) for fed beef, using projected baseline fed beef consumption shown in Table 4.

Table 7. Projected changes in imports of cull cattle, feeder cattle, fed cattle, fed beef, and processing beef from Canada in scenario 3, and projected changes in imports from Canada as a percentage of the projected U.S. baseline supplies, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Projected Changes in Imports from Canada					
Cull cattle (thousand head)	75	79	81	134	161
Feeder cattle (thousand head)	-1	9	-5	-16	-21
Fed cattle (thousand head)	-23	4	-34	-80	-98
Fed beef (million pounds, carcass weight equivalent)	18	-3	28	65	79
Processing beef (million pounds, carcass weight equivalent)	277	273	272	234	217
Projected Changes in Imports from Canada as a Percentage of the Projected U.S. Baseline Supply					
Cull cattle	1.3%	1.3%	1.3%	2.2%	2.7%
Feeder cattle	nil	nil	nil	nil	-0.1
Fed cattle	-0.1%	nil	-0.1%	-0.3%	-0.3%
Fed beef	0.1%	nil	0.1%	0.3%	0.3%
Processing beef	4.7%	4.5%	4.4%	3.7%	3.4%

Notes: Changes in cattle and beef imports from Canada for scenario 3 are taken from Appendix Tables 5 and 8. The percentage changes to the baseline are computed (i) for cull cattle, using projected baseline cull cattle slaughter shown in Appendix Table 2; (ii) for feeder cattle, using projected baseline feeder cattle consumption shown in Table 2; (iii) for fed cattle, using projected baseline fed cattle consumption shown in Table 3; (iv) for fed beef, using projected baseline fed beef consumption shown in Table 4, and (v) for processing beef, using projected baseline processing beef consumption from Table 1.

Commodities not analyzed using the BAS Model

Five commodity categories are not analyzed using the BAS model: breeding cattle including dairy, vealers and slaughter calves, bison, bovine casings and small intestine products, and bovine blood and blood products. Breeding cattle comprise dairy and beef heifers, cows, and bulls. Vealers and slaughter calves include cattle from less than 1 month old up to 8 months, with most between 4 and 5 months of age. Bison refers to both breeding and slaughter bison. Bovine casings are intestines, stomachs, esophagi, and urinary bladders from cattle and possibly other bovines that are used to encase processed meats in foods such as sausage. Bovine blood and blood products comprise a number of commodities that include ones used in the preparation of vaccines and drugs, the most important of which is fetal bovine serum.

We use available data to describe expected effects for these commodities. Changes in import quantities projected for breeding cattle including dairy, vealers and slaughter calves, and bison are small, suggesting that impacts for U.S. entities will not be significant. For bovine casings, small intestine products, and blood and blood products, our findings are constrained by a scarcity of information about the commodities and quantities that would be imported and levels of U.S. production and consumption. In the preliminary RIA, we acknowledged these data deficiencies and invited the public to submit comments that would enable us to more fully evaluate impacts in the RIA for the final rule, but information applicable to an analysis for these commodities was not received.

Breeding cattle, including dairy. To illustrate the relatively small number of breeding cattle that are projected to be imported from Canada, we compare these

quantities to past imports and recent U.S. beef and dairy replacement numbers. We also note that the decision to purchase a breeding animal is largely influenced by the animal's expected productivity and the herd's breeding requirements. Although we do not estimate price and welfare effects for breeding cattle using the BAS model, we do simulate impacts for dairy operations using the multi-sector model.

Vealers and slaughter calves. We expect market effects for vealers and slaughter calves to be insignificant, given the small change in the number projected to be imported from Canada with this rulemaking.

Bison. The net effect for bison will be to allow importation of Canadian breeding bison to resume, since bison destined for feeding or slaughter (and slaughtered at less than 30 months of age) may already be imported from BSE minimal-risk regions. We compare the small number of Canadian breeding bison projected to be imported to an approximation of the U.S. breeding bison population.

Bovine casings and small intestine products. The rule may affect the U.S. supply of bovine casings and small intestine products directly through resumption of imports from Canada, and indirectly, through changes in U.S. cattle slaughter numbers and the reestablished importation of Canadian bovine small intestines, minus the distal ileum.

Bovine blood and blood products. Fetal bovine serum is the most important blood product that will be affected by the rule, and the only one for which we have production, consumption, and trade data.

3. Expected Impacts for Commodities not analyzed using the BAS Model

In this section we evaluate expected effects for the commodities not analyzed using the BAS model: breeding cattle including dairy, vealers and slaughter calves, bison, bovine casings and small intestine products, and bovine blood and blood products. Where appropriate, we consider effects in terms of scenario 3 (entry of Canadian cattle born on or after March 1, 1999, and resumption of OTM beef imports from Canada).

Breeding Cattle including Dairy

Breeding cattle are projected to comprise about 5 percent of the cattle imported from Canada in scenario 3 (Table 8). In contrast to the feeder and slaughter cattle markets, the demand for breeding cattle depends on considerations of herd composition and future productivity. While variations in the price of breeding stock influence the quantity demanded, their purchase is ultimately an investment decision based on expected net returns over several years. In turn, a producer's prospects are related to whether herds in general are expanding or contracting as reflected by the nation's cattle cycle. A dairy farmer needing a replacement heifer is unlikely to wait long for a more favorable price before making the purchase.

Projected imports of breeding cattle from Canada over the 5-year period, 2008-2012, closely match historic levels, as shown in Table 8. About 86 percent of the breeding cattle imported are expected to be dairy cows and heifers. Between 1992 and 2002, dairy cows and heifers comprised from 78 to 92 percent of annual breeding cattle imports from Canada. Nine percent of breeding cattle imports are expected to be beef

cows and heifers, and bulls (dairy and beef) are projected to comprise the remaining 5 percent.

Table 8. Average annual cattle imports from Canada, 1992-2002, and projected imports in scenario 3, 2008-2012

	Average Annual Imports 1992- 2002 (Head)	Percentage of Imports 1992-2002	Percentage of Breeding Cattle Imports 1992-2002	Projected Average Annual Imports 2008-2012 (Head)	Projected Percentage of Imports 2008-2012	Projected Percentage of Breeding Cattle Imports 2008-2012
Breeding						
Dairy Heifers/Cows	44,500	3.6%	86.4%	47,800	4.2%	85.6%
Beef Heifers/Cows	4,300	0.3%	8.3%	5,000	0.4%	9.0%
Bulls	2,800	0.2%	5.3%	3,000	0.3%	5.4%
Breeding Total	51,600	4.1%	100.0%	55,800	4.9%	100.0%
Slaughter	1,028,400	82.2%		834,400	73.0%	
Stocker/Feeder	171,000	13.7%		252,200	22.1%	
Total	1,251,000	100.0%		1,142,400	100.0%	

Sources: For 1992-2002 averages, Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics.
<http://www.fas.usda.gov/ustrade/>. Projected annual averages for 2008-2012 are calculated from Appendix Table 3.

From 1992 to 2002, U.S. producers annually raised about 4.1 million dairy replacement heifers and about 5.9 million beef replacement heifers (Table 9). The average number of Canadian breeding cattle imported during that period (including bulls) totaled only 0.5 percent of these combined quantities, a percentage that would be even smaller if cows and bulls that were purchased as replacement animals were included in the comparison. The breeding cattle imports from Canada during this period represented about 1.1 percent of dairy heifer replacements and less than 0.1 percent of beef heifer replacements.

Table 9. Breeding cattle: average annual imports from Canada and average annual U.S. heifer replacements, 1992-2002

	Average Annual Imports from <u>Canada</u> (Head)	Average Annual U.S. Heifer <u>Replacements</u> (Head)	Imports from Canada as a Percentage of U.S. Heifer <u>Replacements</u>
Dairy Heifers/Cows	44,500	4,079,000*	1.1%
Beef Heifers/Cows	4,300	5,886,000*	0.1%
Bulls	2,800	N/A	
Total	51,600	9,965,000	0.5%

Sources: Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics. <http://www.fas.usda.gov/ustrade/>; and National Agricultural Statistics Service (NASS), United States Department of Agriculture, U.S. and All States Data – Cattle and Calves. <http://www.nass.usda.gov/>

* In the preliminary analysis, these numbers were inadvertently transposed.

We have no reason to expect the supply of Canadian heifer replacements to be greater than historical levels. In fact, the numbers of dairy heifer replacements present on all cattle operations in Canada have been in decline in recent years, from 512,000 head on January 1, 2003, to 476,300 head on January 1, 2007.²⁷ Some of this decline may be attributable to BSE restrictions, but dairy cow inventories in both the United States and Canada have been decreasing for several years. In addition, the number of operations that specialize in raising heifers has also declined. In Ontario and Quebec, the two provinces that are historically the primary suppliers of dairy heifer exports, there were 487 of these operations on January 1, 2003, and only 296 on January 1, 2005.²⁸ The

²⁷ Source: Statistics Canada. *Information is used with the permission of Statistics Canada. Users are forbidden to copy the data and disseminate them, in an original or modified form, for commercial purposes, without permission from Statistics Canada. Information on the availability of the wide range of data from Statistics Canada can be obtained from Statistics Canada's Regional Offices, its World Wide Web site at www.statcan.ca, and its toll-free access number 1-800-263-1136.*

²⁸ Ontario and Quebec account for approximately two-thirds of the dairy cattle inventory in Canada. Source: Statistics Canada, as cited in Al Mussell, Graeme Hedley, Don Ault, and David Bullock, "Role and Impact of Renewed Canada – US Trade in Dairy Heifers and Dairy Breeding Stock," George Morris Centre, Informa Economics, February 2006. <http://www.informaecon.com/>

currency exchange rate is also less favorable to Canadian exports than it was prior to 2003.

There is no evidence that imports of Canadian dairy cattle historically have had a significant effect on the U.S. cow herd, U.S. dairy heifer prices, or on U.S. milk prices. The U.S. milking herd declined from about 9.7 million head in 1992, to about 9.1 million in 2002. The number of U.S. milk cow replacements remained essentially steady, fluctuating between 4 million and 4.1 million head over that same time period.²⁹ An empirical investigation by Mussell et al. (2006) concluded that imports from Canada prior to 2003 had no statistically significant impact on the U.S. dairy herd.³⁰ Imports of dairy heifers from Canada also were found to have no statistically significant impact on U.S. heifer prices or on U.S. milk prices.

Dairy heifer imports will be influenced by their price, quality, and the exchange rate. The projected imports of dairy cows and heifers used in our analysis are based on historical import levels prior to formation of a dairy herd retirement initiative called Cooperatives Working Together.³¹ If dairy farmers are dedicated to reducing the national dairy herd, then they may purchase fewer replacement animals and the import projections may be overstated. However, if a replacement heifer from Canada can be purchased at a lower price than a domestic one, then it is to the producer's (and industry's) advantage for the Canadian replacement to be purchased and a domestically raised animal to be retired.

²⁹ Heifers 500 pounds and over kept for milk cow replacements. Source: Agricultural Statistics, National Agricultural Statistics Service, USDA.

³⁰ Al Mussell, Graeme Hedley, Don Ault, and David Bullock, "Role and Impact of Renewed Canada – US Trade in Dairy Heifers and Dairy Breeding Stock," George Morris Centre, Informa Economics, February 2006. <http://www.informaecon.com/>

³¹ www.cwt.coop

In 2006, the farm-milk supply produced from 9.1 million dairy cows was 181.8 billion pounds of milk (19,951 pounds per cow), at an all-milk price of \$12.90 per cwt. If all 47,800 Canadian dairy heifers projected to be imported annually on average over the period of analysis were to constitute, in their entirety, an addition to the U.S. milking herd, the increase would represent an expansion of the 2006 U.S. herd by 0.5 percent. All things equal, this increase would correspond to an increase in milk production of approximately 0.5 percent.³² We would expect the short run effects (more inelastic supply) of such an increase in the U.S. milking herd to be larger than the longer term effects (more elastic supply).³³

Assuming a short-run supply elasticity for milk of 0.15 and a demand elasticity of -0.30, an increase in milk production by 0.5 percent is estimated to decrease the milk price by 15 cents per cwt. This translates into a 1.2 percent price decline. As supply becomes more elastic, the price decline resulting from an increase in production by 0.5 percent becomes smaller. Assuming a longer run supply elasticity of 0.50 would lead to an estimated decline in price of 9 cents per cwt, or 0.7 percent.³⁴

This example of potential effects for milk prices from changes in the size of the U.S. milking herd assumes that the projected imports of Canadian breeding cattle would expand the U.S. milking herd in their entirety. Analysis using the multi-sector model

³² Assuming the additional heifers produce milk at the same average rate reported for the U.S. herd in 2006.

³³ Milk supply elasticities of 0.12 in year 1 and 2.46 in year 10 are cited in Chavas, J.P., and R.M Klemme, "Aggregate Milk Supply Response and Investment Behavior on U.S. Dairy Farms," *American Journal of Agricultural Economics* 78 (February 1986). A total dairy product demand elasticity of -0.31 is cited in Haidacher, R.C., J.R. Blaylock, and L.H. Meyers. "Consumer Demand for Dairy Products, A Summary Analysis." USDA Economic Research Service, *Agriculture Information Bulletin* 537 (March 1988).

³⁴ The 0.15 short-run supply elasticity is based on a number of studies cited in Chavas and Klemme (1986). The 0.50 long-run supply elasticity is a 3 to 5 year elasticity used by ERS in dairy analyses. It is also adapted from a number of studies, including Chavas and Klemme, that cite long-run elasticities of up to 10 years. Neither of these supply elasticities is the result of a formal analysis or taken from a specific citation; both are based on ERS dairy outlook research.

indicates that in scenario 3 dairy producers may experience price declines of between 1.3 and 1.7 percent for dairy cattle due to the small number projected to be imported from Canada. These imports translate into an increase in U.S. milk production by 0.1 percent or less and a decrease in the price of milk and increase in consumer surplus by less than 0.1 percent.

In sum, we do not expect imports of dairy and beef breeding cattle from Canada to add significantly to the U.S. national herd, but rather serve as an additional source of replacement stock. Demand for these animals, like the demand for breeding cattle generally, will derive from management decisions based on herd composition and expected future returns. Relative prices, quality, and the exchange rate will influence the decision to purchase breeding cattle from Canada. The numbers projected to be imported are small in comparison to projected cattle imports from Canada overall (less than 5 percent) and even smaller in comparison to the number of replacement breeding heifers supplied on average by U.S. producers (0.5 percent). Our expectation that impacts for U.S. entities of resumption of breeding cattle imports from Canada will be minor is supported by the findings of Mussell et al. (2006) cited above; imports of Canadian dairy cattle prior to May 2003 were found to have had insignificant effects on the U.S. cow herd, dairy heifer prices, and milk prices.³⁵

Vealers and Slaughter Calves

Young cattle sold for meat are divided into vealers and slaughter calves, based on their type of feeding and age.³⁶ Vealers that have subsisted largely on milk usually are

³⁵ Mussell et al. (2006).

³⁶ USDA Agricultural Marketing Service, United States Standards for Vealers and Slaughter Calves, <http://www.ams.usda.gov/lsg/stand/standards/sl-v&c.pdf>. Information on vealers and slaughter calves in this paragraph is taken from this source.

less than three months of age. Animals that have been raised on milk replacer rations are usually older. Calves are usually between 3 and 8 months of age, have subsisted partially or entirely on feeds other than milk or milk replacers for a substantial period of time, and have developed the physical characteristics associated with maturity beyond the vealer stage.

The rule is expected to have a small effect on the number of vealers and slaughter calves imported from Canada. In scenario 3, a decline in imports averaging 3,000 head per year is projected over the period of analysis, given expected changes in the Canadian cattle inventory (Appendix Table 5). For the 10-year period, 1994-2003, slaughter of vealers and calves in the United States averaged 1,297,000 head per year.³⁷ We expect annual U.S. vealer and calf slaughter during the period of analysis to be similar. On this basis, the average annual decrease in vealer and slaughter calf imports from Canada in scenario 3 would be equal to less than 1 percent of U.S. vealer and calf slaughter.³⁸ Any effect on vealer and slaughter calf prices because of the smaller number expected to be imported will not be significant.

Bison

The current bison industry in North America has a relatively young history, emerging in the 1960s and expanding rapidly in the 1980s and 1990s.³⁹ In the late 1990s, prices for bison climbed rapidly as new operations competed for breeding stock to build their herds. By 1998, bison prices had reached such levels that many producers could not afford new stock. At the same time, there was an imbalance in demand for bison meat;

³⁷ ERS Red Meat Yearbook, <http://www.ers.usda.gov/data/sdp/view.asp?f=livestock/94006/>

³⁸ 3,000 head decrease/1,297,000 total head = 0.2 percent

³⁹ Much of the information presented on the bison industry is taken from the Web-site of the National Bison Association, <http://www.bisoncentral.com/>

the more expensive tenderloins and strip steaks were in demand by restaurants, but there was relatively little demand for the less expensive roasts and ground meat. In 1999, the industry entered a 4-year decline, with bison prices falling dramatically at the same time that producers faced a sustained period of drought. Beginning in 2003, the industry has once again entered a period of growth and profitability.

Like the cattle industry, the commercial bison industry is comprised primarily of cow-calf operations that sell weaned calves to other operations for finishing and processing. A smaller number of producers specialize in raising breeding stock. The 2002 Census of Agriculture reported a total of 4,132 bison producers in the United States, who owned 231,950 head of bison. The 2002 Census also reported that 1,734 producers (42 percent) sold 57,210 head of bison (25 percent of inventory). There are approximately 230,000 bison on 1,900 farms in Canada.⁴⁰

Bison are raised in every state, with production concentrated in the High Plains. South Dakota and North Dakota have the largest bison populations, with 40,168 and 30,856 head, respectively, in 2002. Besides the Dakotas, Colorado, Minnesota, Montana, Nebraska, Oklahoma, and Wyoming each contained bison populations of more than 12,000 animals in 2002. North Dakota also boasts the largest bison slaughter plant in the country.⁴¹

U.S. bison imports from Canada, 1996-2006, are shown in Table 10. Annual imports increased from 1,149 head in 1996 to 4,490 head in 1999, reflecting the industry's expansion during that time. Imports fell to an average of 2,400 per year in

⁴⁰ <http://www.agr.gc.ca/redmeat/documents/factsheet05.pdf>

⁴¹ James G. Robb, Livestock Marketing Information Center, personal communication.

2001 and 2002, and were then prohibited due to the May 2003 BSE discovery. In 2002, bison imports from Canada represented about 1 percent of the U.S. bison inventory.

In July 2005, restrictions were lifted on bison imported for immediate slaughter, or feeding and slaughter, at less than 30 months of age. There were 3,513 bison imported from Canada by the end of 2005, a half-year total that was in the range of yearly imports prior to 2003. In 2006, bison imports from Canada increased dramatically to a total of 13,255 head. Over 3,900 bison were imported in the first quarter of 2007. Meanwhile, there has been a marked decline in bison meat imports from Canada.

Table 10. Bison imports from Canada, 1996-2006; U.S. bison inventory, 2002; and U.S. bison slaughter, 2000-2006 (number of head)

<u>Year</u>	<u>Imports from Canada</u>	<u>U.S. Bison Inventory</u>	<u>U.S. Bison Slaughter</u>
1996	1,149	---	---
1997	2,011	---	---
1998	2,737	---	---
1999	4,490	---	---
2000	3,913	---	17,674
2001	2,485	---	19,483
2002	2,306	231,950	25,340
2003	991	---	34,804
2004	0	---	30,135
2005	3,513	---	35,649
2006	13,225	---	42,500

Sources: Imports from Canada: U.S. Bureau of the Census; U.S. inventory: USDA NASS 2002 Census of Agriculture; U.S. federally inspected slaughter: USDA NASS, "Livestock Slaughter," annual summary issues.

Canadian members of the North American Bison Cooperative and independent U.S. marketers that purchase Canadian bison have significantly increased their sales to U.S. bison slaughter plants. The United States is recognized as holding advantages in the slaughter of bison while Canada is seen as offering advantages in the production of the

live bison. The large increase in imports during 2006 reflects the further strengthening of U.S. demand for bison meat as well as U.S. slaughter advantages.

Contacts with the bison industry during the initial preparation of the preliminary RIA in late 2005 indicated that, with this rulemaking, an estimated 80 percent of bison imports would be for slaughter, 10 percent would be for feeding, and 10 percent would be for breeding. The number of bison projected to be imported in the preliminary RIA roughly followed these percentages, with imports totaling 4,000 head in the first year, 3,150 head in the second year, and 2,500 head in the latter three years of the analysis. These projections were based on reported imports through 2005. The maximum number of bison imported during this period was 4,490 head in 1999, and the minimum number (other than none imported in 2004 because of the ban on live bovine imports) was 991 in 2003, when the border was open for only the first 5 months.

Our projection of bison imports has been significantly increased from the projections set forth in the preliminary RIA, to a total of as many as 12,000 head per year. We assume 9,600 head will be for slaughter, 1,200 head will be for feeding, and 1,200 head will be for breeding, using the same percentage shares as above. The 9,600 bison projected to be imported for immediate slaughter in 2008 would equal about 23 percent of the total U.S. bison slaughter in 2006. Numbers of slaughter and feeder bison projected to be imported from Canada are consistent with the 2006 total bison import level.⁴²

⁴² During Fiscal Year 2006, there were 12,025 head of bison imported from Canada, of which 8,460 head (70 percent) were destined for immediate slaughter, while the remaining 3,565 head (30 percent) were for feeding and then slaughter (APHIS VS Import-Export Animals Staff). Based on these one-year totals, our projection of slaughter bison imports (80 percent) may be somewhat high and our projection of feeder bison imports (10 percent) may be somewhat low.

The number of bison slaughtered in the United States increased by more than one-third between 2004 and 2006 (Table 10). The large increase in bison imports in 2006 has left the U.S. bison slaughter and feeding industries in expectation of a continuation of sizable import levels.

Reestablished imports of Canadian breeding bison will be the principal impact of the rule for this industry. Yearly imports from Canada of 1,200 head of breeding bison will augment the U.S. bison breeding herd slightly. They will annually represent about 1 percent of U.S. breeding bison, assuming the composition of the national bison herd is similar to that of the national cattle herd, with breeding stock (cows, replacement heifers, and bulls) constituting about 56 percent of the animals.⁴³

As the market for bison meat becomes better established, the demand for breeding stock will continue to strengthen. The projected imports of breeding bison will help meet this growing demand. However, they will constitute a small addition to the U.S. breeding herd. Effects on bison prices and the welfare of U.S. bison producers are not expected to be significant.

Bovine Casings and Small Intestine Products

The rule may affect the U.S. supply of bovine casings and small intestine products in three ways: by allowing importation of bovine casings from Canada; by allowing importation of Canadian bovine small intestines, minus the distal ileum, that are used to make certain casings and variety meats; and by reducing restrictions on live bovine

⁴³ January 1, 2007, cattle inventory: out of a total of 97 million head, there were 42 million cows and heifers that calved, 10.2 million replacement heifers expected to calve, and 2.2 million bulls 500 pounds and over (<http://usda.mannlib.cornell.edu/usda/nass/Catt/2000s/2007/Catt-02-02-2007.pdf>). The combined breeding cattle stock totaled 54.4 million head, or 56 percent of the national herd. Annual imports of 1,200 head of breeding bison / (232,000 [2002 U.S. bison inventory] x 0.56) = 0.9 percent of the approximated U.S. breeding bison population.

imports from Canada and thereby changing the U.S. supply of bovine products in general, including intestines and other material used to produce casings and variety meats.⁴⁴ We have been unable to acquire much of the information that would be needed to assess expected effects of the rule on the U.S. casings and variety meats industries. Following, we present our current understanding of possible impacts of the rule and identify data gaps. We requested in the preliminary RIA that knowledgeable parties submit information in comment on the proposed rule that would enable us to prepare a more complete final analysis, but additional information was not received.

U.S. supply of bovine small intestines. Animal casings are defined in the CFR as intestines, stomachs, esophagi, and urinary bladders from cattle, sheep, swine, or goats that are used to encase processed meats in foods such as sausage.⁴⁵ The three most widely used types of bovine casings are beef bung caps, beef rounds, and beef middles.⁴⁶ They come from different parts of the animal's intestinal tract and, because of differing diameters and perhaps other characteristics, are used in the production of different types of sausages.

Beef rounds are derived from the small intestine and their name refers to the intestine's round or ring shape. The bovine small intestine is also used in the preparation of certain variety meats. For most of 2004 and 2005, U.S. supplies of beef rounds and small intestine-derived variety meats were constrained by BSE-related restrictions on the use of the small intestine for human food, as described here.

⁴⁴ Variety meats, a catch-all term, refers primarily to the organs, feet, and tails of slaughtered livestock. The rule will result in an increase in the U.S. supply of bovine byproducts in general, due to reestablished imports of Canadian cull cattle exceeding projected declines in imports of Canadian feeder and fed cattle. We include in this discussion the expected increase in the U.S. supply of small intestine-derived casings and variety meats so as to complete our consideration of sources of impact for this commodity category.

⁴⁵ 9CFR 96.1. <http://www.gpoaccess.gov/cfr/index.html>

⁴⁶ International Natural Sausage Casing Association, <http://www.insca.org/>

Following detection of BSE in an imported dairy cow in Washington State in December 2003, the Secretaries of USDA and Health and Human Services announced a series of regulatory actions and policy changes to strengthen protections against the spread of BSE in U.S. cattle and against human exposure to the BSE agent. On January 12, 2004, USDA's Food Safety and Inspection Service (FSIS) issued three interim final rules, one of which was aimed at minimizing human exposure to BSE specified risk materials (SRMs). This rule designated certain materials from cattle as SRMs, declared that SRMs are inedible, and prohibited the use of these materials for human food.⁴⁷ Among the materials identified as SRMs was the distal ileum of the small intestine. To ensure effective removal of the distal ileum, FSIS required that the entire small intestine be removed and disposed of as inedible.

On July 14, 2004, the Food and Drug Administration (FDA) issued an interim final rule that extended the FSIS measures to FDA-regulated human food and cosmetics.⁴⁸ FDA designated the distal ileum of the small intestine from cattle as an SRM, and, as had FSIS, prohibited the use of the entire small intestine for human food.

In September 2005, FSIS and FDA published amendments to their interim final rules that became effective October 7, 2005. The FSIS amendment permits beef small intestine, excluding the distal ileum, to be used for human food. The FDA amendment permits the manufacture and use of beef casings derived from beef small intestine, excluding the distal ileum, for human food and cosmetics.⁴⁹

⁴⁷ 9 CFR 310.22(a) and 9 CFR 310.22(b). <http://www.gpoaccess.gov/cfr/index.html>

⁴⁸ "Prohibited cattle materials; use" *Federal Register*, Vol. 69, No. 134; July 14, 2004, 42255-42274. http://www.access.gpo.gov/su_docs/fedreg/a040714c.html

⁴⁹ Meat and poultry inspection: "Specified risk materials use for human food, prohibition; and non-ambulatory disabled cattle," disposition requirements, 53043-53050; Food and cosmetics: "Cattle materials," prohibited use, 53063-53069; *Federal Register*, Vol. 70, No. 172; September 7, 2005. http://www.access.gpo.gov/su_docs/fedreg/a050907c.html

One source of information on the supply of small intestine for U.S. bovine casings and variety meats production is the Preliminary Regulatory Impact Analysis (PRIA) that was prepared for the interim final rules issued by FSIS on January 12, 2004.⁵⁰ FSIS determined that the quantity of bovine small intestine produced in the United States in 2002 (and that would have been excluded by the interim final rule from the human food supply) was about 160 million pounds, including the distal ileum.⁵¹ The PRIA approximated that of the 160 million pounds of small intestine, about 102 million pounds were used to produce casings and about 58 million pounds were used in the production of variety meats. In fact, these numbers were overstated by about 15 percent because of tissue condemnations for disease and contamination.⁵² In addition, the distal ileum comprises about 10 percent of the small intestine, according to industry sources.⁵³ Adjusting for the condemnations and removal of the distal ileum, about 76.5 million pounds and 43.5 million pounds of bovine small intestine are approximated to have been used in 2002 to produce beef rounds and variety meats, respectively, in the United States, or about 120 million pounds total.

To approximate the change in the U.S. supply of bovine small intestine used for casings and variety meats production under the rule, we assume the relationship between the quantity of bovine small intestine used and the number of cattle slaughtered, 2008-

⁵⁰ “Preliminary Analysis of Interim Final Rules and an Interpretive Rule to Prevent the BSE Agent from Entering the U.S. Food Supply,” http://www.fsis.usda.gov/Frame/FrameRedirect.asp?main=http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/Docs_03-025IF.htm. The PRIA examined expected economic effects of the interim rule’s requirement that the entire small intestine be removed and disposed of as inedible.

⁵¹ The computations used to arrive at this approximated quantity included an average weight of the small intestine including the distal ileum (11 pounds for a 1,250-pound bovine) multiplied by the number of slaughtered cattle from which the small intestine would be taken for human food (14,535,000 head). This number of cattle was based on an FSIS 2002 survey and slaughterhouse site visits.

⁵² James Wilkus, FSIS, personal communication.

⁵³ Ibid.

2012, will be similar to the relationship described in the PRIA for 2002. In 2002, there were 35,735,000 head of cattle slaughtered in the United States.⁵⁴ The 120 million pounds of bovine small intestine minus the distal ileum approximated as having been used that year to produce casings and variety meats yields a ratio of 3.4 pounds per head of cattle slaughtered (including cattle from which the small intestine was not used).

Increases in U.S. slaughter projected for scenario 3 are shown in Table 11. Using the ratio 3.4 pounds per animal slaughtered, we calculate that for scenario 3 the annual supply of bovine casings and variety meats produced from small intestines is expected to increase on average over the period of analysis by less than 0.2 percent. This supply projection presumes a ready market for these products.

Table 11. Annual increases in U.S. production of bovine small intestine used to produce casings and variety meats, 2008-2012, based on changes in fed and cull cattle imports projected in scenario 3

Year	Cattle Slaughter (Thousand Head)			Approximated Increase in the Supply of Small Intestine Used for Casings and Variety Meats (pounds)	Percentage Increase in the Supply of Small Intestine Used for Casings and Variety Meats
	Baseline	Scenario 3	Change		
2008	34,571	34,623	52	176,800	0.2%
2009	35,558	35,641	83	282,200	0.2%
2010	35,766	35,813	47	159,800	0.1%
2011	35,710	35,764	54	183,600	0.2%
2012	35,617	35,680	63	214,200	0.2%

Notes: Cattle slaughter baseline numbers are taken from Table 3 for fed cattle and from Appendix Table 2 for cull cattle. Cattle slaughtered in scenario 3 include the net change in imports from Canada (excluding vealers and slaughter calves), as shown in Appendix Table 5. This calculation does not take into account possible changes in the supply of U.S.-sourced slaughter cattle because of price changes attributable to the rulemaking, and also ignores effects of changes in feeder cattle imports on subsequent slaughter totals. Based on 2002 data compiled by FSIS, the total quantity of bovine small intestine used to produce casings and variety meats divided by the total number of cattle slaughtered yields 3.4 pounds of small intestine minus the distal ileum per animal slaughtered. We assume that this same ratio holds during the period of analysis.

⁵⁴USDA ERS, Red Meat Yearbook, <http://www.ers.usda.gov/data/sdp/view.asp?f=livestock/94006/>

The supply of bovine bladders and of other parts of the bovine intestinal tract may increase by similarly small percentages. We do not have a basis for approximating the additional quantities of bung caps and middles that may be produced, but as with the supply of beef rounds and small intestine-derived variety meats, we expect that the amounts will be relatively small.

Finally, the U.S. supply of bovine intestines used to produce casings and variety meats may be affected by the importation of Canadian bovine small intestines. Among commodities currently allowed to be imported from Canada, as a region presenting a minimal risk of introducing BSE into the United States, are bovine meat, meat byproducts, and meat food products that meet certain conditions.⁵⁵ One of the import conditions is the requirement that the SRMs and small intestine be removed at slaughter.⁵⁶ The rule will allow importation of bovine small intestine minus the distal ileum that could then be processed into casings and variety meats in the United States. APHIS does not have information on the potential volume of bovine small intestine for making casings and variety meats that may be imported from Canada because of the rule. In the preliminary RIA, we requested information that would enable us to evaluate effects on the U.S. supply of bovine small intestine of allowing their importation from Canada, but this information was not received.

Bovine casings from Canada. The importation of bovine and other ruminant casings, except stomachs, is prohibited if the casings originated in or were processed in

⁵⁵ “Bovine Spongiform Encephalopathy; Minimal-Risk Regions and Importation of Commodities,” Final Rule. *Federal Register*, Vol. 70, No. 2; January 4, 2005, 460-553.
http://www.access.gpo.gov/su_docs/fedreg/a050104c.html

⁵⁶ Other conditions are that meat, meat byproducts, and meat food products must be derived from bovines that have been subject to a ruminant feed ban and for which an air-injected stunning process was not used at slaughter.

any region listed in 9 CFR 94.18(a).⁵⁷ The rule will allow the importation of bovine casings from minimal-risk regions, and therefore will allow their entry from Canada to resume.⁵⁸

The Agency does not have information on levels of production or consumption of bovine casings in the United States. U.S. imports and exports of bovine casings are classified in the Harmonized Tariff Schedule under HS 0504.00.0040, as non-hog guts, bladders, and stomachs of animals prepared for use as sausage casings. The trade data do not distinguish between bovine and ovine casings; import and export quantities and prices for bovine casings alone are not available.⁵⁹

Considering the combined trade in bovine and ovine casings, we find that over the 10-year period, 1995-2004, U.S. annual imports ranged from approximately 3,160 MT to 4,240 MT (average: about 3,500 MT), with values ranging from \$18.5 million to \$33.5 million (average: \$24 million). U.S. imports from Canada of bovine and ovine casings over the 4-year period, 1995-1998, averaged 231 MT, and were valued at about \$1.7 million (7 percent of U.S. imports of bovine and ovine casings for that period). Over the following four years, 1999-2002, there was a significant decline in non-hog casings imports from Canada. The annual quantity averaged about 99 MT (3 percent of U.S. imports of bovine and ovine casings) and had an average value of about \$220,000 (1 percent of U.S. imports of bovine and ovine casings). With the BSE discoveries, bovine

⁵⁷ 9 CFR 96.1(b). The one exception is sheep casings from BSE minimal-risk regions, if the sheep are less than 12 months of age at slaughter and had been subject to a ruminant feed ban. Part 94.18(a) lists regions where BSE exists; regions that, because of import requirements less restrictive than those that would be acceptable for import into the United States and/or because of inadequate surveillance, present an undue risk of introducing BSE into the United States; and BSE minimal-risk regions. <http://www.gpoaccess.gov/cfr/index.html>

⁵⁸ Bovine casings produced from the small intestine minus the distal ileum (as well as other types of bovine casings) will be allowed to be imported from certified establishments in Canada listed by FSIS in 9 CFR 327.2(b) as eligible to export meat products to the United States. <http://www.gpoaccess.gov/cfr/index.html>

⁵⁹ Venita Powell, U.S. Department of Commerce, personal communication.

and ovine casings imports from Canada declined further, to 22 MT in 2003 and only 2 MT in 2004. In 2005, there were no reported imports of non-hog casings from Canada. In 2006, non-hog casings imports from Canada totaled 16 MT, valued at \$103,000.

With regard to bovine and ovine casings exports by the United States, annual quantities over the 10-year period, 1995-2004, ranged from about 2,630 MT to about 7,470 MT (average: about 4,360 MT), with annual values ranging from \$14.8 million to \$29.6 million (average: \$22.8 million). Over this same 10-year period, U.S. bovine and ovine casings exports to Canada averaged about 478 MT (11 percent of exports of bovine and ovine casings), valued at \$4.9 million (21 percent of exports of bovine and ovine casings). In 2005, non-hog casings exports to Canada totaled 258 MT and were valued at \$2.7 million. In 2006, they totaled 263 MT, valued at \$2.8 million.

In summary, the rule is expected to have an impact on the U.S. casings and variety meats industries by affecting the supply of bovine intestines used to make these products and, for the casings industry, by allowing resumption of imports of bovine casings from Canada. In scenario 3, we expect that the annual increase in the supply of bovine small intestines from U.S. slaughter used to make beef rounds and small intestine-derived variety meats will average less than 0.2 percent over the 5-year period of analysis, that is, between approximately 160,000 pounds and 280,000 pounds. We are prevented from conducting a more complete analysis by the lack of specific information on U.S. production, consumption, and trade of bovine casings.

Bovine Blood and Blood Products

Imports of bovine blood and blood products from Canada were prohibited following the May 2003 BSE discovery. The rule will allow these imports to resume.

The primary commodities affected will be products used in the manufacture of vaccines and drugs.

We have been unable to acquire much of the information that would be necessary to assess effects of the rule for U.S. drug and vaccine manufacturers. As with the discussion of effects for bovine casings, we present our limited understanding of possible impacts of the rule. We requested public comment in the preliminary RIA that would have enabled us to prepare a more complete analysis, but additional information was not received.

Blood and blood products can be divided into two main groups: whole blood and products derived from blood that are composed of cells; and plasma-derived products including serum, clotting factors, immunoglobulins and albumin.⁶⁰ Plasma is the cell-free portion of the blood. Serum is plasma with fibrinogen and clotting factors removed.

A range of blood products theoretically could be used in preparing drugs and vaccines, but only fetal bovine serum (FBS), derived from blood plasma from bovine fetuses, and bovine serum albumin derived from adult and calf serum are used in significant amounts.⁶¹ Fetal bovine serum and sometimes bovine serum albumin are used in tissue culture media and to produce pharmaceuticals and biologics. FBS is the most important blood-derived material in human and animal vaccine and drug manufacture, and is therefore our focus.

Since the detection of BSE in Canada in 2003, imports of FBS from Canada have been restricted to either research samples of Canadian-origin FBS (limited to 1 liter per

⁶⁰ Farshid, M., R.E. Taffs, D. Scott, D.M. Asher, and K. Brorson. (2005). "The clearance of viruses and transmissible spongiform encephalopathy agents from biologicals." *Current Knowledge in Biotechnology*. 16: 561-567. <http://www.current-knowledge.com/jbio/about.htm?jcode=jbio>

⁶¹ Fetal bovine serum is also called fetal calf serum.

shipment), or FBS that is derived from animals that originate in the United States, Australia, Mexico, or Central America and is processed at a designated Canadian facility under USDA permit. Research samples are restricted to in vitro testing and evaluation, and must be destroyed following such work.

Demand for FBS continues to expand. While exact numbers are not available, one source using industry information placed world production and consumption of FBS at 500,000 liters in 1994, and at 700,000 liters in 2004. This same source indicated that in 2004 the United States and Canada combined produced 300,000 liters and consumed 425,000 liters.⁶²

U.S. imports of FBS have grown considerably in the last five years. In 2006, the United States imported approximately 257,000 liters of FBS valued at \$51 million (Table 12). The rule may affect the supply of FBS in the United States in two ways: by allowing the importation of Canadian-origin FBS for commercial purposes, and by reducing restrictions on bovine imports from Canada and thereby changing the U.S. supply of pregnant cows presented for slaughter.

Table 12. Source and value of U.S. imports of fetal bovine serum, 2002-2006

<u>Source</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>
			(Million Dollars)		
Australia	8.2	13.9	37.6	25.9	20.7
Mexico	3.9	6.6	11.1	7.5	8.0
Canada	1.9	1.3	5.4	6.3	13.1
Central America	3.4	4.3	4.5	3.8	3.4
New Zealand	3	7.3	4.5	3.2	5.7
Other	0.5	0.1	0.2	0.1	0.1
TOTAL	20.9	33.5	63.2	46.8	51.0

Source: Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics, as reported by Global Trade Information Services.

⁶² Biotrade, Inc. "Fetal Bovine Serum: Proposal to allow importation from South America," Proposal submitted to USDA/APHIS, 2005.

From 1996 through 2005, cow slaughter averaged 5.8 million head in the United States, and 0.5 million head in Canada.⁶³ Based on combined U.S. and Canadian FBS production of 300,000 liters and assuming a consistent relationship between FBS production and cow slaughter yields an annual level of Canadian FBS production of about 24,000 liters.⁶⁴ This amount represents potential imports of FBS derived from Canadian cows. Had this amount been imported in 2006, it would have represented about 9 percent of U.S. imports of FBS from all sources.⁶⁵

In addition, because annual U.S. cow slaughter is projected to increase in scenario 3 by between 63,000 and 136,000 head over the period of analysis (Appendix Table 5), we expect that FBS production in the United States would also increase. Again assuming a consistent relationship between cow slaughter and FBS production, an increase in annual domestic production of FBS of between 3,000 and 6,500 liters may occur.⁶⁶

Other than for these upper-bound approximations, we are unable to project the extent to which the U.S. supply of FBS may be affected by the rule. FBS quality varies, and is defined in relation to the performance of the specific cell line being cultured.⁶⁷ A given source may provide FBS useful for one purpose and not another. Nonetheless, resumption of FBS imports from Canada, directly as serum and indirectly through increased U.S. pregnant cow slaughter, is expected to benefit FBS users.

⁶³ Foreign Agricultural Service, USDA. <http://www.fas.usda.gov/> National Agricultural Statistics Service, USDA. <http://www.nass.usda.gov/>

⁶⁴ 300,000 liters of FBS from 6.3 million slaughtered cows yields 0.048 liters of FBS per cow slaughtered. 500,000 cows slaughtered in Canada * 0.048 liters per cow = 24,000 liters.

⁶⁵ 24,000 liters / 257,000 liters of U.S. imports of FBS = 0.093

⁶⁶ 63,000 cows slaughtered * 0.048 liters per cow = 3,024 liters; 136,000 cows slaughtered * 0.048 liters per cow = 6,528 liters. We note that these increases in domestic FBS production are somewhat overstated because the decline in price due to the increased supply of cull cattle would result in fewer domestically raised cull cattle sold for slaughter.

⁶⁷ Biotrade, Inc. "Fetal Bovine Serum: Proposal to allow importation from South America," Proposal submitted to USDA/APHIS, 2005.

4. Expected Impacts under Scenario 1 for the Modeled Commodities

In this section, we report the results from analyzing effects for cull cattle/processing beef, feeder cattle, fed cattle, and fed beef in scenario 1, using the BAS model. We describe first the price and quantity effects for each of the commodities in terms of average yearly changes over the period of analysis. We then present the welfare impacts, separately and combined, for the four commodity categories. We use the multi-sector model to examine effects at the retail level and for dairy producers. Lastly, we note the risk assessment's findings regarding the likely risk and consequences of a BSE occurrence.

Price and welfare effects that are discussed are expressed in 2007 dollars, and the present and annualized values described are discounted at 3 percent. Processing and fed beef prices and quantities are in terms of carcass weight equivalent. All price and quantity averages and percentage averages are over the 5-year period of analysis, 2008-2012.

Price and Quantity Effects

Cull cattle/processing beef. Results of the analysis show the price of processing beef decreasing in 2008 by 1.1 percent in scenario 1, from \$100 to about \$99 per cwt (Table 1 and Appendix Table 10). The annual decrease in the price of processing beef, all things equal, could average about 1.4 percent, ranging from declines of \$1.07 per cwt in 2008, to \$2.16 per cwt in 2012.

In response to this price effect, wholesale demand for processing beef could increase by an average of about 35.4 million pounds per year, and domestic supply could decrease by an annual average of about 44.2 million pounds, after accounting for

the projected displacement of processing beef imported from other sources. These amounts would be equivalent, respectively, to about 0.6 percent and 1.2 percent of the average annual projected U.S. baseline consumption and production quantities (Table 1).

Feeder cattle, fed cattle, and fed beef. We estimate that the price of feeder cattle would essentially remain unchanged (Appendix Table 11). The annual increase in feeder cattle prices in scenario 1, all things equal, could average a miniscule 12 cents per head. In response to this very small average price increase, there could be an average annual decrease in the demand for feeder cattle of about 4,750 head, and an average annual increase in domestic supply of about 2,050 head.

For fed cattle, our analysis indicates that the price would increase in 2008 as well as on average by only 0.1 percent (Appendix Table 12). Estimated price increases range from 11 cents per head in 2009, to \$3.10 per head in 2012. We estimate that these small changes in price could cause the demand for fed cattle to decrease by an average of about 31,600 head per year and the domestic supply of fed cattle to increase by an average of about 25,200 head per year. These numbers of cattle are equivalent, respectively, to about 0.1 percent and less than 0.1 percent of the projected U.S. baseline consumption and production quantities for fed cattle (Table 3).

Impacts for fed beef are also expected to be small, with the price decreasing in 2008 by 0.1 percent, or 11 cents per cwt, from a base price of \$143 per cwt (Table 4 and Appendix Table 13). The decrease in fed beef prices, all things equal, could average 0.1 percent or 22 cents per cwt. In response to this price effect, wholesale demand for fed beef could increase by an average of about 19.5 million pounds per year, and

domestic supply could decrease by an annual average of about 26.3 million pounds. These amounts are equivalent, respectively, to less than 0.1 percent and about 0.1 percent of the projected U.S. baseline consumption and production quantities for fed beef (Table 4).

In summary, expected price and quantity effects for cull cattle/processing beef outweigh those estimated for other commodities. This outcome is matched by the relative magnitude of the welfare impacts.

Welfare Effects

As indicated in the notes to Tables 1, 2, 3, and 4, consumption and production have commodity-specific definitions that differ from their commonly understood meanings. These same definitions hold for the changes in consumer and producer welfare for the commodity categories. As reference, we repeat the definitions in Table 13, since they are central to interpreting the changes in welfare. These consumer and producer definitions imply that the rule may have mixed effects for at least some entities in the affected industry sectors. Undiscounted and present values of welfare changes by commodity are shown in Table 14, and the annualized values are shown in Table 15.

Cull cattle/processing beef. Projected cull cattle imports from Canada are converted to their processing beef equivalent using projected carcass weights of 665 pounds per cow and 1,010 pounds per bull or stag.⁶⁸ Buyers of cull cattle and processing beef would benefit from welfare gains and sellers of cull cattle and processing beef would

⁶⁸ These projected weights are kept constant over the 5-year period to take into account projected increases in grain prices. They are based on year-to-date weights listed in each year's last weekly issue of "Beef Supply at a Glance," for the years 2003 through 2006 (Agriculture and Agri-Food Canada, as sourced from the Canadian Beef Grading Agency).

bear welfare losses due to the cull cattle imports. Present values of the overall welfare changes for these entities are \$413.6 million in consumer gains, \$243.7 million in producer losses, for a net benefit of about \$169.9 million (Table 14). Annualized values over the five years are consumer gains of \$90.3 million, producer losses of \$53.2 million, and net benefits of \$37.1 million (Table 15).

Table 13. Definitions of consumers and producers for the modeled commodity categories

<u>Commodity Category</u>	<u>Consumers</u>	<u>Producers</u>
Cull cattle/processing beef	U.S. buyers of processing beef at the wholesale level	Sellers of U.S.-produced processing beef at the wholesale level
Feeder cattle	Buyers of cattle for feedlot feeding in the United States	Sellers of U.S.-raised cattle for feedlot feeding in the United States
Fed cattle	Buyers of fed cattle for slaughter in the United States	Sellers of U.S.-sourced fed cattle for slaughter in the United States
Fed beef	U.S. buyers of fed beef at the wholesale level	Sellers of U.S.-produced fed beef at the wholesale level

Welfare changes for the cull cattle/processing beef category dominate the modeled effects in all of the scenarios. The relatively large impacts are not unexpected, given that this is the one modeled commodity category for which imports from Canada would be newly reestablished and projected changes from the baseline are much larger than for the other commodities. As shown in Appendix Table 3, the numbers of cull cattle projected to be imported in scenario 1, averaging 124,800 cows and 23,000 bulls and stags per year, are much larger than the projected average annual declines in imports of Canadian fed cattle (56,800 head) and feeder cattle (6,800 head).

Table 14. Undiscounted and present values of welfare changes in scenario 1, by commodity, assuming projected displacement of processing beef imports from other countries by cull cattle imports from Canada, 2008-2012

	<u>Cull Cattle/ Processing Beef</u>	<u>Feeder Cattle</u>	<u>Fed Cattle</u>	<u>Fed Beef</u>	<u>Combined</u>
(Thousand Dollars)					
Undiscounted Welfare Changes					
2007 Dollars					
Consumer Surplus	457,361	-20,093	-229,687	250,861	458,442
Producer Surplus	-269,538	19,084	224,206	-240,353	-266,601
Net Change	187,823	-1,009	-5,481	10,508	191,841
Discounted Welfare Changes (3%)					
2007 Dollars					
Consumer Surplus	413,580	-17,383	-204,726	223,491	414,962
Producer Surplus	-243,675	16,510	199,841	-214,132	-241,456
Net Change	169,905	-873	-4,885	9,358	173,505
2001 Dollars					
Consumer Surplus	367,205	-15,515	-182,327	198,090	367,453
Producer Surplus	-216,356	14,736	177,977	-189,795	-213,438
Net Change	150,849	-779	-4,350	8,295	154,015
Discounted Welfare Changes (7%)					
2007 Dollars					
Consumer Surplus	364,214	-14,405	-176,870	192,955	365,894
Producer Surplus	-214,515	13,681	172,651	-184,879	-213,062
Net Change	149,699	-724	-4,219	8,076	152,832
2001 Dollars					
Consumer Surplus	323,327	-12,859	-157,496	170,999	323,971
Producer Surplus	-190,437	12,213	153,739	-163,842	-188,327
Net Change	132,889	-646	-3,757	7,157	135,643

Note: See Appendix Tables 10-14. Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Table 15. Annualized values of welfare changes in scenario 1, by commodity, assuming projected displacement of processing beef imports from other countries by cull cattle imports from Canada, 2008-2012

	<u>Cull Cattle/ Processing Beef</u>	<u>Feeder Cattle</u>	<u>Fed Cattle</u>	<u>Fed Beef</u>	<u>Combined</u>
(Thousand Dollars)					
Discounted Welfare Changes (3%)					
2007 Dollars					
Consumer Surplus	90,307	-3,795	-44,703	48,800	90,609
Producer Surplus	-53,207	3,605	43,636	-46,757	-52,723
Net Change	37,100	-190	-1,066	2,044	37,888
2001 Dollars					
Consumer Surplus	80,181	-3,388	-39,812	43,254	80,235
Producer Surplus	-47,242	3,218	38,862	-41,442	-46,604
Net Change	32,939	-170	-950	1,811	33,630
Discounted Welfare Changes (7%)					
2007 Dollars					
Consumer Surplus	88,828	-3,513	-43,137	47,060	89,238
Producer Surplus	-52,318	3,337	42,108	-45,090	-51,963
Net Change	36,510	-176	-1,029	1,970	37,275
2001 Dollars					
Consumer Surplus	78,857	-3,136	-38,412	41,705	79,014
Producer Surplus	-46,446	2,979	37,496	-39,959	-45,930
Net Change	32,411	-157	-916	1,746	33,084

Note: See Appendix Tables 10-14. Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Another reason the welfare effects computed for the cull cattle/processing beef category are large is because of the inelastic demand (-0.40), compared to the price elasticities of demand for the other modeled commodities (feeder cattle, -0.88; fed cattle, -0.76; fed beef, -0.60). In the preliminary RIA, we examined the significance of processing beef's more inelastic demand by considering welfare changes for the cull

cattle/processing beef category when a price elasticity of demand of -0.60 is used, that is, the same elasticity as for fed beef. This exercise found that all impacts—consumer gains, producer losses, net benefits, and price declines—are reduced by nearly one-fifth when a price elasticity of demand of -0.60 is used in place of -0.40. The price elasticity of demand, that is, buyers’ responsiveness to changes in price, is an important determinant of the magnitude of welfare and price changes for the cull cattle/processing beef category.⁶⁹

Lastly, the large difference between consumer welfare gains and producer welfare losses for the cull cattle/processing beef category can be attributed to the fact that the United States is projected to import about 40 percent of its supply of processing beef over the period of analysis. In modeling the welfare effects, demand (defined as U.S. consumption) is much larger than supply (defined as U.S. production minus exports). Consequently the change in consumer surplus is large compared to the change in producer surplus because the effects are estimated only for U.S. entities.

Feeder cattle, fed cattle, and fed beef. Slightly fewer feeder cattle are projected to be imported from Canada in scenario 1 than would otherwise be imported, and the analysis indicates small gains in producer welfare (higher prices and less competition from Canadian suppliers) and small losses in consumer welfare (higher prices and fewer feeder cattle available for purchase). Present values of the welfare changes are \$16.5 million in producer gains, \$17.4 million in consumer losses, for a net loss of \$0.9 million.

⁶⁹ We note that the price elasticity of supply used for cull cattle/processing beef is the same as that for fed beef (0.84), and is more elastic than the supply elasticities for fed cattle (0.62) and feeder cattle (0.40). A more inelastic supply would also result in larger welfare and price effects for the cull cattle/processing beef category.

Annualized values are producer gains of \$3.6 million, consumer losses of \$3.8 million, and net losses of \$0.2 million.

As with feeder cattle, fewer fed cattle are projected to be imported in scenario 1 than would otherwise be imported. Once again producers (sellers of fed cattle for slaughter) would benefit from welfare gains and consumers (buyers of fed cattle for slaughter) would bear welfare losses. Present values of the welfare changes for fed cattle are \$199.8 million in producer gains, \$204.7 million in consumer losses, for a net loss of \$4.9 million. Annualized values are producer gains of \$43.6 million, consumer losses of \$44.7 million, and net losses of \$1.1 million.

Scenario 1 is projected to result in increased imports of Canadian fed beef ranging from an additional 3 million pounds in 2009, to 92 million pounds in 2012 (Appendix Table 6). Present values of welfare changes for fed beef are \$223.5 million in consumer gains, \$214.1 million in producer losses, for a net gain of \$9.4 million. Annualized values are consumer gains of \$48.8 million, producer losses of \$46.8 million, and net gains of \$2 million.

Combined effects. The analysis tells us that the present values of the combined welfare changes are \$415 million in consumer gains, \$241.5 million in producer losses, for a net welfare benefit of \$173.5 million. Annualized values are consumer gains of \$90.6 million and producer losses of \$52.7 million, yielding net benefits of \$37.9 million.

By far, the largest effects would be due to resumption of Canadian cull cattle imports, which are projected to average 147,800 head yearly (Appendix Table 3). As can be seen in Table 14, the present values of consumer welfare losses for feeder cattle

and fed cattle when combined (\$222.1 million) are similar to the consumer welfare gains for fed beef (\$223.5 million). The combined welfare gains of \$415 million are very similar to the consumer welfare gains estimated for the cull cattle/processing beef category: \$413.6 million. A similar but opposite outcome is evident with respect to producer welfare changes, with gains for feeder cattle and fed cattle (\$216.4 million) nearly the same as the producer welfare losses for fed beef (\$214.1 million). The result is combined welfare losses of \$241.5 million that are close to the \$243.7 million in producer welfare losses estimated for cull cattle/processing beef. The combined net welfare benefits, \$173.5 million, are only slightly more than the \$169.9 million in net benefits estimated for cull cattle/processing beef. In terms of annualized values, the estimated combined net welfare benefits are \$37.9 million, compared to annualized net benefits for the cull cattle/processing beef category of \$37.1 million.

Price and Welfare Effects assuming Other Levels of Displacement of Processing Beef Imports

The price and welfare effects reported above are based on our estimate (using the multi-sector model) that 25 percent of the cull cattle imported from Canada would displace processing beef imports. We also have computed price and welfare effects, assuming that either 50 percent or none of the cull cattle imports would displace processing beef imports (Appendices 2 and 3).

Assuming that 50 percent of the cull cattle imported from Canada displace processing beef imports in scenario 1, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 1 percent, or \$0.98 per cwt in 2007 dollars. This decrease can be compared to the 1.4 percent decline (\$1.47 per

cwt), based on the estimated 25 percent of cull cattle imported from Canada displacing processing beef imports. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/ processing beef of \$60.3 million, losses for U.S. producers of cull cattle/processing beef of \$35.6 million, for a net benefit of \$24.7 million.

Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, assuming that 50 percent of the imported cull cattle displace processing beef imports, are gains of \$60.6 million, losses of \$35.2 million, for a net benefit of \$25.4 million. This overall net benefit is 33 percent less than the net benefit based on the 25 percent of imported cull cattle estimated to displace processing beef imports (\$25.4 million, compared to \$37.9 million from Table 15).

Assuming that none of the cull cattle imported from Canada displace processing beef imports, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 1.9 percent, or \$1.96 per cwt in 2007 dollars. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/processing beef of \$120.6 million, losses for U.S. producers of cull cattle/processing beef of \$70.8 million, for a net benefit of \$49.8 million.

Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, assuming that none of the cull cattle imported from Canada displace processing beef imports, are gains of \$120.9 million, losses of \$70.3 million, for a net benefit of \$50.6 million. This overall net benefit is 34 percent more than the net benefit based on 25 percent of the imported cull cattle displacing processing beef imports.

Impacts Simulated Using the Multi-sector Model, including Effects at the Retail Level and for Dairy Producers

Simulations of effects for scenario 1 using the multi-sector model yield impacts similar to those estimated using the BAS model. As noted in section 2, the simulated multi-sector impacts tend to be smaller than the BAS model results because the model linkages specified between the livestock production and processing sectors capture at least some of the flexibility that businesses employ in response to supply shocks. The results support our expectation that broader impacts would be limited. Effects are simulated quarterly, and we present impacts as ranges of percentage changes; the end-points of the ranges reflect the lowest and highest quarterly changes.

In scenario 1, increases in the number of imported cattle available for slaughter in the United States (+10.1 percent to +17.6 percent) are simulated, along with slight decreases in the number of imported cattle available to be fed (-0.7 percent to -1.3 percent) and still smaller increases in the inventory of dairy breeding animals due to the resumption of imports from Canada (+0.13 percent). In addition, imports of fed beef are increased by 2.7 to 3.2 percent because of the projected reduction in fed cattle imports.

The results indicate a decrease in the cutout (wholesale) value of beef by 0.4 to 0.5 percent, and a decrease in the retail price of beef by 0.1 to 0.2 percent, when compared to the base. As a result, consumer surplus for the beef sector at the retail level is estimated to increase by 0.3 to 0.4 percent while capital and management costs in the beef sector decline by 0.7 to 1.7 percent. For beef cattle producers, the live steer price declines between 0.4 and 0.6 percent, with returns to capital and management in beef cattle production falling by 2.1 to 2.6 percent.

Dairy producers may also experience price declines of less than 1 percent for dairy cattle due to the small number of dairy breeding cattle imported from Canada. These imports translate into an increase in milk production of less than 0.1 percent, and a decrease in the price of milk and increase in consumer surplus of less than 0.1 percent.

BSE Risk

As described in the risk assessment for the rule, transmission of BSE requires that bovines ingest feed that contains the infectious agent.⁷⁰ Feed contamination results from the incorporation of ingredients that contain certain ruminant protein derived from infected animals. Rendered protein such as meat-and-bone meal derived from infected animals may remain contaminated. Prohibitions on the use of ruminant protein in ruminant feed are imposed by the Food and Drug Administration to mitigate the risk of BSE transmission.

The World Organization for Animal Health (OIE) establishes standards for the international trade in animals and animal products. It recommends that cattle be imported from a BSE controlled risk region only if the cattle selected for export were born after the date from which a ban on the feeding of ruminants with meat-and-bone meal and greaves (the residue left after animal fat or tallow has been rendered) derived from ruminants had been effectively enforced.⁷¹ In May 2007, the OIE classified both the United States and Canada as BSE controlled risk regions.

⁷⁰ APHIS, Veterinary Services. "Revised assessment of Bovine Spongiform Encephalopathy (BSE) risks associated with the importation of certain commodities from BSE minimal risk regions (Canada)," September 2007.

⁷¹ http://www.oie.int/eng/normes/Mcode/en_chapitre_2.3.13.htm

On August 4, 1997, Canada issued regulations prohibiting the use of mammalian protein in ruminant feeds.⁷² Implementation of the feed ban was a gradual process, with producers, feed mills, retailers, and feed manufacturers given grace periods before they were required to be in full compliance with the regulations. It is believed that this implementation period may have lasted six months, making February 1998 a more realistic date on which the ban can be considered to have gone into effect.

APHIS considers that a period of one year following the full implementation of the feed ban allows sufficient time for the measures taken by Canada to have their desired effect. Therefore, APHIS concludes that there is an extremely low likelihood that cattle born in Canada on or after March 1, 1999, will have been exposed to the BSE agent via feed. Therefore, these animals have an extremely low likelihood of being infected and can be imported into the United States for any purpose

Expected impacts if new cases of BSE were to occur in the U.S. cattle population because of the rule are addressed in the consequence assessment portion of the rule's risk assessment. The consequence assessment notes that effects of BSE include a variety of costs. Some costs are long-term and relatively little affected by new cases; others are one-time costs uniquely associated with new cases. The major long-term cost for the United States has been reduced access to beef export markets since the Washington State BSE discovery in December 2003. Principal Asian markets, in particular, remain largely restricted. The OIE has developed science-based standards to permit safe international trade in beef from countries that have BSE.

⁷² The ban provided exceptions for milk, blood, gelatin, and protein derived solely from porcine or equine sources.

U.S. producers and processors incur other long-term costs in complying with domestic regulations to protect animal and human health. Regulations pertaining to removal of specified risk materials (SRMs), restrictions on the use of SRMs, and other changes mandated of the beef processing and feed processing sectors are examples of this type of impact. Other long-term costs of BSE include those attributable to U.S. surveillance efforts.

As noted in the consequence assessment, impacts of subsequent cases of BSE are the incremental costs associated with those actual cases, namely, regulatory costs and domestic market impacts due to consumer reaction to additional BSE discoveries. Based on the U.S. experience with native BSE cases that have been detected, the regulatory costs per case total approximately \$250,000 for epidemiological investigations and indemnification of depopulated animals.

The potential domestic market effects of any new cases of BSE are difficult to predict. However, as described in the consequence assessment, there is little reason to expect that additional U.S. cases of BSE because of the rule would have a significant impact on U.S. beef consumption, based on past experience.⁷³ We do not foresee significant costs in terms of BSE-related declines in domestic beef consumption. The consequence assessment concludes that costs of BSE prevention will continue even in the absence of future cases, and the costs that we may expect to be associated with the investigation of possible future cases are relatively minor.

⁷³ See: Kuchler, F. and A. Tegene. "Did BSE Announcements Reduce Beef Purchases?" Economic Research Service, ERS Report Number 34, December 2006.

5. Expected Impacts under Scenario 2 for the Modeled Commodities

Under scenario 2, Canadian bovines could be imported for any U.S. destination or purpose without regard to their age. Regulations governing their importation would be similar to those that existed prior to Canada's May 2003 BSE discovery, but with the addition of BSE-related requirements other than a maximum age restriction. These regulations include requirements that imported cattle be permanently marked as to country of origin and that they be individually identified to allow an animal to be traced back to its premises of origin.

Under scenarios 1 and 3, Canadian cattle that are 9 years or older prior to March 1, 2008 would be prohibited entry. Each year thereafter, the prohibited older cull cattle comprise a smaller age group: 10 years or older prior to March 1, 2009, 11 years or older prior to March 1, 2010, and so forth. Eventually (but not within the period of analysis), the requirement that bovines be born on or after March 1, 1999, will not limit bovine imports from Canada; bovine imports allowed under the various scenarios would be the same.

Over the period of analysis, we project that in scenario 2 there would be a significantly larger quantity of cull cattle imported than in scenario 1 because there would be no age restriction or age-verification requirement. Whereas in scenario 1, an average of 147,800 head of cull cattle are projected to be imported each year, imports averaging 459,800 head per year are projected in scenario 2, that is, more than three times as many. The age-verification requirement accounts for most of this difference, as described in Appendix 1.

Regarding the other commodities, feeder cattle imports are projected to be the same under all of the scenarios; yearly fed cattle imports over the period of analysis would average 77,800 head fewer in scenario 2 than in scenario 1; and yearly fed beef imports are projected to average 63.4 million pounds more in scenario 2 than in scenario 1.⁷⁴ As in section 4, the price and welfare effects discussed in this section are expressed in 2007 dollars, and the present and annualized values described are discounted at 3 percent. Processing and fed beef prices and quantities are in terms of carcass weight equivalent. Price and quantity averages and percentage averages are over the 5-year period of analysis, 2008-2012.

Price and Quantity Effects

Cull cattle/processing beef. Results of the analysis show the price of processing beef decreasing in 2008 by 4.7 percent in scenario 2, from \$100 to about \$95 per cwt (Table 1 and Appendix Table 15). The annual decrease in the price of processing beef, all things equal, is expected to average about 4.5 percent, ranging from declines of \$4.74 per cwt in 2008, to \$4.44 per cwt in 2012.

In response to this price effect, wholesale demand for processing beef could increase by an average of about 110.5 million pounds per year, and domestic supply could decrease by an annual average of about 137.7 million pounds, after accounting for the projected displacement of processing beef imported from other sources.

Feeder cattle, fed cattle, and fed beef. The very small price and quantity effects for feeder cattle estimated in scenario 1 hold as well for scenario 2 (Appendix Table

⁷⁴ Impacts under the various scenarios also may differ for the commodities not modeled. For example, the supply of bovine casings would be larger in scenario 2 than in scenario 1, due to larger projected slaughter numbers.

11). The yearly increase in feeder cattle prices is expected to average only 12 cents per head, the annual decrease in the demand for feeder cattle and the annual increase in the domestic supply of cattle for feeding are estimated to average only about 4,750 head and 2,050 head, respectively.

For fed cattle, our analysis indicates that in scenario 2 the price could increase on average by 0.3 percent (Appendix Table 16). Estimated price increases range from \$2.47 per head in 2009, to \$4.70 per head in 2012. We estimate that these small changes in price could cause the demand for fed cattle to decrease by an average of about 75,000 head per year and the domestic supply of fed cattle to increase by an average of about 59,600 head per year.

Impacts in scenario 2 for fed beef are also expected to be small, with the price decreasing in 2008 by 0.3 percent, or 44 cents per cwt, from a base price of \$143 (Table 4 and Appendix Table 17). The decrease in fed beef prices, all things equal, also could average 0.3 percent (52 cents per cwt). In response to this price effect, wholesale demand for fed beef could increase by an average of about 46.6 million pounds per year, and domestic supply could decrease by an annual average of about 62.6 million pounds.

Welfare Effects

The undiscounted and present values of welfare changes by commodity in scenario 2 are shown in Table 16, and the annualized values are shown in Table 17.

Cull cattle/processing beef. As in scenario 1, buyers of processing beef and buyers of cull cattle would benefit from welfare gains and sellers of cull cattle and sellers of processing beef would bear welfare losses. The present values of the cull

cattle/processing beef welfare changes are \$1.31 billion in consumer gains, \$758.5 million in producer losses, for a net benefit of \$555.6 million (Table 16). Annualized values are consumer gains of \$286.9 million, producer losses of \$165.6 million, and net benefits of \$121.3 million (Table 17).

Feeder cattle, fed cattle, and fed beef. The same changes in feeder cattle imports are projected to occur in scenario 2 as in scenario 1, and therefore the welfare impacts also would be the same. Present values of the welfare changes are \$16.5 million in producer gains, \$17.4 million in consumer losses, for a net loss of \$0.9 million. Annualized values are producer gains of \$3.6 million, consumer losses of \$3.8 million, and net losses of \$0.2 million.

The decline in fed cattle imports is projected to be larger than in scenario 1. Present values of the welfare changes for fed cattle are \$481.3 million in producer gains, \$492.4 million in consumer losses, for a net loss of \$11 million. Annualized values are producer gains of \$105.1 million, consumer losses of \$107.5 million, and net losses of \$2.4 million.

Scenario 2 is projected to result in increased imports of Canadian fed beef ranging from an additional 74 million pounds in 2009, to 140 million pounds in 2012 (Appendix Table 7). Present values of welfare changes for fed beef are \$537.9 million in consumer gains, \$514.9 million in producer losses, for a net gain of \$23 million. Annualized values are consumer gains of \$117.5 million, producer losses of \$112.4 million, and net gains of \$5 million.

Table 16. Undiscounted and present values of welfare changes in scenario 2, by commodity, assuming projected displacement of processing beef imports from other countries by cull cattle imports from Canada, 2008-2012

	<u>Cull Cattle/ Processing Beef</u>	<u>Feeder Cattle</u>	<u>Fed Cattle</u>	<u>Fed Beef</u>	<u>Combined</u>
(Thousand Dollars)					
Undiscounted Welfare Changes					
2007 Dollars					
Consumer Surplus	1,434,916	-20,093	-542,087	592,565	1,465,301
Producer Surplus	-828,578	19,084	529,917	-567,168	-846,745
Net Change	606,338	-1,009	-12,170	25,397	618,556
Discounted Welfare Changes (3%)					
2007 Dollars					
Consumer Surplus	1,314,081	-17,383	-492,380	537,928	1,342,246
Producer Surplus	-758,469	16,510	481,333	-514,880	-775,506
Net Change	555,611	-873	-11,047	23,048	566,739
2001 Dollars					
Consumer Surplus	1,165,943	-15,515	-437,849	476,359	1,188,938
Producer Surplus	-672,990	14,736	428,025	-455,949	-686,178
Net Change	492,953	-779	-9,824	20,410	502,760
Discounted Welfare Changes (7%)					
2007 Dollars					
Consumer Surplus	1,176,210	-14,405	-436,108	476,103	1,201,800
Producer Surplus	-678,500	13,681	426,332	-455,711	-694,198
Net Change	497,710	-724	-9,776	20,391	507,601
2001 Dollars					
Consumer Surplus	1,043,465	-12,859	-387,739	421,548	1,064,415
Producer Surplus	-601,948	12,213	379,046	-403,493	-614,182
Net Change	441,517	-646	-8,692	18,055	450,234

Note: See Appendix Tables 11 and 15-18. Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Table 17. Annualized values of welfare changes in scenario 2, by commodity, assuming projected displacement of processing beef imports from other countries by cull cattle imports from Canada, 2008-2012

	<u>Cull Cattle/ Processing Beef</u>	<u>Feeder Cattle</u>	<u>Fed Cattle</u>	<u>Fed Beef</u>	<u>Combined</u>
(Thousand Dollars)					
Discounted Welfare Changes (3%)					
2007 Dollars					
Consumer Surplus	286,936	-3,795	-107,513	117,459	293,087
Producer Surplus	-165,615	3,605	105,101	-112,426	-169,335
Net Change	121,320	-190	-2,412	5,033	123,751
2001 Dollars					
Consumer Surplus	254,589	-3,388	-95,606	104,015	259,610
Producer Surplus	-146,950	3,218	93,461	-99,558	-149,829
Net Change	107,639	-170	-2,145	4,457	109,781
Discounted Welfare Changes (7%)					
2007 Dollars					
Consumer Surplus	286,867	-3,513	-106,363	116,117	293,108
Producer Surplus	-165,480	3,337	103,979	-111,144	-169,308
Net Change	121,387	-176	-2,384	4,973	123,800
2001 Dollars					
Consumer Surplus	254,492	-3,136	-94,566	102,812	259,602
Producer Surplus	-146,809	2,979	92,446	-98,408	-149,792
Net Change	107,682	-157	-2,120	4,404	109,809

Note: See Appendix Tables 11 and 15-18. Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Combined effects. For scenario 2, present values of the combined welfare changes are \$1.34 billion in consumer gains, \$775.5 million in producer losses, for a net welfare benefit of \$566.7 million. Annualized values are consumer gains of \$293.1 million and producer losses of \$169.3 million, yielding net benefits of \$123.8 million.

Price and Welfare Effects assuming Other Levels of Displacement of Processing Beef Imports

In scenario 2, assuming that 50 percent of the cull cattle imported from Canada displace processing beef imports, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 3 percent, or \$3.07 per cwt in 2007 dollars (Appendix 2). This decrease can be compared to the 4.5 percent decline (\$4.61 per cwt), based on the estimated 25 percent of imported cull cattle displacing processing beef imports. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/ processing beef of \$190.4 million, losses for U.S. producers of cull cattle/processing beef of \$110.9 million, for a net benefit of \$79.5 million.

Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, assuming that 50 percent of the imported cull cattle displace processing beef imports, are gains of \$196.6 million, losses of \$114.7 million, for a net benefit of \$81.9 million. This overall net benefit is 34 percent less than the net benefit based on the 25 percent of cull cattle imported from Canada estimated to displace processing beef imports (\$81.9 million, compared to \$123.8 million from Table 17).

Assuming that none of the cull cattle imported from Canada displace processing beef imports, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 6 percent, or \$6.15 per cwt in 2007 dollars (Appendix 3). This decrease can be compared to the 4.5 percent decline (\$4.61 per cwt), based on the estimated 25 percent of imported cull cattle displacing processing beef imports. Annualized values of welfare changes, in 2007 dollars and discounted at 3

percent, are gains for U.S. consumers of cull cattle/ processing beef of \$383.3 million, losses for U.S. producers of cull cattle/processing beef of \$219.2 million, for a net benefit of \$164.1 million.

Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, assuming that none of the imported cull cattle displace processing beef imports, are gains of \$389.5 million, losses of \$222.9 million, for a net benefit of \$166.6 million. This overall net benefit is 35 percent more than the net benefit based on 25 percent of cull cattle imported from Canada displacing processing beef imports.

Impacts Simulated Using the Multi-sector Model, including Effects at the Retail Level and for Dairy Producers

We simulate this scenario's larger increases in the number of imported cattle available for slaughter in the United States (+27.7 percent to +47.9 percent) and larger increases in fed beef imports (+4.2 percent to +4.8 percent), along with the decreases in imported cattle available to be fed and the resumption of imports of breeding cattle. In scenario 2, the estimated price declines for beef and beef cattle are larger than in scenario 1, due to the larger number of slaughter cattle entering from Canada. The cutout (wholesale) value of beef is estimated to decline between 0.6 and 0.8 percent while retail prices decline by 0.2 to 0.3 percent. As a result, consumer surplus for the beef sector at the retail level increases by 0.6 to 0.7 percent while capital and management costs for the beef sector decline by 0.1 to 2.9 percent. Beef cattle prices fall by an estimated 0.7 to 0.9 percent and returns to capital and management for beef cattle producers decline by 4.0 to 4.3 percent.

While prices for dairy cattle fall slightly due to the small number of dairy breeding animals imported from Canada, inventories of dairy cattle held in the United States actually fall (by less than 1 percent), in contrast to the results for scenario 1. This estimated decline in dairy cattle inventories is due to the competition for feed presented by the larger imports of animals for slaughter, which cause beef cattle producers to hold larger inventories of beef cattle. U.S. milk production declines by 0.1 percent and milk prices rise by less than 0.1 percent to 0.2 percent. Consumer surplus for the milk sector at the retail level decreases by less than 0.1 to 0.1 percent.

Comparison of Effects under Scenarios 1 and 2

In Table 18, we highlight differences between scenarios 1 and 2 in terms of projected imports and estimated price and welfare effects. The significant difference in projected cull cattle imports for the two scenarios is the principal source of their differences in impact. As shown, projected cull cattle imports under scenario 2 are 3.1 times larger than under scenario 1. There is no difference in projected feeder cattle imports under the two scenarios, and import differences for fed cattle and fed beef are relatively small.

The difference in price effects is largest for processing beef, with the decline in price under scenario 2 again 3.1 times greater than the decline in price estimated under scenario 1. For both fed cattle and fed beef, the price changes are estimated to be 2.4 times larger under scenario 2 than under scenario 1. Not surprisingly, the differences in annualized net welfare changes between the two scenarios, by commodity, closely match the differences in price effects.

Table 18. Comparison of projected imports from Canada and price and welfare effects for scenarios 1 and 2

	<u>Scenario 1</u>	<u>Scenario 2</u>	<u>Ratio of Scenario 2 to Scenario 1</u>
Projected Average Annual Imports from Canada			
Cull Cattle (head)	147,800	459,800	3.1
Processing Beef (million pounds, carcass weight equivalent)	0	0	---
Feeder Cattle (head)	252.2	252.2	1.0
Fed Cattle (head)	668.8	591.0	0.9
Fed Beef (million pounds, carcass weight equivalent)	955.0	1,018.4	1.1
Average Annual Change in Prices, 2007 dollars			
Processing Beef (\$ per cwt)	-1.47	-4.61	3.1
Feeder Cattle (\$ per head)	0.12	0.12	1.0
Fed Cattle (\$ per head)	1.56	3.68	2.4
Fed Beef (\$ per cwt)	-0.22	-0.52	2.4
Annualized Net Change in Welfare by Commodity (thousand dollars) (a)			
Cull Cattle/Processing Beef	37,100	121,320	3.3
Feeder Cattle	-190	-190	1.0
Fed Cattle	-1,066	-2,412	2.3
Fed Beef	2,044	5,033	2.5
Combined	37,888	123,751	3.3

(a) Annualized net changes are expressed in 2007 dollars, discounted at 3 percent.

BSE Risk

As described in section 4, APHIS has concluded that cattle born on or after March 1, 1999, are unlikely to have been exposed to the BSE agent via feed and can be imported into the United States for any purpose with an extremely low likelihood that they will be infected with the BSE agent. We do not have a quantitative estimate of the additional risk posed by importation of Canadian cattle born before March 1, 1999. However, the importance of an effectively enforced feed ban as a risk mitigation measure is demonstrated in science and experience, and is incorporated into the OIE guidelines.

We conclude that there may be some degree of increased likelihood of BSE infectivity entering the United States via imports of live bovines from Canada in scenario 2, compared to the extremely low likelihood posed in scenario 1, because of the greater likelihood of the older cull cattle having been exposed to infectivity. While our analysis indicates, as presented in Table 16 and 17, that larger total net welfare benefits may be realized under scenario 2 through increased trade, scenario 1 is preferable because it poses a lower likelihood of BSE infectivity entering the United States via imports of live bovines from Canada and is consistent with the demonstrated science and experience of the OIE.

6. Expected Impacts under Scenario 3 for the Modeled Commodities

Current regulations require that imported Canadian cattle be slaughtered at less than 30 months of age and that imported Canadian beef come from cattle slaughtered at less than 30 months of age. Scenarios 1 and 2 assume no imports of OTM beef from Canada. In this section, we consider effects of entry of Canadian cattle born on or after March 1, 1999, and resumption of imports of Canadian OTM beef.

Importation of ruminant products and byproducts was included in the BSE minimal-risk regions final rule.⁷⁵ However, in March 2005, APHIS published amendments to that final rule to delay until further notice the applicability of provisions of the rule pertaining to bovine meat, meat byproducts, whole and half carcasses, and certain other bovine products.⁷⁶ This partial delay of applicability of the BSE minimal-risk regions rule prohibits importing these products when derived from bovines 30 months of age or older when slaughtered. Removal of the delay of applicability, thereby allowing importation of Canadian beef from cattle slaughtered at 30 months or older, is included in this third scenario.

Canadian boneless beef and certain other products derived from bovines slaughtered at less than 30 months of age have been allowed to be imported by permit since August 2003. In July 2005, the scope of allowed imports was broadened to include additional bovine meat and meat byproducts when the Ninth Circuit Court of Appeals reversed a preliminary injunction issued by the District Court for Montana that had

⁷⁵ “Bovine Spongiform Encephalopathy; Minimal-Risk Regions and Importation of Commodities,” Final Rule. *Federal Register*, Vol. 70, No. 2; January 4, 2005, 460-553.
http://www.access.gpo.gov/su_docs/fedreg/a050104c.html

⁷⁶ “Bovine Spongiform encephalopathy; minimal-risk regions and commodities importation,” Partial delay of applicability. *Federal Register*, Vol. 70, No. 47; March 11, 2005, 12112-12113.
http://www.access.gpo.gov/su_docs/fedreg/a050311c.html

prohibited implementation of the BSE minimal-risk regions rule.⁷⁷ However, bovine commodities that are imported must still come only from Canadian animals slaughtered at less than 30 months of age, and they must be accompanied by certification that the age requirement is satisfied.

As discussed, the United States is a large importer of processing beef, with Australia, New Zealand, and Uruguay currently our primary suppliers. Over the period of analysis, total processing beef imports are projected to provide about 40 percent of the United States' supply of processing beef. For scenario 3, we project that annual imports of Canadian processing beef, 2008-2012, will average 254.6 million pounds, of which 25 percent is assumed to displace processing beef imports from other countries. The percentage increase in total U.S. imports of processing beef under this scenario over the baseline imports, net of displacement and including the processing beef derived from cull cattle imports from Canada, is projected to be about 10 percent (Appendix Table 9).

As in sections 4 and 5, the price and welfare effects that are discussed in this section are expressed in 2007 dollars, and present and annualized values described are discounted at 3 percent. Processing and fed beef prices and quantities are in terms of carcass weight equivalent. Price and quantity averages and percentage averages are over the 5-year period of analysis, 2008-2012.

Price and Quantity Effects

Cull cattle/processing beef. Results of the analysis show the price of processing beef decreasing in 2008 by 4.7 percent in scenario 3, from \$100 to about \$95 per cwt (Table 1 and Appendix Table 19). The annual decrease in the price of processing beef,

⁷⁷[http://www.ca9.uscourts.gov/ca9/newknowledges.nsf/3A12983071711CF4882570490055E969/\\$file/0535264.pdf?openelement](http://www.ca9.uscourts.gov/ca9/newknowledges.nsf/3A12983071711CF4882570490055E969/$file/0535264.pdf?openelement)

all things equal, is expected to average about 4.5 percent, ranging from declines of \$4.74 per cwt in 2008, to \$4.46 per cwt in 2012.

In response to this price effect, wholesale demand for processing beef could increase by an average of about 110.5 million pounds per year, and domestic supply could decrease by an annual average of about 137.7 million pounds, after accounting for the projected displacement of processing beef imported from other sources.

Feeder cattle, fed cattle, and fed beef. The very small price and quantity effects for feeder cattle estimated in scenarios 1 and 2 hold for this scenario as well, since the projected imports are the same in all three cases (Appendix Table 11). For fed cattle, our analysis indicates small price changes under this scenario, ranging from a drop by 11 cents per head in 2009 to an increase by \$2.66 per head in 2012 (Appendix Table 20). We estimate that these small changes in price could cause the demand for fed cattle to decrease by an average of about 25,700 head per year and the domestic supply of fed cattle to increase by an average of about 20,500 head per year.

Impacts for fed beef are expected also to be small, with the price declining by 0.1 percent in 2008, or 8 cents per cwt, from a base price of \$143 (Table 4 and Appendix Table 21). The decrease in fed beef prices, all things equal, is expected to average 0.1 percent (18 cents per cwt). In response to this price effect, wholesale demand for fed beef could increase by an average of about 16 million pounds per year, and domestic supply could decrease by an annual average of about 21.4 million pounds.

The largest price effects are expected to result from the reestablished imports of both cull cattle and OTM beef from Canada. These effects are evident in the estimated welfare impacts.

Welfare Effects

The undiscounted and present values of welfare changes by commodity for scenario 3 are shown in Table 19, and the annualized values are shown in Table 20.

Cull cattle/processing beef. The present values of the welfare changes for cull cattle/processing beef are \$1.31 billion in consumer gains, \$758.4 million in producer losses, for a net benefit of about \$555.5 million (Table 19). Annualized values are consumer gains of \$286.9 million, producer losses of \$165.6 million, and net benefits of \$121.3 million (Table 20).

These effects are much the same as the effects estimated under scenario 2. This outcome is not surprising. In scenario 2, far more cull cattle would be imported because of the absence of age-related restrictions. In scenario 3, the age-related restrictions observed in scenario 1 remain imposed, but the restriction on OTM beef imports from Canada is removed. OTM beef imports substitute for cull cattle ineligible for importation (but eligible under scenario 2). In other words, the additional quantities of Canadian cull cattle/processing beef imported in scenarios 2 and 3 are essentially the same, entering as live cattle in scenario 2 and as beef in scenario 3.

Feeder cattle, fed cattle, and fed beef. Welfare effects for feeder cattle would be the same as reported for the first two scenarios. Fewer fed cattle are expected to be imported, and producers (sellers of fed cattle for slaughter) would benefit from welfare gains and consumers (buyers of fed cattle for slaughter) would bear welfare losses. Present values of the welfare changes for fed cattle are \$162.1 million in producer gains, \$166.1 million in consumer losses, for a net loss of \$4 million. Annualized values are

producer gains of \$35.4 million, consumer losses of \$36.3 million, and net losses of \$0.9 million.

Under scenario 3, fed beef imports from Canada average a yearly increase of 37.4 million pounds (Appendix Table 8). Present values of welfare changes for fed beef are \$182.2 million in consumer gains, \$174.6 million in producer losses, for a net gain of \$7.6 million. Annualized values are consumer gains of \$39.8 million, producer losses of \$38.1 million, and net gains of \$1.7 million.

Combined effects. The present values of the combined welfare changes under scenario 3 are \$1.31 billion in consumer gains, \$751.9 million in producer losses, for a net welfare benefit of \$558.1 million. Annualized values are consumer gains of \$286.6 million and producer losses of \$164.7 million, yielding benefits of \$121.9 million. By far, the largest effects would be due to the cull cattle and OTM beef imports (Appendix Tables 5 and 9).

Table 19. Undiscounted and present values of welfare changes in scenario 3, by commodity, assuming projected displacement of processing beef imports from other countries by cull cattle and processing beef imports from Canada, 2008-2012

	<u>Cull Cattle/Pro- cessing Beef</u>	<u>Feeder Cattle</u>	<u>Fed Cattle</u>	<u>Fed Beef</u>	<u>Combined</u>
(Thousand Dollars)					
Undiscounted Welfare Changes					
2007 Dollars					
Consumer Surplus	1,434,896	-20,093	-186,923	205,194	1,433,074
Producer Surplus	-828,576	19,084	182,415	-196,631	-823,708
Net Change	606,320	-1,009	-4,508	8,563	609,366
Discounted Welfare Changes (3%)					
2007 Dollars					
Consumer Surplus	1,313,970	-20,093	-166,073	182,230	1,310,034
Producer Surplus	-758,415	19,084	162,068	-174,628	-751,891
Net Change	555,555	-1,009	-4,005	7,602	558,143
2001 Dollars					
Consumer Surplus	1,165,843	-15,515	-147,942	161,535	1,163,921
Producer Surplus	-672,941	14,736	144,374	-154,795	-668,626
Net Change	492,902	-779	-3,568	6,739	495,294
Discounted Welfare Changes (7%)					
2007 Dollars					
Consumer Surplus	1,176,008	-14,405	-142,853	156,659	1,175,409
Producer Surplus	-678,393	13,681	139,409	-150,126	-675,429
Net Change	497,615	-724	-3,444	6,533	499,980
2001 Dollars					
Consumer Surplus	1,043,284	-12,859	-127,240	138,848	1,042,033
Producer Surplus	-601,852	12,213	124,172	-133,057	-598,524
Net Change	441,432	-646	-3,068	5,791	443,509

Note: See Appendix Tables 11 and 19-22. Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Table 20. Annualized values of welfare changes in scenario 3, by commodity, assuming projected displacement of processing beef imports from other countries by cull cattle and processing beef imports from Canada, 2008-2012

	<u>Cull Cattle/Pro- cessing Beef</u>	<u>Feeder Cattle</u>	<u>Fed Cattle</u>	<u>Fed Beef</u>	<u>Combined</u>
(Thousand Dollars)					
Discounted Welfare Changes (3%)					
2007 Dollars					
Consumer Surplus	286,912	-3,795	-36,263	39,791	286,645
Producer Surplus	-165,603	3,605	35,388	-38,131	-164,741
Net Change	121,308	-190	-874	1,660	121,904
2001 Dollars					
Consumer Surplus	254,567	-3,388	-32,304	35,272	254,147
Producer Surplus	-146,940	3,218	31,525	-33,800	-145,997
Net Change	107,628	-170	-779	1,472	108,151
Discounted Welfare Changes (7%)					
2007 Dollars					
Consumer Surplus	286,818	-3,513	-34,840	38,208	254,147
Producer Surplus	-165,454	3,337	34,001	-36,614	-145,997
Net Change	121,364	-176	-840	1,594	108,151
2001 Dollars					
Consumer Surplus	254,447	-3,136	-31,032	33,864	254,143
Producer Surplus	-146,786	2,979	30,285	-32,451	-145,973
Net Change	107,661	-157	-748	1,412	108,168

Note: See Appendix Tables 11 and 19-22. Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Price and Welfare Effects assuming Other Levels of Displacement of Processing Beef

Imports

Assuming in scenario 3 that 50 percent of the cull cattle and OTM beef imported from Canada displace processing beef imports from elsewhere, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 3 percent, or \$3.08 per cwt in 2007 dollars. This decrease can be compared to the 4.5 percent decline (\$4.61 per cwt), based on the estimated 25 percent of cull cattle and OTM beef imported from Canada displacing processing beef imports from elsewhere.

Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/processing beef of \$190.7 million, losses for U.S. producers of cull cattle/processing beef of \$111.1 million, for a net benefit of \$79.6 million.

Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, assuming that 50 percent of the cull cattle and OTM beef imported from Canada displace processing beef imports from elsewhere, are gains of \$190.4 million, losses of \$110.2 million, for a net benefit of \$80.2 million. This overall net benefit is 34 percent less than the net benefit based on the 25 percent of cull cattle and OTM beef imported from Canada estimated to displace processing beef imports from elsewhere (\$80.2 million, compared to \$121.9 million from Table 20).

Assuming that none of the cull cattle and OTM beef imported from Canada displaces processing beef imports from elsewhere, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 6 percent, or \$6.15 per cwt in 2007 dollars. This decrease can be compared to the 4.5 percent decline

(\$4.61 per cwt), based on the estimated 25 percent of cull cattle and OTM beef imported from Canada displacing processing beef imports from elsewhere. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/processing beef of \$383.5 million, losses for U.S. producers of cull cattle/processing beef of \$219.3 million, for a net benefit of \$164.2 million.

Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, assuming that none of the cull cattle or OTM beef imported from Canada displace processing beef imports from elsewhere, are gains of \$383.3 million, losses of \$218.4 million, for a net benefit of \$164.8 million. This overall net benefit is 35 percent more than the net benefit based on 25 percent of cull cattle and OTM beef imported from Canada displacing processing beef imports from elsewhere.

Impacts Simulated Using the Multi-sector Model, including Effects at the Retail Level and for Dairy Producers

For scenario 3, increases in the number of imported cattle available for U.S. slaughter (+5.6 percent to +9.6 percent) are simulated along with slight decreases in the number of imported animals available to be fed (-0.7 percent to -1.3 percent) and the same addition of dairy breeding cattle as in the other scenarios, due to reestablished imports from Canada (+0.13 percent). In addition, imports of beef are increased by 8.8 to 10.3 percent in response to the resumption of cull cattle and OTM beef imports. The estimated impact of these measures include a 1.2 to 1.5 percent decline in the cutout (wholesale) value of beef and a decrease in the retail price of beef by 0.5 to 0.6 percent, larger impacts than for either scenario 1 or scenario 2. Consumer surplus increases at the retail level by 1.0 to 1.3 percent while capital and management costs in the beef sector

decline by 2.0 to 3.0 percent. The price of beef cattle is estimated to fall between 1.3 and 1.7 percent such that returns to capital and management for beef cattle producers decline between 6.1 and 7.5 percent.

For dairy cattle, prices are estimated to decline 1.3 to 1.7 percent from the base level. Because the number of imported slaughter animals does not increase to the same extent as in scenario 2 and there is therefore less competition for feed, inventories of dairy cattle rise very slightly such that milk production rises by 0.1 percent or less. The decline in the price of milk and increase in consumer welfare are also less than 0.1 percent.

Comparison of Effects under Scenarios 1 and 3

Inclusion of OTM beef imports from Canada in scenario 3 is the source of differences in impact for scenarios 1 and 3 (Table 21). Annual processing beef imports from Canada are projected to average 254.6 million pounds. The OTM beef imports result in the projected quantity of cull cattle imports falling by about one-fourth, compared to import projections for scenario 1. Feeder cattle imports are projected to be the same under the two scenarios, and fed cattle and fed beef imports are projected also to be very nearly the same.

The price decline for processing beef under scenario 3 is estimated to be more than three times the price decline under scenario 1. For fed cattle and fed beef, the price changes are somewhat smaller for scenario 3 due to the smaller projected imports.

Table 21. Comparison of projected imports from Canada and price and welfare effects for scenarios 1 and 3

	<u>Scenario 1</u>	<u>Scenario 3</u>	<u>Ratio of Scenario 3 to Scenario 1</u>
Projected Average Annual Imports from Canada			
Cull Cattle (head)	147,800	106,000	0.7
Processing Beef (million pounds, carcass weight equivalent)	0	254.6	----
Feeder Cattle (head)	252.2	252.2	1.0
Fed Cattle (head)	668.8	679.4	1.0
Fed Beef (million pounds, carcass weight equivalent)	955.0	946.6	1.0
Average Annual Change in Prices, 2007 dollars			
Processing Beef (\$ per cwt)	-1.47	-4.61	3.1
Feeder Cattle (\$ per head)	0.12	0.12	1.0
Fed Cattle (\$ per head)	1.56	1.27	0.8
Fed Beef (\$ per cwt)	-0.22	-0.18	0.8
Annualized Net Change in Welfare by Commodity (thousand dollars) (a)			
Cull Cattle/Processing Beef	37,100	121,308	3.3
Feeder Cattle	-190	-190	1.0
Fed Cattle	-1,066	-874	0.8
Fed Beef	2,044	1,660	0.8
Combined	37,888	121,904	3.2

(a) Annualized net changes are expressed in 2007 dollars, discounted at 3 percent.

The import and price differences are reflected in the differences in welfare changes between the two scenarios, especially for the cull cattle/processing beef commodity category. The results of the analysis make it apparent that the positive net welfare effects of scenario 1 are expected to be significantly augmented (and negative

welfare effects for cow-calf and dairy producers reduced) by having the removal of the partial delay of applicability for importation of OTM beef from Canada coincide with allowing the importation of Canadian cattle born on or after March 1, 1999.

BSE Risk

The BSE risk mitigations under scenario 3 are comparable to those under scenario

1. The age-related restrictions and other safeguard measures are the same in both cases.

As with scenario 1, the likelihood of BSE infectivity entering the United States via imports of live bovines from Canada under this scenario is extremely low. Resumption of OTM beef imports from Canada will not affect the likelihood of BSE infectivity entering the United States because SRMs will be removed and disposed of in Canada.

Fourth Scenario

A fourth possible scenario would be to allow entry of Canadian cattle unrestricted by age, along with resumption of OTM beef imports from Canada. A quantitative analysis of expected price and welfare effects for this scenario was not performed. However, when we compare projected imports under this scenario with those projected for scenario 3, we find the differences in combined cattle and beef imports to be very small. These import quantities are described here.

Cull cattle imports from Canada are projected to average about 328,000 head per year under scenario 4, compared to 106,000 head per year under scenario 3 (Appendix Tables 5 and 23). Conversely, annual processing beef imports under scenario 4 are projected to average 94 million pounds, carcass weight equivalent, compared to 255 million pounds for scenario 3 (Appendix Tables 8 and 24).

Similar differences between the two scenarios are projected for fed cattle and fed beef imports. The larger number of cull cattle that would be imported from Canada under scenario 4 could be expected to result in increased fed cattle slaughter in Canada, with fewer fed cattle and more fed beef exported to the United States. Under scenario 4, fed cattle imports from Canada are projected to average about 624,000 head per year, compared to 679,000 head per year under scenario 3. Annual fed beef imports under scenario 4 are projected to average 992 million pounds, compared to 947 million pounds for scenario 3.

These projections are shown in Appendix Table 25, with the cull and fed cattle imports converted to their processing and fed beef equivalents. The average annual net difference between scenarios 3 and 4 in projected cull cattle and processing beef imports from Canada, after converting the cull cattle to processing beef, is about 700,000 pounds (330.8 million pounds in scenario 3, and 330.1 million pounds in scenario 4). This amount represents about 0.2 percent of projected cull cattle/processing beef imports under scenario 3. For fed cattle and fed beef imports from Canada, the average annual net difference between scenarios 3 and 4 after converting the fed cattle to fed beef, is about 1.3 million pounds (1,483.7 million pounds in scenario 3, and 1,485.0 million pounds in scenario 4). This amount represents about 0.1 percent of the projected fed cattle and fed beef imports under scenario 3. Hence, we conclude that the overall welfare effects of scenario 4 would be very similar to those for scenario 3.

7. Final Regulatory Flexibility Analysis

The Regulatory Flexibility Act requires agencies to evaluate the potential effects of rules on small businesses, small organizations and small governmental jurisdictions. For a final rule, agencies are obligated to prepare a final regulatory flexibility analysis describing expected impacts of the rule for such entities. In this section, we provide the following information for this final rule, as required in Section 604(a) of the Act.

- A succinct statement of the need for, and objectives of, the rule;
- A summary of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;
- A description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;
- A description of the projected reporting, record keeping and other compliance requirements of the final rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and
- A description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

Need for and Objective of the Rule

APHIS has established a category of regions that present a minimal risk of introducing BSE into the United States through live ruminants and ruminant products and byproducts. The Agency has set conditions for the importation of certain live ruminants and ruminant products and byproducts from such regions, and named Canada as a BSE minimal-risk region. With this rule, APHIS will remove certain restrictions on the importation of certain bovine commodities from BSE minimal-risk regions. The Agency has determined that the restrictions are unnecessary and that, with this rule, the BSE risk to the United States via imports of live bovines and bovine products from Canada will be negligible.

We are proposing to allow the following commodities to be imported from Canada under specified conditions (in addition to commodities currently allowed to be imported from BSE minimal-risk regions):

- Live bovines that were born on or after March 1, 1999;
- Bovine small intestines, minus the distal ileum;
- Bovine casings; and
- Bovine blood and blood products.

Additionally, this rule removes the delay of applicability of provisions of the BSE minimal-risk regions rule regarding the importation of meat, meat products, and meat byproducts derived from bovines in Canada that were 30 months of age or older when slaughtered.

Significant Issues Raised in Public Comment on the Initial Regulatory Flexibility

Analysis

There were no significant issues raised in public comment on the initial regulatory flexibility analysis (RFA) for this rulemaking. However, as described below, the majority of businesses that may be affected are small entities. Therefore, while none of the comments received on the proposed rule raised specific issues regarding the initial RFA, comments on the preliminary RIA can be inferred to express small-entity concerns.

Topics that received public comment and concerned the estimated economic impacts of the proposed rule included modeling issues; the timing of the rule's implementation; consequences of a BSE occurrence; and impacts for beef exports, consumers, cow-calf producers, the dairy industry, and the packing industry. These comments are addressed in the Agency's responses that are included as part of the final rule.

There have been no changes made to the proposed rule as a result of these comments. In the RIA, however, we have responded to certain comments by quantitatively considering impacts downstream of the wholesale sector. We also include in this final RFA an evaluation of welfare effects by industry sector for scenario 3. While this evaluation is admittedly broad, it provides an indication of the extent to which major sectors of the cattle and beef industries may be impacted.

Small Entities that may be Affected

We describe in the RIA expected effects of the rule for certain bovine commodities. Categories of commodities included in the analysis are cull cattle/processing beef, feeder cattle, fed cattle, fed beef, breeding cattle including dairy,

vealers and slaughter calves, bison, bovine casings and small intestine products, and bovine blood and blood products. Small entities comprise the majority of the establishments engaged in the production, processing, and sale of these commodities, as shown in Table 22. These small entities number at least in the hundreds of thousands, with cow-calf and dairy producers comprising the largest single industry share.

Some small entities may be impacted both positively and negatively by the rule because of the various commodities affected. Overall, changes in net welfare are expected to be positive, as shown in Tables 19 and 20 for scenario 3. We highlight here some of the possible impacts for the affected industries under scenario 3. Price effects that are discussed are expressed in 2007 dollars, and present and annualized values described are discounted at 3 percent. Processing and fed beef prices and quantities are in terms of carcass weight equivalent. Price and quantity averages and percentage averages are over the 5-year period of analysis, 2008-2012, unless indicated otherwise.

Table 22. Small entity representation in industries that may be affected by the rule

Industry (NAICS code) ¹	Small-entity Standard	Total Number of Establishments	Number of Small Entities	Percentage of Establishments that are Small Entities
Beef Cattle Ranching and Farming (112111)	≤ \$750,000 annual receipts	657,015	> 655,757	> 99.8%
Dairy Cattle and Milk Production (112120)	≤ \$750,000 annual receipts	75,645	>72,743	>96.2%
All Other Animal Production (112990)	≤ \$750,000 annual receipts	1,734 ²	Unknown	Unknown
Cattle Feedlots (112112)	≤ \$2,000,000 annual receipts	88,165	Unknown	Unknown
Animal (except Poultry) Slaughtering (311611)	≤ 500 employees	1,728	1,689	97.7%
Meat Processed from Carcasses (311612)	≤ 500 employees	1,142	1,073	94.0%
Meat and Meat Product Merchant Wholesalers (424470)	≤ 100 employees	3,004	>2,425	>80.7%
Supermarkets and Other Grocery (except Convenience) Stores (445110)	≤ \$25,000,000 annual receipts	62,934	>38,943	>61.9%
Meat Markets (445210)	≤ \$6,500,000 annual receipts	6,467	>5,861	>90.6%
In-Vitro Diagnostic Substance Manufacturing (325413)	≤ 500 employees	175	145	82.9%
Biological Product (except Diagnostic) Manufacturing (325414)	≤ 500 employees	242	215	88.8%

Sources: U.S. Small Business Administration, Office of Advocacy, based on data provided by the U.S. Census Bureau, Statistics of U.S. Businesses; USDA NASS, 2002 Census of Agriculture, Volume 1, Chapter 1, Tables 16, 17, and 32; USDA NASS "Cattle on Feed," February 23, 2007.

¹ North American Industry Classification System. <http://www.sba.gov/size/sizetable2002.html>

² Bison producers with reported sales in 2002.

Notes to Table 22: For Beef Cattle Ranching and Farming, Dairy Cattle and Milk Production, and Bison Production, number of establishments and number of small entities only include those establishments that reported sales in 2002. Numbers of establishments and small entities for dairy producers are based on dairy product sales. We are unable to approximate the number of small-entity bison producers. The average number of bison sold in 2002 by establishments with reported sales was about 33 head. Clearly, most bison production is by small entities. For Cattle Feedlots, data are unavailable on the number of establishments with annual receipts of not more than \$2 million. Over 97 percent of feedlots (86,000 of 88,165) had capacities of fewer than 1,000 head in 2006, and the majority of these are likely to be small entities. For Meat and Meat Product Merchant Wholesalers, data are unavailable on the number of establishments with 100 or fewer employees; of the industry's 3,004 establishments, 2,425 had 20 or fewer employees. For Supermarkets and Other Grocery Stores, data are unavailable on the number of establishments with annual receipts of not more than \$25 million; 61.9 percent of establishments had annual receipts of less than \$10 million. For Meat Markets, data are not available on the number of establishments with annual receipts of not more than \$6.5 million; 90.6 percent of establishments had annual receipts of less than \$5 million.

Cow-calf and dairy producers. Beef and dairy producers are expected to be principally affected by the resumption of cull cattle imports from Canada. They will also be affected by the reestablishment of breeding cattle imports and projected changes in feeder cattle imports from Canada. As shown in Table 22, the small-entity standard for beef cattle and dairy producers is annual receipts of not more than \$750,000. According to the 2002 Census of Agriculture, annual receipts for beef cattle producers averaged about \$29,200 for those operations with reported sales, well below the small-entity threshold.⁷⁸ In that same year, annual receipts for dairy farmers averaged about \$31,000 from the sale of cattle and calves and about \$265,700 from the sale of milk and other dairy products.⁷⁹ Average receipts for dairy operations in 2002, while much larger than those for cow-calf producers, were still well below the small-entity threshold of \$750,000 per year.

Yearly imports of Canadian cull cattle, 2008-2012, are projected to average 89,400 cows and 16,600 bulls and stags in scenario 3 (Appendix Table 5). These import quantities are projected to equal about 1.7 percent and 2.9 percent, respectively, of projected average annual U.S. baseline cow and bull/stag slaughter (Appendix Table 2).

⁷⁸ USDA, NASS. 2002 Census of Agriculture, Volume 1, Chapter 1, Table 16.

http://www.nass.usda.gov/Census_of_Agriculture/index.asp

⁷⁹ USDA, NASS. 2002 Census of Agriculture, Volume 1, Chapter 1, Table 17.

http://www.nass.usda.gov/Census_of_Agriculture/index.asp

All things equal, the increased supply of cull cattle will lead to a decline in their price, and consequent welfare losses for producers marketing cull cattle (and welfare gains for slaughtering establishments afforded a lower purchase price and additional supply). Cull cattle sales are generally a less critical source of income for cow-calf and dairy producers than are sales of steers, heifers, and dairy products.

We are unable to determine the extent to which cull cattle prices may fall because of the rule. Assuming that the price decline for cull cattle is proportional to the estimated price decline for processing beef, cow-calf and dairy producers in scenario 3 may experience a fall in price for cull cattle of 4.7 percent in 2008, and an average price decline of 4.5 percent (\$4.61 per cwt). To place this average price decline in perspective, we consider the effect it may have on gross earnings of small-entity cow-calf operations. Based on data from the 2002 Census of Agriculture, the average value of cattle and calves sold by small-entity beef cow operations was about \$26,600.⁸⁰ The projected 2008 price for a culled cow is \$54.19 per cwt.⁸¹ Assuming the cow weighs 1,100 pounds, its price in 2008 would be \$596.09 per head. A 4.7 percent decline would result in a price of \$568.07. Presumably, most of a cow-calf operation's revenue is earned from the sale of calves. If one-half of an operation's revenue were to derive from the sale of cull cattle, the reduction in revenue attributable to the decline in the price of cull cattle in scenario 3 would total about \$625 for the year.⁸²

For dairy enterprises, the expected price decline for cull cattle because of imports from Canada is expected to have a small effect on their incomes because most revenue

⁸⁰ USDA, NASS. 2002 Census of Agriculture, Volume 1, Chapter 1, Table 16. The \$26,000 average is for operations with fewer than 1,000 head. http://www.nass.usda.gov/Census_of_Agriculture/index.asp

⁸¹ Boning utility cow (Sioux Falls) nominal price.

⁸² $(\$26,600 / 2) (0.047) = \625.10 .

(over 86 percent in 2002) is earned from the sale of milk and other dairy products.⁸³ The average per animal value of cattle and calves sold by small-entity dairy cow operations in 2002 was about \$453. A price decline of 4.7 percent, notwithstanding the fact that not all of the animals sold would be cull cattle, would mean a decrease in annual revenue for the average small-entity dairy operation of about \$1,040, assuming no change in the number of cattle sold.⁸⁴ This forgone income would represent a decline in average revenue of about 0.6 percent.⁸⁵

Effects of the rule on imports of Canadian vealers and slaughter calves are not expected to measurably impact the welfare of producers that sell them. Over the 5-year period of analysis, an average of 3,000 fewer Canadian vealers and slaughter calves are projected to be imported annually under scenario 3, a number equivalent to less than 1 percent of historical U.S. vealer and calf slaughter (see section 3).

As described in section 3, historically the number of breeding cattle imported from Canada is very small in comparison to the number of replacement breeding heifers supplied by U.S. producers (one-half of 1 percent). Breeding cattle imported from Canada will augment the U.S. breeding herd only slightly, providing buyers with an additional source of breeding stock while having a minor effect on prices.

Beef cattle and dairy producers may be affected by the rule in other ways. The rule will permit cattle to be imported from Canada as stockers for backgrounding on

⁸³ USDA, NASS, 2002 Census of Agriculture, Volume 1, Chapter 1, Table 17. For small-entity producers, revenue from cattle and calf sales totaled \$1.7 billion and revenue from dairy product sales totaled \$11.2 billion. http://www.nass.usda.gov/Census_of_Agriculture/index.asp

⁸⁴ In 2002, the average revenue from cattle sales for small-entity dairy operations was \$22,197 (\$453 per head multiplied by 49 head). $(\$22,197)(0.047) = \$1,043.26$.

⁸⁵ \$1,043 divided by \$175,912 (average income for small dairy farms from combined dairy product and cattle sales) equals 0.59 percent.

pasture. The resumption of stocker imports will benefit buyers of these younger, lighter animals, and result in additional competition for U.S. sellers of such cattle.

These examples of possible impact abstract from the wide range in size of small-entity cow-calf and dairy cattle operations, but do illustrate the small effect the rule is expected to have, on average, for this sector of the cattle industry.

Bison producers. We do not have information on the number of bison enterprises that are small entities. We believe that the composition of the bison industry is very much like that of the beef cattle industry, with the overwhelming majority of operations small entities. The 2002 Census of Agriculture reported a total of 4,132 bison producers in the United States, owning 231,950 head of bison. The Census also reported that 1,734 producers (42 percent) sold 57,210 head of bison (25 percent of inventory) that year.

Projected annual imports of bison, 2008-2012, total 12,000 head (Appendix Table 5). Each year, 1,200 head are projected to be imported for breeding, 9,600 head for immediate slaughter, and 1,200 head for feeding.

The 9,600 Canadian bison projected to be imported yearly for immediate slaughter would equal about 23 percent of total U.S. bison slaughter in 2006. This import projection for slaughter bison, together with the projected feeder bison imports, is consistent with the 2006 total bison import level (13,255 head). The large increase in bison imports in 2006 (from 3,513 head imported in the last half of 2005) has left the U.S. bison slaughter and feeding industries in expectation of a continuation of sizable import levels.

The principal change in bison imports in 2008 and subsequent years under the rule will be projected annual imports of 1,200 head of breeding bison. As described in

section 3, the Canadian breeding bison imported annually are projected to represent about 1 percent of the U.S. breeding bison herd, assuming the composition of the national bison herd is similar to that of the national cattle herd. The bison industry is currently strengthening, and the imported Canadian breeding bison will help meet an expanding demand for breeding stock.

Feedlot establishments. We do not know the number of feedlots with annual receipts of not more than \$2 million, the small-entity standard. In 2006, over 97 percent of feedlots had capacities of fewer than 1,000 animals. Given an average projected price for fed cattle during the period of analysis of about \$1,099 per head in 2007 dollars (Table 3), the average feedlot needs to feed and sell fewer than 1,820 head per year in order to qualify as a small entity. Assuming 2.5 inventory turns per year, only feedlots with capacities of at least 730 animals are able to feed and sell 1,820 or more cattle per year. Reasonably, the majority of feedlots are most likely small establishments with inventory capacities of fewer than 730 animals.

Feedlot establishments are expected to enjoy a net benefit with the rule because the projected decline in the number of fed cattle imported is much larger than the projected decline in feeder cattle imports. Changes in feeder cattle imports are projected to be negligible and are not expected to have any impact of note. Even in the case of fed cattle, the average decline in U.S. supply and average increase in price with the rule are estimated to be less than 0.1 percent. As buyers of feeder cattle, feedlots are expected to be little harmed by the estimated price rise for feeders. As sellers of fed cattle, feedlots may benefit from their price rise.

The effect on the average annual revenue of a small feedlot will be minor. Based on sales of 1,800 head over a one-year period (a throughput quantity at the high end for small-entity feedlots), the cost of feeder cattle purchased may increase by \$216, and the gross return on fed cattle sold may increase by \$2,286, for a gain of \$2,070.⁸⁶ This gain will be about 0.1 percent of annual revenue.⁸⁷

Slaughtering establishments. Livestock slaughter is a highly concentrated industry with a large percentage of the slaughter performed by a small percentage of establishments. In 2004, less than 7 percent of cattle slaughtering plants conducted nearly 90 percent of commercial slaughter.⁸⁸ As indicated in Table 22, most slaughtering establishments are small entities.

The additional supply of cull cattle is expected to benefit slaughtering establishments that primarily slaughter cull cattle and that, prior to May 2003, may have relied on imports from Canada for at least a part of their supply. Resumption of cull cattle imports will help address capacity underutilization that these establishments may have experienced because of import restrictions. As noted in the discussion of expected effects for cow-calf and dairy producers, imports of Canadian cull cattle in scenario 3 when averaged over the five years, 2008-2012, are projected to equal about 1.7 percent and 2.9 percent, respectively, of baseline cow and bull/stag slaughter in the United States for the same period. In the preliminary RIA, we requested information to help us

⁸⁶ $(\$0.12 \text{ per head})(1,800 \text{ head}) = \216 . $(\$1.27 \text{ per head})(1,800 \text{ head}) = \$2,286$. $\$2,286 - \$216 = \$2,070$.

⁸⁷ Average projected baseline price of fed cattle (\$1,099 per head) multiplied by 1,800 animals equals \$1,978,200. \$2,070 divided by \$1,978,200 equals 0.1 percent.

⁸⁸ <http://www.gipsa.usda.gov/GIPSA/webapp?area=newsroom&subject=landing&topic=pub-stat> Based on data for federally inspected slaughter plants. Forty-seven out of 689 reporting plants accounted for 89.8 percent of total commercial slaughter.

document the extent to which slaughter plants are underutilized and would benefit from the rule, but this information was not received.

Slaughtering establishments are expected to be negatively affected by the reduced supply of fed cattle (higher purchase price) and negatively affected by the increased supply of fed beef (lower sale price). They will be negligibly affected (again, negatively) by the projected average annual decline in imports of Canadian vealers and slaughter calves of 3,000 head in scenario 3.

Meat packing and processing establishments. Most meat packing and processing establishments are small. Like livestock slaughter, the meat packing and processing industry is concentrated, with one-third of establishments engaged in boxed fed beef production in 2004 accounting for over 80 percent of total production.⁸⁹ The analysis indicates that decreases in the price of fed beef due to increased fed beef imports from Canada are expected to be very small: only 8 cents per cwt in 2008 and on average only 18 cents per cwt (Appendix Table 21). Based on projected baseline fed beef prices averaging \$151.80 per cwt, the price declines signify a loss for the average establishment of less than 0.2 percent of average revenue, assuming no change in the quantity sold. Projected annual decreases in fed cattle imports from Canada may result in very small price increases (averaging \$1.27 per head over the 5-year period) that may impact the prices of carcasses purchased by packing and processing establishments.

Effects of the rule for those packers and processors that utilize processing beef are expected to be larger, due to the resumption of cull cattle imports from Canada. Annual prices of processing beef may fall by an average of \$4.61 per cwt in scenario 3. The

⁸⁹ *Ibid.* Twenty-one out of 64 reporting plants accounted for 82.2 percent of total boxed fed beef production.

price declines will benefit establishments that use processing beef to produce ground beef for the wholesale market. Conversely, establishments that sell processing beef may be negatively affected by the expected price declines.

Included within NAICS 311612 are establishments that make sausage and similarly encased products. These businesses may be affected by the rule's impacts with respect to bovine casings. We have been unable to obtain information on the production, consumption, and trade in bovine casings by the United States. We also do not know the extent to which the rule will change the domestic supply of bovine casings, although we anticipate an increased availability due to the projected increase in slaughter numbers and reestablished imports of bovine casings and bovine small intestines from Canada.

When FSIS amended its rules to permit beef small intestine, excluding the distal ileum, to be used for human food, it stated that approximately 47 federally-inspected, primarily large establishments would be affected.⁹⁰ FSIS was unable to determine how many of these establishments are small. In the preliminary RIA, we requested public comment that would have allowed us to better evaluate impacts for small-entity meat packing and processing establishments generally, and processors and users of bovine casings in particular. Information that may have helped us to assess the effects was not received.

Meat wholesalers, importers, and exporters. Most wholesalers, importers, and exporters of beef are small entities. Effects of the rule for these businesses will depend on the foreign and domestic markets in which they trade. Wholesalers, as buyers of

⁹⁰ Meat and poultry inspection: "Specified risk materials use for human food, prohibition; and non-ambulatory disabled cattle," disposition requirements; *Federal Register*, Vol. 70, No. 172; September 7, 2005, 53043-53050. http://www.access.gpo.gov/su_docs/fedreg/a050907c.html

processing beef and fed beef, are expected to gain in welfare because of the estimated decline in beef prices with the rule. Benefits received at the wholesale level can be expected to be at least partly distributed further along the marketing chain, to retailers and end buyers, depending on the degree of competitiveness that exists.

Importers of processing beef from other countries may face reduced sales because of partial displacement by cull cattle imports from Canada. As has been described, we expect only small changes in the domestic supply of fed beef as a result of the rule. U.S. beef exporters should be little affected and U.S. access to foreign beef markets is not expected to be adversely impacted by the rule.

Grocery stores and meat markets. Most retail food establishments are small entities. As buyers at the wholesale level, retailers that market beef may benefit from the expected 4.5 percent average yearly decline in the price of processing beef in scenario 3. Effects, if any, of this price decline on retail stores' revenues will vary, depending upon the extent to which lower prices and welfare gains at the wholesale level are distributed down the marketing chain and upon the relative importance of ground beef sales as a source of store receipts. The effect on the wholesale price of fed beef in scenario 3 is expected to be about 0.1 percent; any effects for this commodity for grocery stores and meat markets will be very small.

Manufacturers of substances that use bovine blood and blood products. The majority of businesses that use bovine blood and blood products in their manufacturing processes are small entities. The primary commodities affected will be products intended for medical and scientific use in vaccines and drugs, of which fetal bovine serum (FBS) is the most important. FBS is used in tissue culture media and to produce pharmaceuticals

and biologics. Under the rule, commercial imports of FBS of Canadian origin will be allowed to resume.

There is a large and growing demand for FBS. Annual production of FBS in the United States and Canada combined is about 300,000 liters, while consumption for the two countries is approximated at 425,000 liters. The rule may affect the U.S. supply of FBS in two ways: by allowing its direct importation from Canada, and by reducing restrictions on bovine imports from Canada and thereby changing the U.S. supply of pregnant cows presented for slaughter.

As described in section 3, we expect that the rule may result in as much as 24,000 liters of Canadian-origin FBS becoming available for commercial import by the United States. Had this amount entered the United States in 2006, it would have represented about 9 percent of U.S. imports. Additional U.S. cow slaughter projected in scenario 3 may result in an increase in annual domestic production of FBS of between 3,000 and 6,500 liters. These additional supplies will benefit small-entity establishments that use fetal bovine serum in their manufacturing processes.

A Consideration of Welfare Effects by Industry Sector for Scenario 3

In considering how welfare impacts estimated for cull cattle/processing beef, feeder cattle, fed cattle, and fed beef may affect different sectors of the cattle and beef industries under scenario 3, we group the entities that we expect to be directly affected into four generalized categories: cow-calf and dairy producers, feedlot establishments, slaughter and packing establishments, and wholesaler and successive establishments. Admittedly, this simple categorization does not capture the many complexities of the cattle and beef industries, but it does provide a level of specification sufficient for

examining expected effects for the industries' principal stages of economic activity. In reality, businesses combine the slaughter, packing, processing, and wholesaling functions in various ways. In this discussion of sector impacts, we make note of effects on the size and sign of the welfare effects when the slaughter and packing establishments are combined with the wholesalers and successive establishments, in recognition of the vertical integration that characterizes the cattle and beef industries.

Combining cull cattle and processing beef within a single commodity category is logical. The demand for cull cattle derives from the demand for processing beef. In scenario 3, the processing beef from the cull cattle imports is projected to be equivalent to only about 1.2 percent of the U.S. baseline supply of processing beef over the period of analysis.⁹¹ Canada is the only country with a history of cull cattle exports to the United States, and reestablished cull cattle imports will compete against processing beef imported from other countries. However, in combining cull cattle and processing beef within a single category, we face the difficulty of apportioning the cull cattle/processing beef welfare effects among sectors of the cattle and beef industries expected to be directly affected.

Using the BAS model, we estimate processing beef price declines expected to occur in scenario 3 due to the resumption of cull cattle plus OTM beef imports from Canada. These price declines and related welfare impacts will affect not only slaughter and packing establishments (as sellers of processing beef) and wholesalers (as buyers of processing beef), but also cow-calf and dairy producers (as sellers of cull cattle) and

⁹¹ In scenario 3, cull cattle imports from Canada are projected to average 106,000 head per year, 2008-2012, yielding an average of 76.2 million pounds of processing beef, carcass weight equivalent (see Appendix Table 9). U.S. baseline supplies, 2008-2012, of processing beef are projected to average 6,166 million pounds, carcass weight equivalent (see Table 1).

slaughter and packing establishments (as buyers of cull cattle). The question is how to appropriately apportion the measured welfare changes among these entities.

We use relative prices as a guide to this apportioning problem. Processing beef prices used in the analysis are based on liveweight cull cow prices. As described in the notes to Table 1, two operations are performed to derive the processing beef prices: Liveweight utility cow (cull cow) prices per cwt are first multiplied by a factor of 2.56, to convert to 90 percent lean beef prices per cwt. This product is then divided by a factor of 1.36 to convert to carcass weight equivalent prices per cwt. These price relationships are based on historical price series.⁹² The two operations can be combined into a single step of multiplying cull cattle liveweight prices per cwt by 1.89 to arrive at processing beef carcass weight equivalent prices per cwt. We use this price ratio, generalized as 2:1, as a basis for apportioning the welfare changes among industry sectors, bearing in mind the theoretical limitations of this approach.

While imported cull cattle will replace a certain number of domestically produced cull cattle in the marketplace, the broader effect for U.S. sellers of cull cattle will be the decline in processing beef prices. We use the 2:1 ratio (that is, processing beef prices per cwt, carcass weight equivalent, historically equal to about twice liveweight cull cattle prices per cwt) in addressing industry sector effects by assuming that two-thirds of welfare impacts for buyers of cull cattle will occur at the wholesale level and one-third will occur at the slaughter and packing level. Similarly, we assume that two-thirds of welfare impacts for sellers of cull cattle will occur at the slaughter and packing level, and

⁹² The 2.56 conversion factor is based on price ratios per cwt for Boning Utility Cows, Sioux Falls, and beef trimmings, 90 percent lean, 1997-2006, as provided by USDA/ERS. The 1.36 conversion factor comes from Nelson, K.E., L.A. Duewer, and T.L. Crawford. "Reevaluation of the Beef Carcass-to-Retail Weight Conversion Factor," AER 623, USDA/ERS, October 1, 1989.

one-third will occur at the cow-calf and dairy producer level. For the OTM beef, we assume that the welfare changes will occur at the wholesale (purchase of processing beef) and slaughter and packing (sale of processing beef) levels, while recognizing that the OTM beef imports will have indirect price effects for cow-calf and dairy producers.

Allocation of the other welfare changes among the industry sectors is more straightforward. Feedlots are buyers of feeder cattle and cow-calf and dairy producers are sellers of feeder cattle. Slaughter and packing establishments are buyers of fed cattle and feedlots are sellers of fed cattle. Wholesalers are buyers of fed beef and slaughter and packing establishments are sellers of fed beef. These purchase and sale activities by which the estimated welfare effects are allocated are shown in Table 23.

A widely held impression is the belief that the slaughter and packing sector's concentrated structure results in the practice of significant market power, a practice that might bring into question our allocation of cull cattle/processing beef welfare impacts. However, this impression has not been substantiated by industry studies. Although structure-conduct-performance (SCP) and new empirical industrial organization (NEIO) studies have found evidence of market power, researchers have concluded that the theoretical models underlying SCP do not necessarily allow for the inferred generalizations, while NEIO studies have been found to be overly simplified and unable to prove noncompetitive behavior.⁹³

⁹³ Azzam, A.M. and D.G. Anderson. *Assessing Competition in Meatpacking: Economic History, Theory, and Evidence*. GIPSA/USDA Rep. GIPSA-RR-96-6, May 1996.

Table 23. Allocation of estimated consumer and producer welfare changes by industry sector, for scenario 3

<u>Industry Sector</u>	<u>Source of Consumer Welfare Changes</u>	<u>Source of Producer Welfare Changes</u>
Cow-calf and Dairy Producers		Sale of cull cattle (apportioned one-third of producer welfare changes attributable to cull cattle imports from Canada). Sale of cattle for feeding.
Feedlot Establishments	Purchase of cattle for feeding.	Sale of fed cattle.
Slaughter and Packing Establishments	Purchase of fed cattle. Purchase of cull cattle (apportioned one-third of consumer welfare changes attributable to cull cattle imports from Canada).	Sale of fed beef. Sale of processing beef (apportioned two-thirds of producer welfare changes attributable to cull cattle imports from Canada and all producer welfare changes attributable to OTM beef imports from Canada).
Wholesalers and Successive Establishments	Purchase of fed beef. Purchase of processing beef (apportioned two-thirds of consumer welfare changes attributable to cull cattle imports from Canada and all consumer welfare changes attributable to OTM beef imports from Canada).	

Note: This depiction of sources of sector-level effects is generalized and is not intended to capture the variety and complexity of cross-sectional and sub-sectional interactions that characterize the industry. Welfare gains for the wholesale sector may, to some extent, be distributed to the retail sector and end consumers through lower prices, depending on the competitiveness of the markets.

An analysis of the slaughter and packing industry by Mathews et al. (1999) found evidence of market concentration by firms, based on the Herfindahl-Hirshman Index (HHI).⁹⁴ However, the authors assert that while it has been a generally held belief that market concentration is a sign of market power, “[t]here is a difference between the ability to exercise market power, for example, concentration, and the actual exercise of market power.” The authors concluded that having market power may not necessarily indicate a firm will exercise it.

A more recent study by Paul (2001) using a cost-based approach showed that the slaughter and packing industry’s market power has had little impact on cattle or beef prices.⁹⁵ The author found that cost economies are more important to firms than market power. The research showed that “[p]lants are willing to pay more on the margin for cattle than would be the case without potential utilization increases and thus cost savings.” The author concluded that the slaughter and packing industry is competitive, albeit not perfectly competitive.

Present values and annualized values of the welfare changes by sector are presented in Tables 24 and 25, respectively, and summarized below. The welfare effects are discussed in terms of 2007 dollars, discounted at 3 percent.

Cow-calf and dairy producers. The major effect for cow-calf and dairy producers is expected to come from the sale of cull cattle, with feeder cattle sales affected only slightly. The present value of producer welfare losses for these entities is estimated to

⁹⁴ Mathews, K.H., Jr., W.F. Hahn, K.E. Nelson, L.A. Duewer, and R.A. Gustafson. *U.S. Beef Industry: Cattle Cycles, Price Spreads, and Packer Concentration*. ERS/USDA Technical Bulletin No. 1874, April 1999.

⁹⁵ Paul, C.J.M. “Market and Cost Structure in the U.S. Beef Packing Industry: A Plant-Level Analysis.” *Amer. J. Agr. Econ.* 83 (February 2001): 64-76.

total \$41.6 million, with the annualized loss totaling \$9.1 million. We note that an unquantified benefit will be reestablishment of the availability of breeding cattle imports from Canada.

Feedlot establishments. Feedlots may incur small consumer welfare losses as purchasers of cattle for feeding, due to their slight reduction in supply and increase in price. Of greater significance is expected to be producer welfare gains attributable to the reduced supply and higher price of fed cattle. The net outcome for feedlots is estimated to be a present value gain of \$144.7 million, which is equal to a net gain of \$31.6 million on an annualized basis.

Slaughter and packing establishments. Consumer welfare changes for the slaughter and packing sector will derive from supply and price changes for cull cattle and fed cattle. We project that the supply of fed cattle will decline and fed cattle prices will increase, while the price of cull cattle is expected to fall due to the increased supply. Overall, the present value of consumer welfare losses for slaughter and packing facilities is expected to total \$65.3 million. The losses total \$14.3 million on an annualized basis. As sellers of fed and processing beef, these entities will incur producer welfare losses having a present value of \$874.9 million, due to price declines for processing and fed beef. Net losses for this sector total, as a present value, \$940.2 million, or \$205.3 million on an annualized basis.

Table 24. Undiscounted and present values of welfare changes in scenario 3, by industry sector, assuming projected displacement of processing beef imports from other countries by cull cattle and processing beef imports from Canada, 2008-2012

	<u>Cow-calf and Dairy Producers</u>	<u>Feedlots</u> (Thousand Dollars)	<u>Slaughter and Packing</u>	<u>Whole- salers</u>
Undiscounted Welfare Changes				
2007 Dollars				
Consumer Surplus	(a)	-20,093	-76,925	1,530,092
Producer Surplus	-44,434	182,415	-961,689	
Net Change	-44,434	162,322	-1,038,614	1,530,092
Discounted Welfare Changes (3%)				
2007 Dollars				
Consumer Surplus	(a)	-17,383	-65,345	1,395,472
Producer Surplus	-41,629	162,068	-874,904	
Net Change	-41,629	144,685	-940,249	1,395,472
2001 Dollars				
Consumer Surplus	(a)	-15,515	-58,570	1,238,006
Producer Surplus	-36,851	144,374	-776,149	
Net Change	-36,851	128,859	-834,719	1,238,006
Discounted Welfare Changes (7%)				
2007 Dollars				
Consumer Surplus	(a)	-15,515	-58,570	1,238,006
Producer Surplus	-36,851	144,374	-776,149	
Net Change	-36,851	128,859	-834,719	1,238,006
2001 Dollars				
Consumer Surplus	(a)	-12,859	-47,263	1,102,155
Producer Surplus	-33,924	124,172	-688,772	
Net Change	-33,924	111,313	-736,035	1,102,155

(a) Cow-calf and dairy producers will gain consumer surplus by the resumption of breeding cattle imports from Canada. These welfare gains are unquantified.

The pattern for allocation of welfare effects among the industry sectors is presented in Table 23.

Table 25. Annualized values of welfare changes in scenario 3, by industry sector, assuming projected displacement of processing beef imports from other countries by cull cattle and processing beef imports from Canada, 2008-2012

	<u>Cow-calf and Dairy Producers</u>	<u>Feedlots</u>	<u>Slaughter and Packing</u>	<u>Whole- salers</u>
	(Thousand Dollars)			
Discounted Welfare Changes (3%)				
2007 Dollars				
Consumer Surplus	(a)	-3,795	-14,269	304,709
Producer Surplus	-9,090	35,388	-191,039	
Net Change	-9,090	31,593	-205,308	304,709
2001 Dollars				
Consumer Surplus	(a)	-3,388	-12,789	270,324
Producer Surplus	-8,046	31,525	-169,476	
Net Change	-8,046	28,137	-182,265	270,324
Discounted Welfare Changes (7%)				
2007 Dollars				
Consumer Surplus	(a)	-3,513	-12,853	303,039
Producer Surplus	-9,347	34,001	-189,384	
Net Change	-9,347	30,488	-202,237	303,039
2001 Dollars				
Consumer Surplus	(a)	-3,136	-11,526	268,805
Producer Surplus	-8,273	30,285	-167,985	
Net Change	-8,273	27,149	-179,511	268,805

(a) Cow-calf and dairy producers will gain consumer surplus by the resumption of breeding cattle imports from Canada. These welfare gains are unquantified.

The pattern for allocation of welfare effects among the industry sectors is presented in Table 23.

Wholesalers and successive establishments. Wholesalers, as buyers of processing beef and fed beef, would gain in consumer welfare from the decline in their prices, and in particular, from imports of Canadian OTM beef. The present value of this welfare gain is estimated to be \$1.4 billion, and the annualized net benefit is \$304.7 million. Wholesalers' benefits may be partially distributed to retailers depending on the level of competitiveness in these sectors.

Distribution of effects. This consideration of sector-level effects for scenario 3 indicates that cow-calf and dairy producers and slaughter and packing establishments are expected to incur net welfare losses, while feedlots and wholesalers are expected to have net welfare gains. We note that those establishments that combine in various ways the slaughter, packing, processing, and wholesaling functions will similarly accrue welfare benefits and incur welfare losses that pertain to these combined activities. In scenario 3, combining the estimated net welfare losses for slaughter and packing establishments with the estimated net welfare gains for wholesalers and successive establishments yields a present value net welfare gain of \$455.2 million and an annualized net welfare gain of \$99.4 million.

Reporting, Recordkeeping and Other Compliance Requirements

Currently, bovines imported from Canada are restricted to animals that are slaughtered at less than 30 months of age. Bovines not imported for immediate slaughter must be moved from the port of entry to a feedlot in a sealed means of conveyance and from the feedlot to a recognized slaughtering establishment again in a sealed means of conveyance. The animals may not be moved to more than one feedlot. Under this rule, these movement restrictions will no longer be imposed. Canadian bovines imported other

than for immediate slaughter can be moved any number of times to any destinations in unsealed means of conveyance.⁹⁶

Under this rule, feeder bovines imported from BSE minimal-risk regions will not need to be accompanied by APHIS Form VS 17-130, which currently is used to identify the feedlot of destination. (The name of the individual responsible for the movement of an imported animal and individual identification of the animal will still be required information on the accompanying health certificate.) APHIS estimates that the time saved by entities no longer needing to acquire APHIS Form VS 17-130 will total approximately 40,000 hours per year.⁹⁷ Also under this rule, bovines of Canadian origin moved from a U.S. feedlot to a slaughtering establishment will not need to be accompanied by APHIS Form VS 1-27. APHIS estimates the same total time savings by entities no longer needing to acquire APHIS Form VS 1-27: 40,000 hours per year.

Removal of these movement and paperwork requirements will benefit buyers and sellers of Canadian-origin bovines. Many of the beneficiaries are likely to be small entities, given that cow-calf and dairy operations and feedlot establishments are predominantly small. Affected businesses will be able to take advantage of a broader range of transactional opportunities than under current regulations. For example, the sale of a young steer first for backgrounding, then for confined feeding at one or more facilities, and finally for slaughter may enable the original and subsequent owners of the animal to better maximize returns compared to current marketing possibilities. While we

⁹⁶ Canadian bovines imported for immediate slaughter will still be required to be moved directly to slaughter in a sealed means of conveyance because they are not subject to the tuberculosis and brucellosis testing requirements applied to Canadian bovines that are imported other than for immediate slaughter.

⁹⁷ This approximation is based on 1,000 entities filling out Form VS 17-130 on 20 occasions per year, with each form requiring two hours. The estimated total time saved by not having to complete Form VS 1-27 is calculated on this same basis.

are not able to quantify impacts of removing current movement restrictions on Canadian cattle imports, we expect their removal will benefit the cattle industry across-the-board.

Steps taken to Minimize Significant Economic Effects for Small Entities that are Consistent with Stated Objectives and Reasons for Selecting the Alternative Adopted

The Agency has identified alternatives to the rule and analyzed them in the RIA. We have found that the chosen alternative (scenario 3) best strikes the balance of continuing to provide an acceptable level of protection against BSE infectivity entering the United States via live bovine and bovine product imports, while removing unnecessary prohibitions on the importation of certain commodities from Canada. Without this rule, restrictions on U.S. importation of certain Canadian bovine commodities that are without scientific merit would continue. With this rule, importation of these Canadian commodities will be allowed to resume under certain conditions with a negligible BSE risk to the United States.

Appendix 1. Information and procedures used to derive cattle and beef baseline and import projections for the first three scenarios.

This appendix provides background on the data used and procedures followed by USDA's Economic Research Service staff in deriving the U.S. baselines and quantities of Canadian cattle and beef expected to be imported under the three scenarios evaluated in the regulatory impact analysis. We first describe the document, "USDA Agricultural Baseline Projections to 2016" (USDA Baseline).⁹⁸ We then describe the steps taken in determining import projections under the first three scenarios.

As indicated in the notes to Tables 1 through 4, the USDA Baseline data underlie the "no action" U.S. baseline quantities (consumption, production, imports, and exports) and prices used to analyze effects for the four modeled commodities: cull cattle/processing beef, feeder cattle, fed cattle, and fed beef. Projections of cattle and fed beef imports from Canada included in the "no action" baselines are taken directly from the USDA Baseline, with the projections for slaughter steers and heifers, slaughter veal calves, and feeder cattle allocated according to their respective import shares observed since the U.S. border reopened to Canadian cattle in July 2005.

The USDA Baseline

The USDA Baseline provides long-run projections for the agricultural sector through 2016.⁹⁹ The projections cover agricultural commodities, agricultural trade, and aggregate sector indicators, such as farm income and food prices. The USDA Baseline identifies major forces and uncertainties affecting future agricultural markets; prospects for global long-term economic growth, consumption, and trade; and future price trends, trade flows, and U.S. exports of major farm commodities. The projections assume no shocks and are based on specific assumptions regarding the macro economy, agricultural and trade policies, the weather, and international developments. They assume normal weather, no outbreaks of plant or animal diseases, and include short-term projections from USDA's *World Agricultural Supply and Demand Estimates* reports.

Each year, USDA's baseline projections are updated between October and December, and reflect a composite of model and judgment-based analyses. Beginning in August, macroeconomic and policy assumptions are developed. These assumptions are input into a large country commodity trade model called the Country-Commodity Linked System. This model covers 44 commodities and 32 countries and regions. Workshops are held in September and October, and the model results are presented to USDA's World Agricultural Outlook Board committee members. Model inputs are adjusted to reflect comments from the committee members.

⁹⁸ USDA, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007. http://www.usda.gov/oce/commodity/ag_baseline.htm

⁹⁹ This description is taken from the baseline publication on the ERS website: <http://www.ers.usda.gov/Briefing/Baseline/summary.htm>. Development of USDA's agricultural baseline projections is part of the process used to determine the President's annual budget.

The USDA Baseline assumes that the Farm Security and Rural Investment Act of 2002 (the 2002 Farm Act), the Energy Policy Act of 2005, and the Agricultural Reconciliation Act of 2005 will remain in effect through the projection period. The projections are not intended to be a forecast of what the future will be, but instead a description of what would be expected to happen under a continuation of current farm legislation, under very specific external circumstances. Thus, the projections provide a neutral reference or point of departure for discussion of alternative farm sector outcomes that could result under different domestic or international assumptions.

Cattle and Beef Import Projections under Scenario 1

Cattle. Canadian inventory and export projections in the USDA Baseline are not considered the most appropriate values to use in evaluating expected impacts of the rule. Prior to May 2003, when the U.S. border was open to all Canadian cattle, the Canadian cattle inventory tracked more closely with the U.S. inventory, and in fact, tended to be more expansionary from 1985 to 2003. Our import projections for scenario 1 reflect a return to this relationship; year-to-year percentage changes in the Canadian herd are assumed to slightly exceed those projected for the U.S. herd. This is accomplished by adding a “Canadian increment” of 0.3 percent to the yearly percentage changes in the U.S. cattle inventory projections taken from the USDA Baseline. The beginning Canadian inventory in 2008 is a revised number taken from the March 2007 FAS-USDA semi-annual review of country-level production, supply, and distribution of livestock products. The Canadian export percentages reflect adjusted historic percentages.

Feeder cattle imports are expected to track closely with the overall Canadian cattle inventory, and year-to-year percentage changes in feeder cattle imports are projected to correspond to the percentage changes in the overall Canadian inventory. Feeder cattle markets should be affected only indirectly by the rule, to the extent that the rule affects the overall size of the Canadian herd. Feeder import quantities are projected to be the same under all three scenarios.

Breeding cattle imports are expected to return to historic patterns with the rule. Between 1990 and 2002, an average of about 9.5 percent of the Canadian cattle inventory was exported to the United States each year, and less than 5 percent of these animals (less than 0.5 percent of the inventory) were cattle for breeding. Dairy cows and heifers represent the great majority – almost 90 percent – of cattle in this grouping. Breeding animals are typically imported as yearlings and generally have papers verifying their age, so the age restriction (born on or after March 1, 1999) and age-verification requirement are expected to have almost no impact on the number imported. Imports of vealers and other light calves for slaughter, another niche market, are estimated in the same fashion and account for less than 5 percent of total imports.

Year-to-year percentage changes in imports of slaughter steers and heifers are expected to correspond to the year-to-year changes in the overall Canadian inventory. Import volumes are adjusted downward to reflect greater competition from Canadian packers for slaughter animals of all types, as U.S. imports of non-fed slaughter cattle resume and

U.S. slaughter of Canadian cattle moves toward the U.S./Canadian shares seen prior to 2003.

Estimating quantities of cull cattle (slaughter cows, bulls, and stags) that will be imported under the rule is complex due to the age restriction and the age-verification requirement. A culling age distribution was developed to determine how the availability of cull animals might change during the 5-year period of analysis. Statistics Canada reports that on January 1, 2007, the Canadian cattle inventory included a total of 5.0 million beef cows and 1.0 million dairy cows, and of those, 28.2 percent of Canadian beef cows and 9.2 percent of Canadian dairy cows were born prior to 1999. The culling age distribution was calibrated around these percentages, with culling rates declining for each successive year's breeding herd cohort (other than for a notable culling of heifers and one-time cows that fail to become pregnant). Most dairy cows are culled by the time they have completed their fourth lactation, as milk productivity declines with cow age.

A more significant issue in projecting cull cattle imports is age verification. Age-verification rates (percentage of animals for which the age can be verified) are high among dairy cattle but relatively low for beef cattle, and beef cattle represent the vast majority of the Canadian herd. On January 1, 2001, the Canadian Food Inspection Agency initiated a records system requiring animals leaving their farm of origin to have approved ear tags, with full enforcement beginning July 1, 2002. However, the record system was designed to identify farm of origin, and date of birth is an optional feature used by only a minority of participants.

The USDA Foreign Agriculture Service office in Canada estimates that, at present, only 20-25 percent of Canadian cattle are able to have their ages satisfactorily verified. We assume that the rule will prompt rapid adoption of age verification by Canadian cattle producers, with 75 percent of beef producers and all dairy producers age-verifying their 2008 calf crop. We assume that the verification rate will continue to grow among beef producers, with near universal adoption by 2012. However, because of the lag time for age-verified cattle to reach culling age, the number of beef cattle that will qualify for importation during the 5-year period of analysis will be markedly reduced, given the low age-verification rates for beef producers prior to 2008.

We expect the effects on cull cattle imports of the age restriction and especially the age-verification requirement to be dramatic. Of the cull cattle that could be imported by the United States if there were no age restriction and no age-verification requirement (as projected in scenario 2), only about one-fourth are expected to be eligible under the rule in 2008, and only about one-half may be eligible by 2012.

Another factor considered in projecting cull cattle imports for scenario 1 is the prohibition on beef imports from Canadian cattle slaughtered at 30 months or older (referred to as OTM beef). This restriction limits the value of OTM beef in Canada and hence the amount Canadian packers pay for cull animals. Cull cattle imports from Canada prior to May 2003 suggest that the United States could receive up to 40 percent more OTM beef in the form of Canadian cull cattle, given current U.S.-Canada price

differentials. It is important to note, however, that Canadian cull cow slaughter has increased as a portion of all slaughter in Canada since the border closing in 2003. Canadian cow slaughter has been particularly high since the U.S. border reopened in July 2005 to animals less than 30 months of age, and U.S. packers began competing again with Canadian packers for slaughter steers and heifers. A good portion of the “bubble” of cattle that accumulated during the border closure has already been whittled down, and Canadian cow prices have roughly doubled since the second half of 2003. However, the U.S.-Canada price differential is still wider than what was seen prior to May 2003.

All of these factors have been incorporated into the estimates of Canadian cull cattle imported under scenario 1. Like the projections of breeding cattle imports, the cull cattle projections are a function of the size of the total Canadian herd, historic import rates, and cull cattle’s share of total imports. Quantities have then been adjusted to reflect the March 1, 1999 age restriction, the age-verification requirement, and the prohibition on OTM beef. The age-verification requirement is expected to have the single largest limiting effect on cull cattle imports over the 2008-2012 period. Expected import quantities are substantially lower than was projected in the preliminary regulatory impact analysis.

Beef. As described, we expect fewer slaughter steers and heifers to be imported from Canada in scenario 1 than would enter otherwise. Fed beef imports from Canada are projected to increase in this scenario by an amount that replaces the beef that would have been produced by the slaughter steers and heifers now marketed in Canada. The change in fed cattle imports is converted to beef using carcass weights from Agriculture Canada. Historically, 60.1 percent of fed cattle imports have been steers, so a 60/40 mix of steers and heifers is used in calculating the overall carcass weight of imports. This additional beef is combined with projected baseline fed beef imports. OTM beef from Canada (processing beef) remains restricted under scenario 1.

Cattle and Beef Import Projections under Scenario 2

Cattle. Projections of imports for feeder cattle, breeding cattle, slaughter vealers and light calves for scenario 2 (no restriction by date of birth) are calculated in the same fashion as for scenario 1, based on the Canadian cattle inventory. Likewise, projected imports of slaughter steers and heifers are calculated as in scenario 1, but the scenario 2 quantities are lower as a result of larger cull cattle imports.

Without the age restriction and age-verification requirement, the number of animals that would qualify for importation is much larger, approaching import levels similar to those seen prior to May 2003. For slaughter cows and bulls/stags, import projections are a function of the size of the total Canadian herd, historic import rates, and cull cattle’s share of total imports. As in scenario 1, these quantities are adjusted upward to reflect the continuing prohibition on imports of OTM beef.

Competition between U.S. and Canadian packers for both fed and non-fed cattle would be strongest in this scenario, given the much larger number of Canadian cull cattle

eligible for export. U.S. imports of slaughter steers and heifers are expected to decline more in this scenario than in the others; to the extent possible, Canadian packers would bid for a larger share of the Canadian fed cattle market to maintain plant volume.

Beef. The same approach for projecting fed beef imports was used in this scenario as in scenario 1: lower steer and heifer imports are replaced by an equivalent amount of fed beef imports. This fed beef is in addition to the baseline imports. As in scenario 1, no OTM beef is allowed to be imported from Canada.

Cattle and Beef Import Projections under Scenario 3

Cattle. The same methods for estimating shares of the Canadian cattle inventory and U.S. imports for feeder cattle, breeding cattle, slaughter vealers and light calves used in the first two scenarios are used in scenario 3. Likewise, imports of slaughter steers and heifers are a function of historic import levels, changes in the Canadian inventory, and an adjustment for the level of cull cattle imports.

For cull cattle, scenario 3 imposes the age-related restrictions seen in scenario 1. The estimates are calculated similarly except with respect to OTM beef; cull cattle imports in this scenario are somewhat lower than those in scenario 1 because beef from these animals may also be imported. That is, allowing U.S. imports of OTM beef raises these animals' value in Canada, meaning fewer live cull cattle imported by the United States.

Beef. The calculation for fed beef imports in scenario 3 follows the same method as in scenarios 1 and 2. However, scenario 3 also assumes imports of OTM beef from Canada. This amount is estimated by calculating the volume of beef produced from the additional cull cattle which would enter the U.S. if the border was open to cull cattle with no age restriction, as in scenario 2. This quantity is found by taking the scenario 2 cow and bull/stag import totals and subtracting the cull cattle imported under scenario 3. The volume of beef produced by these animals is determined using slaughter weight statistics for cows and bulls/stags from Agriculture Canada.

Appendix 2. Price and welfare effects assuming that 50 percent of the cull cattle imports in scenarios 1 and 2, and 50 percent of the cull cattle and OTM beef imports from Canada in scenario 3, displace processing beef imports from elsewhere.

Scenario 1

As shown in Table A, in scenario 1 assuming that 50 percent of the cull cattle imported from Canada displace processing beef imports, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 1 percent, or \$0.98 per cwt in 2007 dollars. This decrease can be compared to the 1.4 percent decline (\$1.47 per cwt), based on the estimated 25 percent of cull cattle imported from Canada displacing processing beef imports. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/processing beef of \$60.3 million, losses for U.S. producers of cull cattle/processing beef of \$35.6 million, for a net benefit of \$24.7 million.

Table B shows combined welfare changes in scenario 1, assuming that 50 percent of the cull cattle imported from Canada displace processing beef imports. Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, are gains of \$60.6 million, losses of \$35.2 million, for a net benefit of \$25.4 million. This overall net benefit is 33 percent less than the net benefit based on the 25 percent of cull cattle imported from Canada estimated to displace processing beef imports (\$25.4 million, compared to \$37.9 million from Table 15).

Scenario 2

As shown in Table C, in scenario 2 assuming that 50 percent of the cull cattle imported from Canada displace processing beef imports, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 3 percent, or \$3.07 per cwt in 2007 dollars. This decrease can be compared to the 4.5 percent decline (\$4.61 per cwt), based on the estimated 25 percent of cull cattle imported from Canada displacing processing beef imports. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/processing beef of \$190.4 million, losses for U.S. producers of cull cattle/processing beef of \$110.9 million, for a net benefit of \$79.5 million.

Table D shows combined welfare changes in scenario 2, assuming that 50 percent of the cull cattle imported from Canada displace processing beef imports. Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, are gains of \$196.6 million, losses of \$114.7 million, for a net benefit of \$81.9 million. This overall net benefit is 34 percent less than the net benefit based on the 25 percent of cull cattle imported from Canada estimated to displace processing beef imports (\$81.9 million, compared to \$123.8 million from Table 17).

Scenario 3

As shown in Table E, in scenario 3 assuming that 50 percent of the cull cattle and OTM beef imported from Canada displace processing beef imports from elsewhere, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 3 percent, or \$3.08 per cwt in 2007 dollars. This decrease can be compared to the 4.5 percent decline (\$4.61 per cwt), based on the estimated 25 percent of cull cattle and OTM beef imported from Canada displacing processing beef imports from elsewhere. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/processing beef of \$190.7 million, losses for U.S. producers of cull cattle/processing beef of \$111.1 million, for a net benefit of \$79.6 million.

Table F shows combined welfare changes in scenario 3, assuming that 50 percent of the cull cattle and OTM beef imported from Canada displace processing beef imports from elsewhere. Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, are gains of \$190.4 million, losses of \$110.2 million, for a net benefit of \$80.2 million. This overall net benefit is 34 percent less than the net benefit based on the 25 percent of cull cattle and OTM beef imported from Canada estimated to displace processing beef imports from elsewhere (\$80.2 million, compared to \$121.9 million from Table 20).

Appendix 2 Table A. Cull cattle/processing beef: welfare and price changes in scenario 1, assuming 50 percent of cull cattle imports from Canada displace processing beef imports, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	41,702	46,005	47,748	78,127	91,776	305,359	
Producer Surplus	-24,145	-27,089	-28,459	-46,403	-54,452	-180,548	
Net	17,557	18,916	19,289	31,724	37,325	124,811	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	40,488	43,364	43,696	69,415	79,167	276,130	60,294
Producer Surplus	-23,442	-25,534	-26,044	-41,228	-46,971	-163,219	-35,639
Net	17,046	17,830	17,652	28,187	32,197	112,911	24,655
2001 Dollars							
Consumer Surplus	35,629	38,733	38,702	61,482	70,630	245,176	53,535
Producer Surplus	-20,629	-22,807	-23,067	-36,516	-41,905	-144,925	-31,645
Net	15,000	15,926	15,635	24,965	28,724	100,251	21,890
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	38,974	40,182	38,976	59,603	65,435	243,171	59,307
Producer Surplus	-22,566	-23,661	-23,231	-35,400	-38,823	-143,681	-35,042
Net	16,408	16,522	15,746	24,202	26,612	99,490	24,265
2001 Dollars							
Consumer Surplus	34,297	35,891	34,522	52,791	58,379	215,880	52,651
Producer Surplus	-19,858	-21,134	-20,576	-31,355	-34,637	-127,559	-31,110
Net	14,439	14,757	13,946	21,436	23,742	88,321	21,541
							<u>5-Year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$0.71	-\$0.76	-\$0.76	-\$1.24	-\$1.44	-\$0.98	
Percentage Price Changes	-0.7%	-0.7%	-0.7%	-1.2%	-1.4%	-1.0%	

Appendix 2 Table B. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 1, assuming 50 percent of cull cattle imports from Canada displace processing beef imports, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	42,498	51,088	48,027	75,873	88,954	306,440	
Producer Surplus	-24,509	-31,867	-28,136	-42,935	-50,166	-177,611	
Net	17,989	19,221	19,891	32,938	38,790	128,829	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	41,261	48,155	43,951	67,412	76,734	277,512	60,596
Producer Surplus	-23,796	-30,037	-25,748	-38,146	-43,274	-161,000	-35,155
Net	17,466	18,118	18,202	29,265	33,461	116,511	25,443
2001 Dollars							
Consumer Surplus	36,229	42,975	38,752	59,311	68,155	245,424	53,589
Producer Surplus	-20,861	-26,794	-22,635	-33,400	-38,315	-142,007	-31,007
Net	15,368	16,180	16,117	25,910	29,840	103,417	22,581
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	39,718	44,622	39,203	57,883	63,424	244,851	59,717
Producer Surplus	-22,905	-27,834	-22,967	-32,754	-35,767	-142,228	-34,687
Net	16,812	16,788	16,238	25,128	27,656	102,623	25,030
2001 Dollars							
Consumer Surplus	34,875	39,821	34,566	50,927	56,334	216,524	52,808
Producer Surplus	-20,082	-24,829	-20,191	-28,680	-31,668	-125,449	-30,594
Net	14,793	14,993	14,376	22,248	24,663	91,075	22,214

Appendix 2 Table C. Cull cattle/processing beef: welfare and price changes in scenario 2, assuming 50 percent of cull cattle imports from Canada displace processing beef imports, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	186,878	190,638	193,001	193,067	188,642	952,226	
Producer Surplus	-106,567	-110,663	-113,467	-113,442	-110,892	-555,030	
Net	80,312	79,975	79,534	79,625	77,750	397,196	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	181,435	179,695	176,623	171,537	162,725	872,015	190,409
Producer Surplus	-103,463	-104,310	-103,838	-100,791	-95,656	-508,060	-110,937
Net	77,973	75,385	72,784	70,746	67,068	363,955	79,472
2001 Dollars							
Consumer Surplus	159,663	160,504	156,437	151,933	145,176	773,714	168,944
Producer Surplus	-91,047	-93,171	-91,971	-89,272	-85,340	-450,802	-98,434
Net	68,616	67,334	64,466	62,660	59,835	322,912	70,509
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	174,653	166,511	157,546	147,290	134,499	780,499	190,357
Producer Surplus	-99,595	-96,657	-92,623	-86,544	-79,064	-454,484	-110,844
Net	75,058	69,854	64,923	60,745	55,435	326,015	79,512
2001 Dollars							
Consumer Surplus	153,694	148,728	139,541	130,456	119,995	692,414	168,874
Producer Surplus	-87,644	-86,335	-82,037	-76,653	-70,538	-403,207	-98,338
Net	66,051	62,394	57,503	53,803	49,457	289,207	70,535
							<u>5-Year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$3.15	-\$3.12	-\$3.07	-\$3.06	-\$2.96	-\$3.07	
Percentage Price Changes	-3.2%	-3.0%	-2.9%	-2.9%	-2.9%	-3.0%	

Appendix 2 Table D. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 2, assuming 50 percent of cull cattle imports from Canada displace processing beef, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	192,703	201,303	199,765	197,568	191,270	982,611	
Producer Surplus	-110,256	-119,362	-117,812	-115,109	-110,659	-573,197	
Net	82,449	81,941	81,953	82,459	80,611	409,414	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	187,091	189,748	182,813	175,535	164,991	900,180	196,560
Producer Surplus	-107,045	-112,510	-107,814	-102,271	-95,455	-525,097	-114,657
Net	80,047	77,238	74,998	73,264	69,536	375,083	81,903
2001 Dollars							
Consumer Surplus	164,332	169,412	161,408	154,816	146,739	796,709	173,965
Producer Surplus	-93,895	-100,436	-94,997	-89,942	-84,718	-463,990	-101,313
Net	70,436	68,976	66,411	64,873	62,019	332,719	72,651
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	180,098	175,827	163,068	150,724	136,373	806,089	196,598
Producer Surplus	-103,043	-104,255	-96,170	-87,816	-78,898	-470,182	-114,672
Net	77,055	71,571	66,899	62,908	57,474	335,906	81,925
2001 Dollars							
Consumer Surplus	158,187	156,982	143,975	132,932	121,287	713,364	173,984
Producer Surplus	-90,386	-93,066	-84,736	-77,228	-70,024	-415,441	-101,321
Net	67,803	63,916	59,239	55,704	51,262	297,924	72,662

Appendix 2 Table E. Cull cattle/processing beef: welfare and price changes in scenario 3, assuming 50 percent of cull cattle and OTM beef imports from Canada displace processing beef imports from other countries, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	188,018	190,638	193,001	193,067	188,642	953,366	
Producer Surplus	-107,204	-110,663	-113,467	-113,442	-110,892	-555,668	
Net	80,814	79,975	79,534	79,625	77,750	397,699	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	182,542	179,695	176,623	171,537	162,725	873,122	190,650
Producer Surplus	-104,081	-104,310	-103,838	-100,791	-95,656	-508,678	-111,072
Net	78,460	75,385	72,784	70,746	67,068	364,443	79,578
2001 Dollars							
Consumer Surplus	160,637	160,504	156,437	151,933	145,176	774,687	169,157
Producer Surplus	-91,592	-93,171	-91,971	-89,272	-85,340	-451,346	-98,553
Net	69,045	67,334	64,466	62,660	59,835	323,341	70,603
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	175,718	166,511	157,546	147,290	134,499	781,564	190,616
Producer Surplus	-100,191	-96,657	-92,623	-86,544	-79,064	-455,079	-110,989
Net	75,527	69,854	64,923	60,745	55,435	326,485	79,627
2001 Dollars							
Consumer Surplus	154,632	148,728	139,541	130,456	119,995	693,352	169,102
Producer Surplus	-88,168	-86,335	-82,037	-76,653	-70,538	-403,731	-98,466
Net	66,464	62,394	57,503	53,803	49,457	289,621	70,636
							<u>5-Year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$3.17	-\$3.12	-\$3.07	-\$3.06	-\$2.96	-\$3.08	
Percentage Price Changes	-3.2%	-3.0%	-2.9%	-2.9%	-2.9%	-3.0%	

Appendix 2 Table F. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 3, assuming 50 percent of cull cattle and OTM beef imports from Canada displace processing beef imports from other countries, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	188,084	195,782	192,972	190,326	184,378	951,544	
Producer Surplus	-106,968	-115,609	-112,986	-109,731	-105,506	-550,800	
Net	81,117	80,172	79,986	80,596	78,872	400,745	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	182,607	184,544	176,597	169,102	159,047	871,896	190,383
Producer Surplus	-103,851	-108,973	-103,398	-97,494	-91,010	-504,728	-110,210
Net	78,754	75,571	73,198	71,608	68,037	367,168	80,174
2001 Dollars							
Consumer Surplus	160,632	164,798	156,272	149,429	141,634	772,765	168,737
Producer Surplus	-91,329	-97,300	-91,445	-86,014	-80,944	-447,031	-97,610
Net	69,303	67,498	64,827	63,414	60,689	325,733	71,126
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	175,780	171,004	157,523	145,199	131,459	780,965	190,471
Producer Surplus	-99,969	-100,978	-92,230	-83,713	-75,224	-452,115	-110,265
Net	75,811	70,026	65,292	61,485	56,235	328,850	80,205
2001 Dollars							
Consumer Surplus	154,627	152,706	139,394	128,306	117,068	692,101	168,798
Producer Surplus	-87,915	-90,160	-81,568	-73,856	-66,904	-400,403	-97,653
Net	66,712	62,547	57,826	54,451	50,162	291,698	71,143

Appendix 3. Price and welfare effects assuming that none of the cull cattle imports in scenarios 1 and 2, and none of the cull cattle and OTM beef imports from Canada in scenario 3, displace processing beef imports from elsewhere.

Scenario 1

As shown in Table A, in scenario 1 assuming that none of the cull cattle imported from Canada displace processing beef imports, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 1.9 percent, or \$1.96 per cwt in 2007 dollars. This decrease can be compared to the 1.4 percent decline (\$1.47 per cwt), based on the estimated 25 percent of cull cattle imported from Canada displacing processing beef imports. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/processing beef of \$120.6 million, losses for U.S. producers of cull cattle/processing beef of \$70.8 million, for a net benefit of \$49.8 million.

Table B shows combined welfare changes in scenario 1, assuming that none of the cull cattle imported from Canada displace processing beef imports. Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, are gains of \$120.9 million, losses of \$70.3 million, for a net benefit of \$50.6 million. This overall net benefit is 34 percent more than the net benefit based on the 25 percent of cull cattle imported from Canada estimated to displace processing beef imports (\$50.6 million, compared to \$37.9 million from Table 15).

Scenario 2

As shown in Table C, in scenario 2 assuming that none of the cull cattle imported from Canada displace processing beef imports, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 6 percent, or \$6.15 per cwt in 2007 dollars. This decrease can be compared to the 4.5 percent decline (\$4.61 per cwt), based on the estimated 25 percent of cull cattle imported from Canada displacing processing beef imports. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/ processing beef of \$383.3 million, losses for U.S. producers of cull cattle/processing beef of \$219.2 million, for a net benefit of \$164.1 million.

Table D shows combined welfare changes in scenario 2, assuming that none of the cull cattle imported from Canada displace processing beef imports. Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, are gains of \$389.5 million, losses of \$222.9 million, for a net benefit of \$166.6 million. This overall net benefit is 35 percent more than the net benefit based on the 25 percent of cull cattle imported from Canada estimated to displace processing beef imports (\$166.6 million, compared to \$123.8 million from Table 17).

Scenario 3

As shown in Table E, in scenario 3 assuming that none of the cull cattle and OTM beef imported from Canada displace processing beef imports from elsewhere, there would be an average yearly decline in the price of processing beef over the 5-year period of analysis of 6 percent, or \$6.15 per cwt in 2007 dollars. This decrease can be compared to the 4.5 percent decline (\$4.61 per cwt), based on the estimated 25 percent of cull cattle and OTM beef imported from Canada displacing processing beef imports from elsewhere. Annualized values of welfare changes, in 2007 dollars and discounted at 3 percent, are gains for U.S. consumers of cull cattle/processing beef of \$383.5 million, losses for U.S. producers of cull cattle/processing beef of \$219.3 million, for a net benefit of \$164.2 million.

Table F shows combined welfare changes in scenario 3, assuming that none of the cull cattle or OTM beef imported from Canada displace processing beef imports from elsewhere. Annualized values of overall welfare changes, in 2007 dollars and discounted at 3 percent, are gains of \$383.3 million, losses of \$218.4 million, for a net benefit of \$164.8 million. This overall net benefit is 35 percent more than the net benefit based on the 25 percent of cull cattle and OTM beef imported from Canada estimated to displace processing beef imports from elsewhere (\$164.8 million, compared to \$121.9 million from Table 20).

Appendix 3 Table A. Cull cattle/processing beef: welfare and price changes in scenario 1, assuming no displacement of processing beef imports by cull cattle imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	84,655	90,989	94,465	156,623	184,071	610,803	
Producer Surplus	-48,794	-53,340	-56,055	-92,343	-108,252	-358,783	
Net	35,861	37,650	38,410	64,280	75,819	252,020	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	82,189	85,766	86,449	139,157	158,781	552,343	120,607
Producer Surplus	-47,373	-50,278	-51,298	-82,045	-93,379	-324,373	-70,828
Net	34,816	35,488	35,150	57,112	65,402	227,970	49,778
2001 Dollars							
Consumer Surplus	72,326	76,607	76,569	123,254	141,658	490,413	107,084
Producer Surplus	-41,688	-44,908	-45,436	-72,669	-83,309	-288,009	-62,888
Net	30,638	31,698	31,133	50,585	58,349	202,404	44,196
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	79,116	79,474	77,112	119,487	131,240	486,429	118,636
Producer Surplus	-45,602	-46,589	-45,758	-70,448	-77,182	-285,578	-69,650
Net	33,515	32,885	31,354	49,039	54,058	200,850	48,986
2001 Dollars							
Consumer Surplus	69,622	70,986	68,299	105,831	117,087	431,825	105,318
Producer Surplus	-40,130	-41,613	-40,528	-62,397	-68,859	-253,526	-61,833
Net	29,493	29,373	27,771	43,435	48,228	178,299	43,486
							<u>5-Year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$1.43	-\$1.49	-\$1.51	-\$2.48	-\$2.89	-\$1.96	
Percentage Price Changes	-1.4%	-1.4%	-1.4%	-2.4%	-2.8%	-1.9%	

Appendix 3 Table B. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 1, assuming no displacement of processing beef imports by cull cattle imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	85,451	96,072	94,744	154,369	181,249	611,884	
Producer Surplus	-49,158	-58,118	-55,732	-88,875	-103,966	-355,846	
Net	36,293	37,955	39,012	65,494	77,284	256,038	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	82,962	90,557	86,704	137,154	156,348	553,725	120,909
Producer Surplus	-47,727	-54,781	-51,002	-78,963	-89,682	-322,154	-70,344
Net	35,236	35,776	35,700	58,190	66,666	231,570	50,566
2001 Dollars							
Consumer Surplus	72,926	80,849	76,619	121,083	139,183	490,661	107,138
Producer Surplus	-41,920	-48,895	-45,004	-69,553	-79,719	-285,091	-62,250
Net	31,006	31,952	31,615	51,530	59,465	205,570	44,887
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	79,860	83,914	77,339	117,767	129,229	488,109	119,046
Producer Surplus	-45,941	-50,762	-45,494	-67,802	-74,126	-284,125	-69,295
Net	33,919	33,151	31,846	49,965	55,102	203,983	49,751
2001 Dollars							
Consumer Surplus	70,200	74,916	68,343	103,967	115,042	432,469	105,475
Producer Surplus	-40,354	-45,308	-40,143	-59,722	-65,890	-251,416	-61,317
Net	29,847	29,609	28,201	44,247	49,149	181,053	44,159

Appendix 3 Table C. Cull cattle/processing beef: welfare and price changes in scenario 2, assuming no displacement of processing beef imports by cull cattle imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	376,098	383,570	388,249	389,558	379,461	1,916,937	
Producer Surplus	-210,275	-218,477	-224,108	-224,738	-219,048	-1,096,646	
Net	165,823	165,093	164,141	164,821	160,414	820,291	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	365,144	361,552	355,303	346,117	327,327	1,755,442	383,309
Producer Surplus	-204,150	-205,936	-205,091	-199,676	-188,952	-1,003,806	-219,185
Net	160,993	155,616	150,212	146,441	138,374	751,636	164,123
2001 Dollars							
Consumer Surplus	321,326	322,939	314,697	306,561	292,027	1,557,550	340,098
Producer Surplus	-179,652	-183,943	-181,652	-176,856	-168,575	-890,678	-194,483
Net	141,674	138,996	133,045	129,705	123,452	666,872	145,615
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	351,493	335,025	316,927	297,192	270,551	1,571,188	383,198
Producer Surplus	-196,518	-190,827	-182,939	-171,451	-156,178	-897,913	-218,993
Net	154,975	144,198	133,988	125,741	114,373	673,275	164,206
2001 Dollars							
Consumer Surplus	309,314	299,246	280,707	263,227	241,374	1,393,867	339,951
Producer Surplus	-172,936	-170,447	-162,032	-151,857	-139,335	-796,607	-194,285
Net	136,378	128,798	118,675	111,371	102,038	597,260	145,666
						<u>5-Year Average</u>	
Price Changes in 2007 Dollars (dollars per cwt)	-\$6.30	-\$6.23	-\$6.15	-\$6.13	-\$5.92	-\$6.15	
Percentage Price Changes	-6.3%	-6.1%	-5.9%	-5.8%	-5.8%	-6.0%	

Appendix 3 Table D. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 2, assuming no displacement of processing beef imports by cull cattle imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	381,923	394,235	395,013	394,059	382,089	1,947,322	
Producer Surplus	-213,964	-227,176	-228,453	-226,405	-218,815	-1,114,813	
Net	167,960	167,059	166,560	167,655	163,275	832,509	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	370,800	371,605	361,493	350,115	329,593	1,783,607	389,460
Producer Surplus	-207,732	-214,136	-209,067	-201,156	-188,751	-1,020,843	-222,905
Net	163,067	157,469	152,426	148,959	140,842	762,764	166,554
2001 Dollars							
Consumer Surplus	325,995	331,847	319,668	309,444	293,590	1,580,545	345,119
Producer Surplus	-182,500	-191,208	-184,678	-177,526	-167,953	-903,866	-197,362
Net	143,494	140,638	134,990	131,918	125,636	676,679	147,757
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	356,938	344,341	322,449	300,626	272,425	1,596,778	389,439
Producer Surplus	-199,966	-198,425	-186,486	-172,723	-156,012	-913,611	-222,821
Net	156,972	145,915	135,964	127,904	116,412	683,166	166,619
2001 Dollars							
Consumer Surplus	313,807	307,500	285,141	265,703	242,666	1,414,817	345,061
Producer Surplus	-175,678	-177,178	-164,731	-152,432	-138,821	-808,841	-197,268
Net	138,130	130,320	120,411	113,272	103,843	605,977	147,793

Appendix 3 Table E. Cull cattle/processing beef: welfare and price changes in scenario 3, assuming no displacement of processing beef imports from other countries by cull cattle and OTM beef imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	377,252	383,570	388,249	388,368	380,618	1,918,056	
Producer Surplus	-210,895	-218,477	-224,108	-224,076	-219,691	-1,097,247	
Net	166,357	165,093	164,141	164,292	160,927	820,809	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	366,264	361,552	355,303	345,060	328,324	1,756,502	383,540
Producer Surplus	-204,752	-205,936	-205,091	-199,088	-189,507	-1,004,374	-219,310
Net	161,512	155,616	150,212	145,971	138,817	752,128	164,231
2001 Dollars							
Consumer Surplus	322,312	322,939	314,697	305,624	292,917	1,558,489	340,303
Producer Surplus	-180,182	-183,943	-181,652	-176,335	-169,070	-891,182	-194,593
Net	142,130	138,996	133,045	129,289	123,846	667,307	145,710
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	352,572	335,025	316,927	296,284	271,375	1,572,183	383,441
Producer Surplus	-197,098	-190,827	-182,939	-170,946	-156,637	-898,446	-219,123
Net	155,474	144,198	133,988	125,338	114,738	673,736	164,318
2001 Dollars							
Consumer Surplus	310,263	299,246	280,707	262,423	242,109	1,394,747	340,166
Producer Surplus	-173,446	-170,447	-162,032	-151,410	-139,744	-797,079	-194,400
Net	136,817	128,798	118,675	111,013	102,365	597,669	145,766
							<u>5-Year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$6.32	-\$6.23	-\$6.15	-\$6.11	-\$5.94	-\$6.15	
Percentage Price Changes	-6.3%	-6.1%	-5.9%	-5.8%	-5.8%	-6.0%	

Appendix 3 Table F. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 3, assuming no displacement of processing beef imports from other countries by cull cattle and OTM beef imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>5-Year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	377,318	388,714	388,220	385,627	376,354	1,916,234	
Producer Surplus	-210,659	-223,423	-223,627	-220,365	-214,305	-1,092,379	
Net	166,660	165,290	164,593	165,263	162,049	823,855	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	366,329	366,401	355,277	342,625	324,646	1,755,276	383,273
Producer Surplus	-204,522	-210,599	-204,651	-195,791	-184,861	-1,000,424	-218,448
Net	161,806	155,802	150,626	146,833	139,786	754,853	164,827
2001 Dollars							
Consumer Surplus	322,307	327,233	314,532	303,120	289,375	1,556,567	339,883
Producer Surplus	-179,919	-188,072	-181,126	-173,077	-164,674	-886,867	-193,650
Net	142,388	139,160	133,406	130,043	124,700	669,699	146,233
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	352,634	339,518	316,904	294,193	268,335	1,571,584	383,296
Producer Surplus	-196,876	-195,148	-182,546	-168,115	-152,797	-895,482	-218,399
Net	155,758	144,370	134,357	126,078	115,538	676,101	164,896
2001 Dollars							
Consumer Surplus	310,258	303,224	280,560	260,273	239,182	1,393,496	339,862
Producer Surplus	-173,193	-174,272	-161,563	-148,613	-136,110	-793,751	-193,587
Net	137,065	128,951	118,998	111,661	103,070	599,746	146,273

Appendix Table 1. Nominal prices and prices in 2007 and 2001 dollars for feeder cattle, fed cattle, processing beef, and fed beef, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Nominal prices					
Feeder cattle (\$ per head)	741	747	775	814	816
Fed cattle (\$ per head)	1,072	1,151	1,199	1,223	1,216
Processing beef (\$ per cwt)	102	108	112	114	113
Fed beef (\$ per cwt)	146	157	165	170	171
2007 prices					
Feeder cattle (\$ per head)	725	716	727	748	735
Fed cattle (\$ per head)	1,049	1,103	1,125	1,124	1,095
Processing beef (\$ per cwt)	100	103	105	105	102
Fed beef (\$ per cwt)	143	150	155	157	154
2001 prices					
Feeder cattle (\$ per head)	641	634	646	666	656
Fed cattle (\$ per head)	928	978	1,000	1,001	978
Processing beef (\$ per cwt)	88	92	93	93	91
Fed beef (\$ per cwt)	126	133	137	139	137

Sources: Nominal prices provided by USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch, based on ERS Livestock, Dairy, and Poultry Outlook/Agricultural Marketing Service data. GDP rates taken from

<http://www.ers.usda.gov/data/macroeconomics/Data/ProjectedGDPDeflatorValues.xls>

Note: Nominal prices are deflated to 2007 and 2001 prices using annual GDP historic and projected rates for the years 2002-2012, as follows: 1.75%, 2.03%, 2.63%, 2.31%, 2.26%, 2.38%, 2.20%, 2.20%, 2.20%, 2.20%, and 2.20%. Beef prices are per hundredweight, or 100 pounds, carcass weight equivalent.

Appendix Table 2. Beef cow, dairy cow, and bull and stag slaughter quantities and carcass weights per animal used to project U.S. processing beef production, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
Beef cow slaughter (1,000 head)	2,636	2,875	3,087	3,090	3,119
Dairy cow slaughter (1,000 head)	2,448	2,424	2,400	2,383	2,366
Beef and dairy cow slaughter	5,084	5,299	5,487	5,473	5,485
Carcass weight per cow (pounds)	579	583	586	590	594
Sub-total, U.S. production from cow slaughter (1,000 pounds carcass weight equivalent)	2,943,636	3,089,317	3,215,382	3,229,070	3,258,090
Bull and stag slaughter (1,000 head)	541	565	576	582	585
Carcass weight per bull or stag (pounds)	893	899	904	909	914
Sub-total, U.S. production from bull and stag slaughter (1,000 pounds carcass weight equivalent)	483,113	507,935	520,704	529,038	534,690
Total U.S. processing beef production (1,000 pounds carcass weight equivalent)	3,426,749	3,597,252	3,736,086	3,758,108	3,792,780

Source: Expert knowledge, USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007.
http://www.usda.gov/oce/commodity/ag_baseline.htm

Appendix Table 3. Cattle and bison imports from Canada projected with and without scenario 1, 2008-2012, in thousand head

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>With scenario 1</u>					
Breeding Cattle					
Dairy Cows and Heifers	48	48	47	48	48
Beef Cows and Heifers	5	5	5	5	5
Bulls	3	3	3	3	3
Subtotal	56	56	55	56	56
Slaughter Cattle					
Steers and Heifers	679	677	676	659	653
Cows	88	93	95	158	190
Bulls and Stags	16	17	18	29	35
Vealers and Light Calves	48	48	47	48	48
Subtotal	831	835	836	894	926
Stockers and Feeders	252	252	252	252	253
Total Cattle	1,139	1,143	1,143	1,202	1,235
Bison					
Breeding	1.2	1.2	1.2	1.2	1.2
For Slaughter	9.6	9.6	9.6	9.6	9.6
For Feeding	1.2	1.2	1.2	1.2	1.2
Total Bison	12	12	12	12	12
<u>Without scenario 1 (baseline)</u>					
Slaughter Cattle					
Steers and heifers	709	681	719	752	767
Vealers and Light Calves	51	49	51	54	55
Subtotal	760	730	770	806	822
Feeders	253	243	257	268	274
Total Cattle	1,013	973	1,027	1,074	1,096
Bison					
For Slaughter	9.6	9.6	9.6	9.6	9.6
For Feeding	1.2	1.2	1.2	1.2	1.2
Total Bison	10.8	10.8	10.8	10.8	10.8
(continued)					

Appendix Table 3. continued

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>Change in imports</u>					
Breeding Cattle					
Dairy Cows and Heifers	48	48	47	48	48
Beef Cows and Heifers	5	5	5	5	5
Bulls	3	3	3	3	3
Subtotal	56	56	55	56	56
Slaughter Cattle					
Steers and Heifers	-30	-4	-43	-93	-114
Cows	88	93	95	158	190
Bulls and Stags	16	17	18	29	35
Vealers and Light Calves	-3	-1	-4	-6	-7
Subtotal	71	105	66	88	104
Stockers and Feeders	-1	9	-5	-16	-21
Total Cattle	126	170	116	128	139
Bison					
Breeding	1.2	1.2	1.2	1.2	1.2
For Slaughter	0	0	0	0	0
For Feeding	0	0	0	0	0
Total Bison	1.2	1.2	1.2	1.2	1.2

Source: Expert knowledge, USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007.
http://www.usda.gov/oce/commodity/ag_baseline.htm

Appendix Table 4. Cattle and bison imports from Canada projected with and without scenario 2, 2008-2012, in thousand head

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>With scenario 2</u>					
Breeding Cattle					
Dairy Cows and Heifers	48	48	47	48	48
Beef Cows and Heifers	5	5	5	5	5
Bulls	3	3	3	3	3
Subtotal	56	56	55	56	56
Slaughter Cattle					
Steers and Heifers	590	590	590	591	594
Cows	387	387	387	388	390
Bulls and Stags	72	72	72	72	72
Vealers and Light Calves	49	49	49	49	49
Subtotal	1,098	1,098	1,098	1,100	1,106
Stockers and Feeders	252	252	252	252	253
Total Cattle	1,406	1,406	1,405	1,408	1,415
Bison					
Breeding	1.2	1.2	1.2	1.2	1.2
For Slaughter	9.6	9.6	9.6	9.6	9.6
For Feeding	1.2	1.2	1.2	1.2	1.2
Total Bison	12	12	12	12	12
<u>Without scenario 2 (baseline)</u>					
Slaughter Cattle					
Steers and heifers	709	681	719	752	767
Vealers and Light Calves	51	49	51	54	55
Subtotal	760	730	770	806	822
Feeders	253	243	257	268	274
Total Cattle	1,013	973	1,027	1,074	1,096
Bison					
For Slaughter	9.6	9.6	9.6	9.6	9.6
For Feeding	1.2	1.2	1.2	1.2	1.2
Total Bison	10.8	10.8	10.8	10.8	10.8
(continued)					

Appendix Table 4. continued

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>Change in imports</u>					
Breeding Cattle					
Dairy Cows and Heifers	48	48	47	48	48
Beef Cows and Heifers	5	5	5	5	5
Bulls	3	3	3	3	3
Subtotal	56	56	55	56	56
Slaughter Cattle					
Steers and Heifers	-119	-91	-129	-161	-173
Cows	387	387	387	388	390
Bulls and Stags	72	72	72	72	72
Vealers and Light Calves	-2	0	-2	-5	-5
Subtotal	338	368	328	294	284
Stockers and Feeders	-1	9	-5	-16	-21
Total Cattle	393	433	378	334	319
Bison					
Breeding	1.2	1.2	1.2	1.2	1.2
For Slaughter	0	0	0	0	0
For Feeding	0	0	0	0	0
Total Bison	1.2	1.2	1.2	1.2	1.2

Source: Expert knowledge, USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007.

http://www.usda.gov/oce/commodity/ag_baseline.htm

Appendix Table 5. Cattle and bison imports from Canada projected with and without scenario 3, 2008-2012, in thousand head

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>With scenario 3</u>					
Breeding Cattle					
Dairy Cows and Heifers	48	48	47	48	48
Beef Cows and Heifers	5	5	5	5	5
Bulls	3	3	3	3	3
Subtotal	56	56	55	56	56
Slaughter Cattle					
Steers and Heifers	686	685	685	672	669
Cows	63	67	68	113	136
Bulls and Stags	12	12	13	21	25
Vealers and Light Calves	49	49	49	49	49
Subtotal	810	813	815	855	879
Stockers and Feeders	252	252	252	252	253
Total Cattle	1,118	1,121	1,122	1,163	1,188
Bison					
Breeding	1.2	1.2	1.2	1.2	1.2
For Slaughter	9.6	9.6	9.6	9.6	9.6
For Feeding	1.2	1.2	1.2	1.2	1.2
Total Bison	12	12	12	12	12
<u>Without scenario 3 (baseline)</u>					
Slaughter Cattle					
Steers and heifers	709	681	719	752	767
Vealers and Light Calves	51	49	51	54	55
Subtotal	760	730	770	806	822
Feeders	253	243	257	268	274
Total Cattle	1,013	973	1,027	1,074	1,096
Bison					
For Slaughter	9.6	9.6	9.6	9.6	9.6
For Feeding	1.2	1.2	1.2	1.2	1.2
Total Bison	10.8	10.8	10.8	10.8	10.8
(continued)					

Appendix Table 5. continued

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>Change in imports</u>					
Breeding Cattle					
Dairy Cows and Heifers	48	48	47	48	48
Beef Cows and Heifers	5	5	5	5	5
Bulls	3	3	3	3	3
Subtotal	56	56	55	56	56
Slaughter Cattle					
Steers and Heifers	-23	4	-34	-80	-98
Cows	63	67	68	113	136
Bulls and Stags	12	12	13	21	25
Vealers and Light Calves	-2	0	-2	-5	-6
Subtotal	50	83	45	49	57
Stockers and Feeders	-1	9	-5	-16	-21
Total Cattle	105	148	95	89	92
Bison					
Breeding	1.2	1.2	1.2	1.2	1.2
For Slaughter	0	0	0	0	0
For Feeding	0	0	0	0	0
Total Bison	1.2	1.2	1.2	1.2	1.2

Source: Expert knowledge, USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007.

http://www.usda.gov/oce/commodity/ag_baseline.htm

Appendix Table 6. Processing beef and fed beef imports projected with and without scenario 1, 2008-2012, in million pounds carcass weight equivalent

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>With scenario 1</u>					
Processing Beef					
From Canada	0	0	0	0	0
From Other Countries	2,447	2,464	2,484	2,489	2,504
Fed Beef from Canada	924	908	944	989	1,010
<u>Without scenario 1 (baseline)</u>					
Processing Beef					
From Canada	0	0	0	0	0
From Other Countries	2,466	2,484	2,504	2,523	2,544
Fed Beef from Canada	900	905	909	914	918
<u>Change in imports</u>					
Processing Beef					
From Canada	0	0	0	0	0
From Other Countries	-19	-20	-20	-34	-40
Fed Beef from Canada	24	3	35	75	92

Source: Expert knowledge, USDA ERS, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch.

Note that the decline in processing beef imports from other countries in scenario 1 would be due to displacement by processing beef derived from imports of Canadian cull cattle. Twenty-five percent of cull cattle imports from Canada are projected to displace processing beef imports from other countries. Cull cattle imports in thousand head (Appendix Table 3) are converted to processing beef in thousand pounds, carcass weight equivalent, by using cow and bull/stag carcass weights for cattle imports from Canada of 665 pounds per head and 1,010 pounds per head, respectively. These carcass weights are kept constant across the five years to account for projected increases in grain prices. Quantities are expressed in million pounds by dividing by 1,000. The conversion of cull cattle imports from Canada to processing beef and projected changes in processing beef imports from other countries are further detailed in Appendix Table 9. Increases in fed beef imports from Canada in this scenario are based on the projected declines in steer and heifer imports, as shown in Appendix Table 3.

Appendix Table 7. Processing beef and fed beef imports projected with and without scenario 2, 2008-2012, in million pounds carcass weight equivalent

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>With scenario 2</u>					
Processing Beef					
From Canada	0	0	0	0	0
From Other Countries	2,383	2,401	2,421	2,440	2,461
Fed Beef from Canada	996	979	1,014	1,045	1,058
<u>Without scenario 2 (baseline)</u>					
Processing Beef					
From Canada	0	0	0	0	0
From Other Countries	2,466	2,484	2,504	2,523	2,544
Fed Beef from Canada	900	905	909	914	918
<u>Change in imports</u>					
Processing Beef					
From Canada	0	0	0	0	0
From Other Countries	-83	-83	-83	-83	-83
Fed Beef from Canada	96	74	105	131	140

Source: Expert knowledge, USDA ERS, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch.

Note that the decline in processing beef imports from other countries in scenario 2 would be due to displacement by processing beef derived from imports of Canadian cull cattle. Twenty-five percent of cull cattle imports from Canada are projected to displace processing beef imports from other countries. Cull cattle imports in thousand head (Appendix Table 4) are converted to processing beef in thousand pounds, carcass weight equivalent, by using cow and bull/stag carcass weights for cattle imports from Canada of 665 pounds per head and 1,010 pounds per head, respectively. These carcass weights are kept constant across the five years to account for projected increases in grain prices. Quantities are expressed in million pounds by dividing by 1,000. The conversion of cull cattle imports from Canada to processing beef and projected changes in processing beef imports from other countries are further detailed in Appendix Table 9. Increases in fed beef imports from Canada in this scenario are based on the projected declines in steer and heifer imports, as shown in Appendix Table 4.

Appendix Table 8. Processing beef and fed beef imports projected with and without scenario 3, 2008-2012, in million pounds carcass weight equivalent

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>With scenario 3</u>					
Processing Beef					
From Canada	277	273	272	234	217
From Other Countries	2,383	2,401	2,421	2,440	2,461
Fed Beef from Canada	918	902	937	979	997
<u>Without scenario 3 (baseline)</u>					
Processing Beef					
From Canada	0	0	0	0	0
From Other Countries	2,466	2,484	2,504	2,523	2,544
Fed Beef from Canada	900	905	909	914	918
<u>Change in imports</u>					
Processing Beef					
From Canada	277	273	272	234	217
From Other Countries	-83	-83	-83	-83	-83
Fed Beef from Canada	18	-3	28	65	79

Source: Expert knowledge, USDA ERS, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch.

Note that the decline in processing beef imports from other countries in scenario 3 would be due to displacement by cull cattle and processing beef imports from Canada. Twenty-five percent of cull cattle and processing beef imports from Canada are projected to displace processing beef imports from other countries. Cull cattle imports in thousand head (Appendix Table 5) are converted to processing beef in thousand pounds, carcass weight equivalent, by using cow and bull/stag carcass weights for cattle imports from Canada of 665 pounds per head and 1,010 pounds per head, respectively. These carcass weights are kept constant across the five years to account for projected increases in grain prices. Projected processing beef imports from Canada are based on the difference between cull cattle imports under scenarios 2 and 3, multiplied by the same average carcass weights. Quantities are expressed in million pounds by dividing by 1,000. The conversion of cull cattle imports from Canada to processing beef and projected changes in processing beef imports from other countries are further detailed in Appendix Table 9. Increases in fed beef imports from Canada in this scenario are based on the projected declines in steer and heifer imports (other than in 2009), as shown in Appendix Table 5.

Appendix Table 9: continued.

Appendix Table 9: Changes in imports of processing beef, including cull cattle imports from Canada converted to processing beef, under import scenarios 1, 2, and 3, 2008-2012, in 1,000 pounds carcass weight equivalent	2008	2009	2010	2011	2012
Projected quantity of processing beef imports from other countries displaced by imports from Canada ⁷	2,088	2,088	2,088	2,083	2,083
Scenario 1					
Net imports from other countries ⁸	2,383	2,401	2,421	2,440	2,461
Cull cattle imports from Canada (1,000 head) ¹	104	110	113	187	225
Total imports under scenario 2	2,714	2,732	2,752	2,771	2,793
Cull cattle imports converted to processing beef ²	2,466	2,484	2,504	2,523	2,544
Total baseline imports	2,466	2,484	2,504	2,523	2,544
Processing beef imports from Canada	248	248	248	248	249
Percentage increase in imports under scenario 2 from Canada	10.0% 75	10.0% 79	9.9% 81	9.8% 134	9.8% 162
Scenario 3					
Projected quantity of processing beef imports from other countries displaced by imports from Canada ⁹	19	20	20	34	40
Cull cattle imports from Canada (1,000 head) ⁹	75	79	81	134	161
Net imports from other countries ⁴	2,447	2,464	2,484	2,488	2,504
Cull cattle imports converted to processing beef ²	2,466	2,484	2,504	2,523	2,544
Total imports under scenario 1	2,522	2,543	2,565	2,624	2,665
Processing beef imports from Canada ¹⁰	277	273	272	234	217
Total baseline imports ⁵	2,466	2,484	2,504	2,523	2,544
Combined cull cattle and processing beef imports from Canada	331	330	331	331	332
Percentage increase in imports under scenario 1	2.3%	2.4%	2.4%	4.0%	4.8%
Projected quantity of processing beef imports from other countries displaced by imports from Canada ¹¹	83	83	83	83	83
Scenario 2					
Net imports from other countries ¹²	2,383	2,401	2,421	2,440	2,461
Cull cattle imports from Canada (1,000 head) ⁶	459	459	459	460	462
Total imports under scenario 3	2,714	2,732	2,752	2,771	2,793
Cull cattle imports converted to processing beef ²	2,466	2,484	2,504	2,523	2,544
Total baseline imports ⁵	2,466	2,484	2,504	2,523	2,544
Processing beef imports from Canada	0	0	0	0	0
Increase in imports under scenario 3	248	248	248	248	249
Combined cull cattle and processing beef imports from Canada	330	330	330	331	332
Percentage increase in imports under scenario 3	10.1%	10.0%	9.9%	9.8%	9.8%

Notes to Appendix Table 9:

¹Imported cows, bulls, and stags, as shown in Appendix Table 3.

²Imports of cows, bulls, and stags in thousand head are converted to processing beef in thousand pounds carcass weight equivalent, using cow and bull/stag carcass weights for cattle imports from Canada of 665 pounds per head and 1,010 pounds per head, respectively. These carcass weights are kept constant across the five years to account for projected increases in grain prices. Quantities are expressed in million pounds by dividing by 1,000.

³Twenty-five percent of cull cattle imports from Canada are estimated to displace processing beef imports from other countries.

⁴Processing beef imports from other countries, as shown in Appendix Table 6, reduced by the quantity displaced by cull cattle imports from Canada.

⁵Baseline processing beef imports shown in Appendix Tables 6, 7, and 8.

⁶Imported cows, bulls, and stags, as shown in Appendix Table 4.

⁷Twenty-five percent of cull cattle imports from Canada are estimated to displace processing beef imports from other countries.

⁸Processing beef imports from other countries, as shown in Appendix Table 7, reduced by the quantity displaced by cull cattle imports from Canada

⁹Imported cows, bulls, and stags, as shown in Appendix Table 5.

¹⁰Projected processing beef imports from Canada, shown in Appendix Table 8.

¹¹Twent-five percent of cull cattle and processing beef imports from Canada are estimated to displace processing beef imports from other countries.

¹²Processing beef imports from other countries, as shown in Appendix Table 8, reduced by the quantity displaced by cull cattle imports and processing beef imports from Canada.

Appendix Table 10. Cull cattle/processing beef: welfare and price changes in scenario 1, assuming projected displacement of processing beef imports from other countries by cull cattle imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	63,163	67,904	71,090	117,915	137,289	457,361	
Producer Surplus	-36,489	-39,898	-42,278	-69,773	-81,101	-269,538	
Net	26,674	28,007	28,812	48,141	56,188	187,823	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	61,323	64,006	65,057	104,766	118,427	413,580	90,307
Producer Surplus	-35,426	-37,607	-38,690	-61,993	-69,959	-243,675	-53,207
Net	25,897	26,399	26,367	42,773	48,468	169,905	37,100
2001 Dollars							
Consumer Surplus	53,965	57,171	57,622	92,793	105,655	367,205	80,181
Producer Surplus	-31,175	-33,591	-34,268	-54,908	-62,414	-216,356	-47,242
Net	22,790	23,580	23,354	37,885	43,241	150,849	32,939
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	59,031	59,310	58,031	89,957	97,885	364,214	88,828
Producer Surplus	-34,101	-34,848	-34,511	-53,230	-57,824	-214,515	-52,318
Net	24,929	24,462	23,519	36,727	40,061	149,699	36,510
2001 Dollars							
Consumer Surplus	51,947	52,976	51,398	79,676	87,329	323,327	78,857
Producer Surplus	-30,009	-31,126	-30,567	-47,146	-51,588	-190,437	-46,446
Net	21,938	21,850	20,831	32,530	35,741	132,889	32,411
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$1.07	-\$1.11	-\$1.14	-\$1.87	-\$2.16	-\$1.47	
Percentage Price Changes	-1.1%	-1.1%	-1.1%	-1.8%	-2.1%	-1.4%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Prices are in carcass weight equivalent. Welfare changes may not sum due to rounding.

Appendix Table 11. Feeder cattle: welfare and price changes for all four import scenarios, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	-576	5,113	-2,884	-9,497	-12,250	-20,093	
Producer Surplus	546	-4,862	2,743	9,024	11,633	19,084	
Net	-29	251	-141	-473	-617	-1,009	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	-559	4,820	-2,639	-8,438	-10,567	-17,383	-3,795
Producer Surplus	530	-4,583	2,510	8,018	10,035	16,510	3,605
Net	-28	237	-129	-420	-532	-873	-190
2001 Dollars							
Consumer Surplus	-494	4,268	-2,345	-7,513	-9,431	-15,515	-3,388
Producer Surplus	469	-4,058	2,230	7,139	8,956	14,736	3,218
Net	-25	209	-115	-374	-475	-779	-170
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	-538	4,466	-2,354	-7,245	-8,734	-14,405	-3,513
Producer Surplus	511	-4,247	2,239	6,884	8,294	13,681	3,337
Net	-27	219	-115	-361	-440	-724	-176
2001 Dollars							
Consumer Surplus	-476	3,954	-2,092	-6,451	-7,795	-12,859	-3,136
Producer Surplus	451	-3,760	1,989	6,130	7,403	12,213	2,979
Net	-24	194	-102	-321	-393	-646	-157
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per head)	\$0.02	-\$0.16	\$0.09	\$0.29	\$0.38	\$0.12	
Percentage Price Changes	nil	nil	nil	nil	0.1%	nil	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Appendix Table 12. Fed cattle: welfare and price changes in scenario 1, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	-23,051	-3,230	-35,425	-76,554	-91,426	-229,687	
Producer Surplus	22,499	3,156	34,593	74,731	89,226	224,206	
Net	-553	-74	-832	-1,823	-2,199	-5,481	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	-22,380	-3,045	-32,419	-68,017	-78,864	-204,726	-44,703
Producer Surplus	21,843	2,975	31,658	66,398	76,967	199,841	43,636
Net	-537	-70	-762	-1,620	-1,897	-4,885	-1,066
2001 Dollars							
Consumer Surplus	-19,799	-2,700	-28,817	-60,574	-70,438	-182,327	-39,812
Producer Surplus	19,324	2,638	28,140	59,132	68,743	177,977	38,862
Net	-475	-62	-677	-1,442	-1,694	-4,350	-950
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	-21,543	-2,821	-28,918	-58,403	-65,185	-176,870	-43,137
Producer Surplus	21,027	2,757	28,238	57,012	63,617	172,651	42,108
Net	-517	-65	-679	-1,391	-1,568	-4,219	-1,029
2001 Dollars							
Consumer Surplus	-19,058	-2,502	-25,705	-52,012	-58,220	-157,496	-38,412
Producer Surplus	18,601	2,444	25,101	50,773	56,820	153,739	37,496
Net	-457	-57	-604	-1,238	-1,401	-3,757	-916
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per head)	\$0.80	\$0.11	\$1.19	\$2.58	\$3.10	\$1.56	
Percentage Price Changes	0.1%	nil	0.1%	0.2%	0.3%	0.1%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Appendix Table 13. Fed beef: welfare and price changes in scenario 1, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	24,423	3,200	38,588	83,797	100,854	250,861	
Producer Surplus	-23,409	-3,072	-37,013	-80,287	-96,573	-240,353	
Net	1,014	128	1,575	3,510	4,281	10,508	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	23,712	3,016	35,313	74,452	86,998	223,491	48,800
Producer Surplus	-22,727	-2,895	-33,872	-71,334	-83,305	-214,132	-46,757
Net	985	121	1,441	3,118	3,693	9,358	2,044
2001 Dollars							
Consumer Surplus	20,893	2,674	31,212	65,916	77,394	198,090	43,254
Producer Surplus	-20,025	-2,567	-29,938	-63,155	-74,109	-189,795	-41,442
Net	868	107	1,274	2,761	3,285	8,295	1,811
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	22,825	2,795	31,499	63,928	71,908	192,955	47,060
Producer Surplus	-21,877	-2,683	-30,213	-61,250	-68,855	-184,879	-45,090
Net	948	112	1,286	2,678	3,052	8,076	1,970
2001 Dollars							
Consumer Surplus	20,112	2,478	27,841	56,599	63,970	170,999	41,705
Producer Surplus	-19,276	-2,379	-26,705	-54,228	-61,254	-163,842	-39,959
Net	835	99	1,136	2,371	2,715	7,157	1,746
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$0.11	-\$0.01	-\$0.17	-\$0.37	-\$0.44	-\$0.22	
Percentage Price Changes	-0.1%	nil	-0.1%	-0.2%	-0.3%	-0.1%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Prices are in carcass weight equivalent. Welfare changes may not sum due to rounding.

Appendix Table 14. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 1, assuming projected displacement of processing beef imports from other countries by cull cattle imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	63,959	72,987	71,369	115,661	134,467	458,442	
Producer Surplus	-36,853	-44,676	-41,955	-66,305	-76,815	-266,601	
Net	27,106	28,312	29,414	49,355	57,653	191,841	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	62,096	68,797	65,312	102,763	115,994	414,962	90,609
Producer Surplus	-35,780	-42,110	-38,394	-58,911	-66,262	-241,456	-52,723
Net	26,317	26,687	26,917	43,851	49,732	173,505	37,888
2001 Dollars							
Consumer Surplus	54,565	61,413	57,672	90,622	103,180	367,453	80,235
Producer Surplus	-31,407	-37,578	-33,836	-51,792	-58,824	-213,438	-46,604
Net	23,158	23,834	23,836	38,830	44,357	154,015	33,630
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	59,775	63,750	58,258	88,237	95,874	365,894	89,238
Producer Surplus	-34,440	-39,021	-34,247	-50,584	-54,768	-213,062	-51,963
Net	25,333	24,728	24,011	37,653	41,105	152,832	37,275
2001 Dollars							
Consumer Surplus	52,525	56,906	51,442	77,812	85,284	323,971	79,014
Producer Surplus	-30,233	-34,821	-30,182	-44,471	-48,619	-188,327	-45,930
Net	22,292	22,086	21,261	33,342	36,662	135,643	33,084

Note: Welfare changes are computed using the BAS model, as described in section 2. They are the sum of the partial equilibrium changes shown in Appendix Tables 10-13.

Appendix Table 15. Cull cattle/processing beef: welfare and price changes in scenario 2, assuming projected displacement of processing beef imports from other countries by cull cattle imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	281,769	287,402	290,936	291,030	283,780	1,434,916	
Producer Surplus	-159,092	-165,253	-169,476	-169,445	-165,312	-828,578	
Net	122,677	122,149	121,459	121,585	118,468	606,338	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	273,562	270,904	266,247	258,576	244,791	1,314,081	286,936
Producer Surplus	-154,459	-155,767	-155,095	-150,550	-142,599	-758,469	-165,615
Net	119,104	115,137	111,153	108,027	102,191	555,611	121,320
2001 Dollars							
Consumer Surplus	240,735	241,973	235,819	229,025	218,392	1,165,943	254,589
Producer Surplus	-135,924	-139,131	-137,370	-133,344	-127,221	-672,990	-146,950
Net	104,811	102,841	98,449	95,681	91,171	492,953	107,639
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	263,335	251,028	237,490	222,025	202,331	1,176,210	286,867
Producer Surplus	-148,684	-144,338	-138,343	-129,269	-117,865	-678,500	-165,480
Net	114,651	106,690	99,147	92,756	84,466	497,710	121,387
2001 Dollars							
Consumer Surplus	231,735	224,219	210,348	196,651	180,511	1,043,465	254,492
Producer Surplus	-130,842	-128,924	-122,532	-114,495	-105,154	-601,948	-146,809
Net	100,893	95,296	87,816	82,156	75,357	441,517	107,682
						<u>Five-year Average</u>	
Price Changes in 2007 Dollars (dollars per cwt)	-\$4.74	-\$4.68	-\$4.62	-\$4.59	-\$4.44	-\$4.61	
Percentage Price Changes	-4.7%	-4.5%	-4.4%	-4.4%	-4.4%	-4.5%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Prices are in carcass weight equivalent. Welfare changes may not sum due to rounding.

Appendix Table 16. Fed cattle: welfare and price changes in scenario 2, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	-91,359	-73,429	-106,191	-132,444	-138,665	-542,087	
Producer Surplus	89,307	71,856	103,848	129,440	135,466	529,917	
Net	-2,052	-1,573	-2,343	-3,004	-3,199	-12,170	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	-88,698	-69,214	-97,180	-117,675	-119,614	-492,380	-107,513
Producer Surplus	86,706	67,731	95,036	115,006	116,854	481,333	105,101
Net	-1,993	-1,483	-2,144	-2,669	-2,759	-11,047	-2,412
2001 Dollars							
Consumer Surplus	-78,467	-61,370	-86,382	-104,798	-106,833	-437,849	-95,606
Producer Surplus	76,704	60,055	84,476	102,421	104,369	428,025	93,461
Net	-1,763	-1,315	-1,906	-2,377	-2,465	-9,824	-2,145
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	-85,382	-64,135	-86,683	-101,041	-98,866	-436,108	-106,363
Producer Surplus	83,464	62,762	84,771	98,749	96,586	426,332	103,979
Net	-1,918	-1,374	-1,912	-2,291	-2,281	-9,776	-2,384
2001 Dollars							
Consumer Surplus	-75,534	-56,867	-77,052	-89,984	-88,302	-387,739	-94,566
Producer Surplus	73,837	55,649	75,352	87,943	86,265	379,046	92,446
Net	-1,697	-1,218	-1,700	-2,041	-2,037	-8,692	-2,120
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per head)	\$3.16	\$2.47	\$3.58	\$4.47	\$4.70	\$3.68	
Percentage Price Changes	0.3%	0.2%	0.3%	0.4%	0.4%	0.3%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Appendix Table 17. Fed beef: welfare and price changes in scenario 2, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	97,760	78,981	115,839	146,442	153,543	592,565	
Producer Surplus	-93,542	-75,693	-110,936	-140,131	-146,866	-567,168	
Net	4,218	3,288	4,903	6,311	6,677	25,397	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	94,913	74,447	106,009	130,111	132,447	537,928	117,459
Producer Surplus	-90,818	-71,348	-101,522	-124,504	-126,688	-514,880	-112,426
Net	4,095	3,099	4,487	5,607	5,759	23,048	5,033
2001 Dollars							
Consumer Surplus	83,630	66,010	93,698	115,194	117,827	476,359	104,015
Producer Surplus	-80,021	-63,262	-89,732	-110,230	-112,703	-455,949	-99,558
Net	3,608	2,748	3,966	4,964	5,124	20,410	4,457
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	91,365	68,985	94,559	111,720	109,474	476,103	116,117
Producer Surplus	-87,423	-66,113	-90,557	-106,905	-104,714	-455,711	-111,144
Net	3,942	2,872	4,003	4,815	4,760	20,391	4,973
2001 Dollars							
Consumer Surplus	80,503	61,167	83,578	98,911	97,389	421,548	102,812
Producer Surplus	-77,030	-58,620	-80,040	-94,648	-93,154	-403,493	-98,408
Net	3,473	2,546	3,538	4,263	4,235	18,055	4,404
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$0.44	-\$0.35	-\$0.51	-\$0.64	-\$0.68	-\$0.52	
Percentage Price Changes	-0.3%	-0.2%	-0.3%	-0.4%	-0.4%	-0.3%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Prices are in carcass weight equivalent. Welfare changes may not sum due to rounding.

Appendix Table 18. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 2, assuming projected displacement of processing beef imports from other countries by cull cattle imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	287,594	298,067	297,700	295,531	286,408	1,465,301	
Producer Surplus	-162,781	-173,952	-173,821	-171,112	-165,079	-846,745	
Net	124,814	124,115	123,878	124,419	121,329	618,556	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	279,218	280,957	272,437	262,574	247,057	1,342,246	293,087
Producer Surplus	-158,041	-163,967	-159,071	-152,030	-142,398	-775,506	-169,335
Net	121,178	116,990	113,367	110,545	104,659	566,739	123,751
2001 Dollars							
Consumer Surplus	245,404	250,881	240,790	231,908	219,955	1,188,938	259,610
Producer Surplus	-138,772	-146,396	-140,396	-134,014	-126,599	-686,178	-149,829
Net	106,631	104,483	100,394	97,894	93,355	502,760	109,781
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	268,780	260,344	243,012	225,459	204,205	1,201,800	293,108
Producer Surplus	-152,132	-151,936	-141,890	-130,541	-117,699	-694,198	-169,308
Net	116,648	108,407	101,123	94,919	86,505	507,601	123,800
2001 Dollars							
Consumer Surplus	236,228	232,473	214,782	199,127	181,803	1,064,415	259,602
Producer Surplus	-133,584	-135,655	-125,231	-115,070	-104,640	-614,182	-149,792
Net	102,645	96,818	89,552	84,057	77,162	450,234	109,809

Note: Welfare changes are computed using the BAS model, as described in section 2. They are the sum of the partial equilibrium changes shown in Appendix Tables 11 and 15-17.

Appendix Table 19. Cull cattle/processing beef: welfare and price changes in scenario 3, assuming projected displacement of processing beef imports from other countries by cull cattle and processing beef imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	281,769	286,233	290,936	291,030	284,929	1,434,896	
Producer Surplus	-159,092	-164,600	-169,476	-169,445	-165,963	-828,576	
Net	122,677	121,633	121,459	121,585	118,966	606,320	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	273,562	269,802	266,247	258,576	245,783	1,313,970	286,912
Producer Surplus	-154,459	-155,151	-155,095	-150,550	-143,161	-758,415	-165,603
Net	119,104	114,651	111,153	108,027	102,621	555,555	121,308
2001 Dollars							
Consumer Surplus	240,735	240,988	235,819	229,025	219,277	1,165,843	254,567
Producer Surplus	-135,924	-138,581	-137,370	-133,344	-127,722	-672,941	-146,940
Net	104,811	102,407	98,449	95,681	91,554	492,902	107,628
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	263,335	250,007	237,490	222,025	203,151	1,176,008	286,818
Producer Surplus	-148,684	-143,768	-138,343	-129,269	-118,330	-678,393	-165,454
Net	114,651	106,239	99,147	92,756	84,821	497,615	121,364
2001 Dollars							
Consumer Surplus	231,735	223,307	210,348	196,651	181,242	1,043,284	254,447
Producer Surplus	-130,842	-128,414	-122,532	-114,495	-105,569	-601,852	-146,786
Net	100,893	94,893	87,816	82,156	75,674	441,432	107,661
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$4.74	-\$4.66	-\$4.62	-\$4.59	-\$4.46	-\$4.61	
Percentage Price Changes	-4.7%	-4.5%	-4.4%	-4.4%	-4.4%	-4.5%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Prices are in carcass weight equivalent. Welfare changes may not sum due to rounding.

Appendix Table 20. Fed cattle: welfare and price changes in scenario 3, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	-17,674	3,231	-28,013	-65,861	-78,606	-186,923	
Producer Surplus	17,248	-3,156	27,351	64,278	76,694	182,415	
Net	-426	74	-662	-1,582	-1,912	-4,508	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	-17,159	3,045	-25,636	-58,516	-67,806	-166,073	-36,263
Producer Surplus	16,746	-2,975	25,030	57,110	66,157	162,068	35,388
Net	-414	70	-606	-1,406	-1,649	-4,005	-874
2001 Dollars							
Consumer Surplus	-15,180	2,700	-22,788	-52,113	-60,561	-147,942	-32,304
Producer Surplus	14,814	-2,638	22,249	50,861	59,088	144,374	31,525
Net	-366	62	-539	-1,252	-1,473	-3,568	-779
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	-16,518	2,822	-22,867	-50,245	-56,045	-142,853	-34,840
Producer Surplus	16,120	-2,757	22,327	49,038	54,682	139,409	34,001
Net	-398	65	-541	-1,207	-1,363	-3,444	-840
2001 Dollars							
Consumer Surplus	-14,612	2,502	-20,326	-44,747	-50,056	-127,240	-31,032
Producer Surplus	14,260	-2,444	19,846	43,671	48,839	124,172	30,285
Net	-352	58	-481	-1,075	-1,218	-3,068	-748
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per head)	\$0.61	-\$0.11	\$0.94	\$2.22	\$2.66	\$1.27	
Percentage Price Changes	0.1%	nil	0.1%	0.2%	0.2%	0.1%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Welfare changes may not sum due to rounding.

Appendix Table 21. Fed beef: welfare and price changes in scenario 3, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	18,316	-3,200	30,868	72,617	86,592	205,194	
Producer Surplus	-17,558	3,072	-29,613	-69,591	-82,941	-196,631	
Net	758	-128	1,255	3,026	3,651	8,563	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	17,783	-3,016	28,249	64,519	74,695	182,230	39,791
Producer Surplus	-17,046	2,895	-27,100	-61,831	-71,546	-174,628	-38,131
Net	736	-121	1,149	2,688	3,150	7,602	1,660
2001 Dollars							
Consumer Surplus	15,669	-2,674	24,968	57,122	66,450	161,535	35,272
Producer Surplus	-15,020	2,567	-23,953	-54,742	-63,648	-154,795	-33,800
Net	649	-107	1,015	2,380	2,802	6,739	1,472
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	17,118	-2,795	25,198	55,399	61,739	156,659	38,208
Producer Surplus	-16,409	2,683	-24,173	-53,091	-59,136	-150,126	-36,614
Net	709	-112	1,025	2,308	2,603	6,533	1,594
2001 Dollars							
Consumer Surplus	15,083	-2,478	22,271	49,048	54,924	138,848	33,864
Producer Surplus	-14,458	2,379	-21,366	-47,004	-52,608	-133,057	-32,451
Net	624	-99	906	2,044	2,316	5,791	1,412
							<u>Five-year Average</u>
Price Changes in 2007 Dollars (dollars per cwt)	-\$0.08	\$0.01	-\$0.14	-\$0.32	-\$0.38	-\$0.18	
Percentage Price Changes	-0.1%	nil	-0.1%	-0.2%	-0.2%	-0.1%	

Note: Welfare and price changes are computed using the BAS model, as described in section 2. Prices are in carcass weight equivalent. Welfare changes may not sum due to rounding.

Appendix Table 22. Combined (cull cattle/processing beef, feeder cattle, fed cattle, and fed beef) welfare changes in scenario 3, assuming projected displacement of processing beef imports from other countries by cull cattle and processing beef imports from Canada, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Five-year Total</u>	<u>Annual- ized Value</u>
Thousand Dollars							
Undiscounted Welfare Changes							
2007 Dollars							
Consumer Surplus	281,835	291,377	290,907	288,289	280,665	1,433,074	
Producer Surplus	-158,856	-169,546	-168,995	-165,734	-160,577	-823,708	
Net	122,980	121,830	121,911	122,556	120,088	609,366	
Discounted Welfare Changes (3%)							
2007 Dollars							
Consumer Surplus	273,627	274,651	266,221	256,141	242,105	1,312,744	286,645
Producer Surplus	-154,229	-159,814	-154,655	-147,253	-138,515	-754,465	-164,741
Net	119,398	114,837	111,567	108,889	103,590	558,280	121,904
2001 Dollars							
Consumer Surplus	240,730	245,282	235,654	226,521	215,735	1,163,921	254,147
Producer Surplus	-135,661	-142,710	-136,844	-130,086	-123,326	-668,626	-145,997
Net	105,069	102,571	98,810	96,435	92,408	495,294	108,151
Discounted Welfare Changes (7%)							
2007 Dollars							
Consumer Surplus	263,397	254,500	237,467	219,934	200,111	1,175,409	254,147
Producer Surplus	-148,462	-148,089	-137,950	-126,438	-114,490	-675,429	-145,997
Net	114,935	106,411	99,516	93,496	85,621	499,980	108,151
2001 Dollars							
Consumer Surplus	231,730	227,285	210,201	194,501	178,315	1,042,033	254,143
Producer Surplus	-130,589	-132,239	-122,063	-111,698	-101,935	-598,524	-145,973
Net	101,141	95,046	88,139	82,804	76,379	443,509	108,168

Note: Welfare changes are computed using the BAS model, as described in section 2. They are the sum of the partial equilibrium changes shown in Appendix Tables 11 and 19-21.

Appendix Table 23. Cattle and bison imports from Canada projected with and without scenario 4, 2008-2012, in thousand head

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>With scenario 4</u>					
Breeding Cattle					
Dairy Cows and Heifers	48	48	47	48	48
Beef Cows and Heifers	5	5	5	5	5
Bulls	3	3	3	3	3
Subtotal	56	56	55	56	56
Slaughter Cattle					
Steers and Heifers	623	623	623	623	627
Cows	277	277	276	277	278
Bulls and Stags	51	51	51	51	52
Vealers and Light Calves	49	49	49	49	49
Subtotal	1,000	1,000	999	1,000	1,006
Stockers and Feeders	252	252	252	252	253
Total Cattle	1,308	1,308	1,306	1,308	1,315
Bison					
Breeding	1.2	1.2	1.2	1.2	1.2
For Slaughter	9.6	9.6	9.6	9.6	9.6
For Feeding	1.2	1.2	1.2	1.2	1.2
Total Bison	12	12	12	12	12
<u>Without scenario 4 (baseline)</u>					
Slaughter Cattle					
Steers and heifers	709	681	719	752	767
Vealers and Light Calves	51	49	51	54	55
Subtotal	760	730	770	806	822
Feeders	253	243	257	268	274
Total Cattle	1,013	973	1,027	1,074	1,096
Bison					
For Slaughter	9.6	9.6	9.6	9.6	9.6
For Feeding	1.2	1.2	1.2	1.2	1.2
Total Bison	10.8	10.8	10.8	10.8	10.8
(continued)					

Appendix Table 23. continued

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>Change in imports</u>					
Breeding Cattle					
Dairy Cows and Heifers	48	48	47	48	48
Beef Cows and Heifers	5	5	5	5	5
Bulls	3	3	3	3	3
Subtotal	56	56	55	56	56
Slaughter Cattle					
Steers and Heifers	-86	-58	-96	-129	-140
Cows	277	277	276	277	278
Bulls and Stags	51	51	51	51	52
Vealers and Light Calves	-2	0	-2	-5	-6
Subtotal	240	270	229	194	184
Stockers and Feeders	-1	9	-5	-16	-21
Total Cattle	295	335	279	234	219
Bison					
Breeding	1.2	1.2	1.2	1.2	1.2
For Slaughter	0	0	0	0	0
For Feeding	0	0	0	0	0
Total Bison	1.2	1.2	1.2	1.2	1.2

Source: Expert knowledge, USDA Economic Research Service, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch. Based on "USDA Agricultural Baseline Projections to 2016," United States Department of Agriculture, Interagency Agricultural Projections Committee, Baseline Report OCE-2007-1, February 2007.

http://www.usda.gov/oce/commodity/ag_baseline.htm

Appendix Table 24. Processing beef and fed beef imports projected with and without scenario 4, 2008-2012, in million pounds carcass weight equivalent

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
<u>With scenario 4</u>					
Processing Beef					
From Canada	94	94	94	94	95
From Other Countries	2,383	2,401	2,422	2,440	2,461
Fed Beef from Canada	970	952	987	1,018	1,032
<u>Without scenario 4 (baseline)</u>					
Processing Beef					
From Canada	0	0	0	0	0
From Other Countries	2,466	2,484	2,504	2,523	2,544
Fed Beef from Canada	900	905	909	914	918
<u>Change in imports</u>					
Processing Beef					
From Canada	277	273	272	234	217
From Other Countries	-83	-83	-82	-83	-83
Fed Beef from Canada	70	47	78	104	114

Source: Expert knowledge, USDA ERS, Market and Trade Economics Division, Animal Products, Grains, and Oil Seeds Branch.

Note that the decline in processing beef imports from other countries in scenario 4 would be due to displacement by cull cattle and processing beef imports from Canada. Twenty-five percent of cull cattle and processing beef imports from Canada are projected to displace processing beef imports from other countries. Cull cattle imports in thousand head (Appendix Table 23) are converted to processing beef in thousand pounds, carcass weight equivalent, by using cow and bull/stag carcass weights for cattle imports from Canada of 665 pounds per head and 1,010 pounds per head, respectively. These carcass weights are kept constant across the five years to account for projected increases in grain prices.

Appendix Table 25. Comparison of projected cattle and beef imports from Canada under scenarios 3 and 4, million pounds carcass weight equivalent, 2008-2012

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Annual Average</u>
<u>Cattle imports converted to beef</u>						
Scenario 3						
Cows	42	45	45	75	90	59
Bulls/stags	12	12	13	21	25	17
Steers/heifers	536	538	542	534	535	537
Scenario 4						
Cows	184	184	184	185	184	184
Bulls/stags	52	52	52	53	52	52
Steers/heifers	487	490	493	495	502	493
Scenario 3 minus scenario 4						
Cows	-142	-140	-138	-109	-94	-125
Bulls/stags	-39	-39	-38	-30	-27	-35
Steers/heifers	49	49	49	39	34	44
<u>Beef imports</u>						
Scenario 3						
Processing beef	277	273	272	234	217	255
Fed beef	918	902	937	979	997	947
Scenario 4						
Processing beef	94	94	94	94	95	94
Fed beef	970	952	987	1,018	1,032	992
Scenario 3 minus scenario 4						
Processing beef	183	179	178	140	122	160
Fed beef	-52	-50	-50	-39	-35	-45
<u>Differences between scenario 3 and scenario 4 for combined cattle and beef imports</u>						
Processing beef	1.30	-0.04	1.30	0.64	0.30	0.70
Fed beef	-2.80	-1.27	-0.96	-0.05	-1.40	-1.29
<u>Differences in imports as a percentage of scenario 3 imports</u>						
Processing beef	0.4%	0.0%	0.4%	0.2%	0.1%	0.2%
Fed beef	-0.2%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%

Note: Imports of cows, bulls, and stags are converted to processing beef using cow and bull/stag carcass weights of 665 pounds per head and 1,010 pounds per head, respectively. Imports of steers and heifers are converted to their fed beef carcass weight equivalent by multiplying by the following projected yield ratios: 2008, 0.781; 2009, 0.786; 2010, 0.791; 2011, 0.795; and 2012, 0.800. Projected cattle imports for scenario 3 are shown in Appendix Table 5. Projected cattle imports for scenario 4 are shown in Appendix Table 23.