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The expansion of large livestock farms between 1991 and 2001

By Martin S. Beaulieu

Over the last few years, the rapid expansion of large livestock¹ operations has fuelled heated debates in many rural communities across Canada. Proposals for new hog operations, among others, have encountered vocal opposition from neighbours and residents in the community.

On one hand, promoters defended the economic value of their project claiming that good farming practices and improved technology minimizes the potential risk of nuisance and pollution.

On the other hand, opponents raised concerns about the reduction of their quality of life associated with large livestock operations, especially hog farms. They fear being driven out of their homes by strong odours or worry about accidental contamination of ground water in surrounding areas, as in Walkerton, Ontario. And still others are upset by prospects of added truck traffic, dust and noise resulting from feed and livestock transportation.

The semi-annual print version of *Vista on the Agri-Food Industry and the Farm Community*, catalogue no. 21-004-XPB, consists of the content or a summary of the previous issue/s of the Internet version (Catalogue no. 21-004-XIE).

It contains articles highlighting statistical insights on themes relating to agriculture, food and environmental issues. In addition, there are current indicators of agricultural activity, a list of subject matter contacts and a schedule of upcoming statistical releases.

¹ For simplicity, livestock: includes all animal farms, including poultry.

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Canada owes the success of its statistical system to a long-standing co-operation between Statistics Canada, the citizens of Canada, its businesses and governments. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Special thanks to: John Flanders and José Bourdeau.

Symbols

The following standard symbols are used in Statistics Canada publications :

- . not available for any reference period
- not available for a specific reference period
- ... not applicable
- p preliminary
- r revised
- x confidential
- E use with caution
- F too unreliable to be published

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New data show that the number of larger livestock operations is on the rise, and the number of animals on these larger operations is soaring. Using data from the 1991 and 2001 Censuses of Agriculture, this article examines how livestock farms have expanded within some of Canada's more intensely settled rural areas.

Populations of cattle and hogs are at a peak

Canadian farmers have been raising more cattle, hogs and poultry than ever before between 1996 and 2001, despite the biggest decline in the number of farms in 30 years, according to the 2001 Census of Agriculture.

The census counted 246,923 farms in Canada on May 15, 2001, down almost 11% since 1996, the fastest percentage decline between censuses since 1971. Many of the farms that disappeared raised livestock.

At the same time, farmers reported record inventories of both cattle and hogs. As a result,

the average size of livestock farms grew substantially.

The number of cattle on Canadian farms rose 19.9% to a record 15.6 million head in the 1991-to-2001 period. A sustained expansion in beef cattle was behind the increase. In 1991, the average cattle farm had 89 head; by 2001, this average had increased to 127. Most of the growth was in Alberta, where the census counted nearly 1.9 million more cattle in 2001 than in 1991.

Similarly, Canada had more pigs than ever. The census counted 13.9 million hogs in 2001, up 36.6% from 1991. During this period, the number of larger producers increased while many smaller operations were no longer raising pigs or had to expand to survive. There were 14,120 fewer farms reporting hogs in 2001. In 1991, the average hog farm had 345 animals; by 2001, the average had soared to around 900 (Text Box 1).

Quebec and Ontario, respectively, were first and second in terms of total number of hogs in 2001. Between them, these two provinces had more than half of all the hogs in Canada.

Text Box 1: Factory hog farms

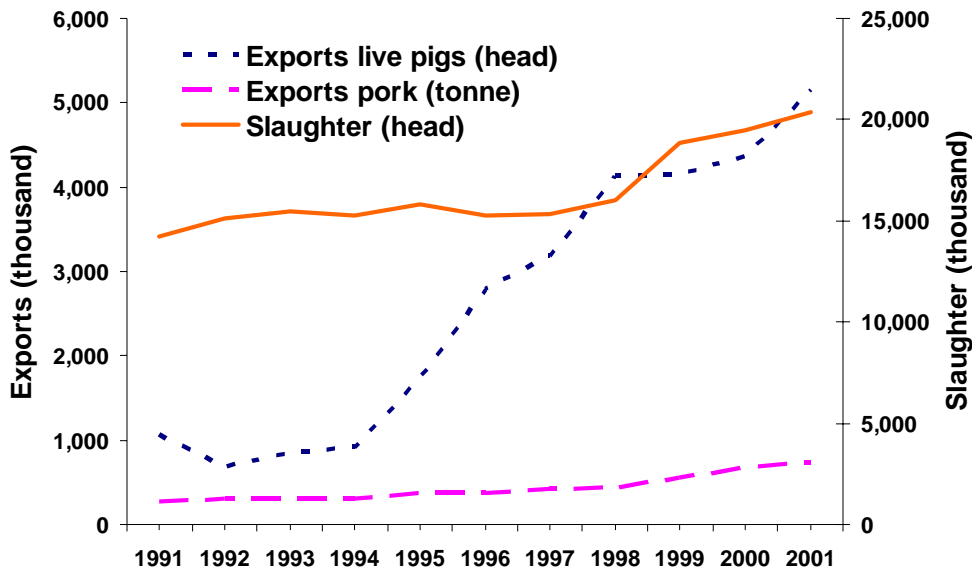
The “mega-farms” or “factory” farms written about in newspaper headlines are often large hog farms. Producing thousands of pigs in a plant raises concerns, mainly because millions of litres of liquid manure end up being concentrated in one location. However, in some regions, numerous mid-size operations producing different types of livestock can also result in high densities of livestock.

Environmental concerns include: greenhouse gas emissions; potential spills, leaks and runoff into surrounding land and watercourses; the lack of treatment before raw liquid manure is spread on land; and potential harmful bacterial epidemics affecting human and animals.

Hog farms are probably victims of their own success. Canada is second to Denmark in pork exports. The Canadian reputation for producing healthy, safe pork products that are free of Foot-and-Mouth Disease has opened doors to several importing countries.

World Trade Organization and the North American Free Trade Agreement increased opportunities to export. Production has soared to meet the increasing world demand (Figure 1).

Figure 1: Expansion of hog production and exports



Source: Statistics Canada, Livestock Statistics, Catalogue no. 23-603-XIE.

Concentration of animals increased on very large farms

The concentration of animals on very large Canadian farms rose substantially between 1991 and 2001, according to the Census of Agriculture. In 2001, very large farms (Text

Box 2) accounted for 4.2% of Canada's total of 162,268 farms reporting livestock. They had 35.1% of all "animal units". Ten years earlier, large farms accounted for 2.1% of all Canadian farms, and they had 20.6% of all "animal units" (Figure 2 or Table A1 in Appendix).

Text Box 2: Definitions of large farms and "animal units"

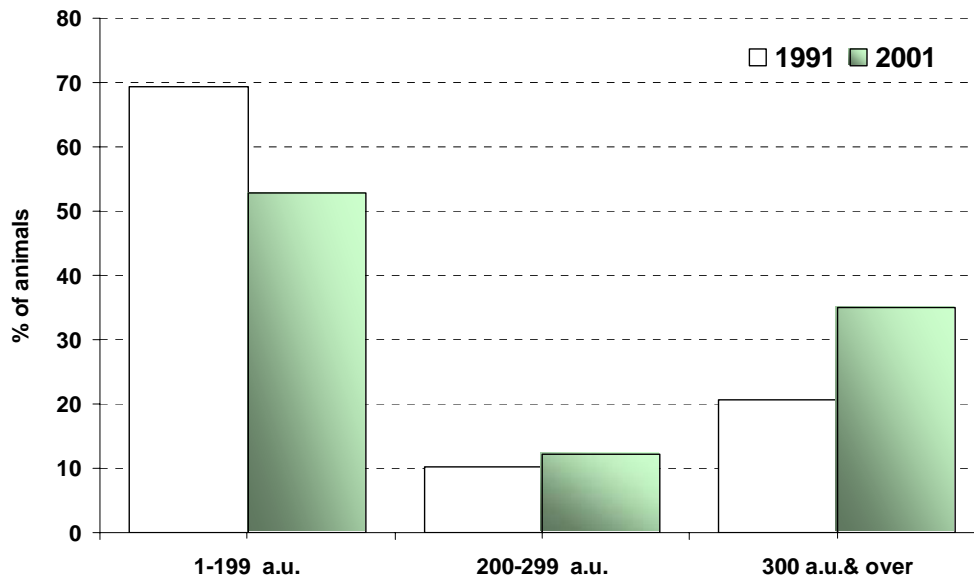
There is no common definition used to classify an intensive or large livestock operation. Definitions presented in codes of practices, regulations or municipal by-laws, are likely to be adapted to local conditions and agricultural practices. For example, in Alberta, a livestock operation is defined as intensive when it holds more than 300 "animal units" in a confined location for more than 90 consecutive days. In Ontario, a livestock farm is considered intensive when it has over 150 animal units or has more than two animal units per acre of tillable land.

In this article, a very large farm was defined as having 300 and more "animal units," a large farm as having 200 to 299 animal units, and a medium- and small-sized farm as having fewer than 200.

Like apples and oranges, different things cannot always be added together. To create one grouping, reported livestock inventories were transformed into an "animal unit." The smaller, lighter or younger the livestock are, the more animals are required to equal one animal unit. For instance, 1 animal unit would be equivalent to 1 beef cow, 4 sows or 125 broiler chickens.

The "animal units" concept used in this paper, originally developed in the United States in the 1960s, was based on the number of animals that would produce the 73 kilograms of nitrogen required to fertilize one acre of corn for one year. Two methods have been used to estimate the amount of nitrogen produced by animals in a 12-month period: the Nitrogen Production Method, based on average live animal weights; and the Feed Consumption Method, based on the conversion of feed protein into excreted nitrogen. More recent research has calculated coefficients based on phosphorus excretion as the level of phosphorus in soil is limiting the amount of manure that could be applied on land in some regions. The coefficients slightly vary across regions and provinces.

Figure 2^F: The percentage of livestock on very large farms increased

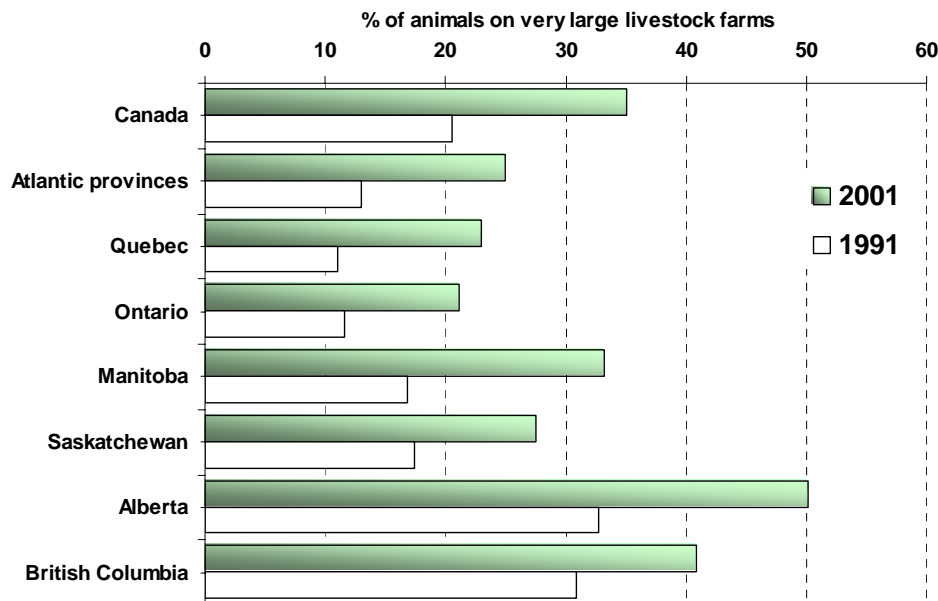


Source: Statistics Canada, derived from the 1991 and 2001 Censuses of Agriculture.

The concentration of animals on very large farms varied widely from province to province. In 2001, the percentage of animals on very large farms was higher than the

national average in only two provinces: Alberta and British Columbia (Figure 3).

Figure 3^F: The number of animals raised on very large farms is increasing in all provinces



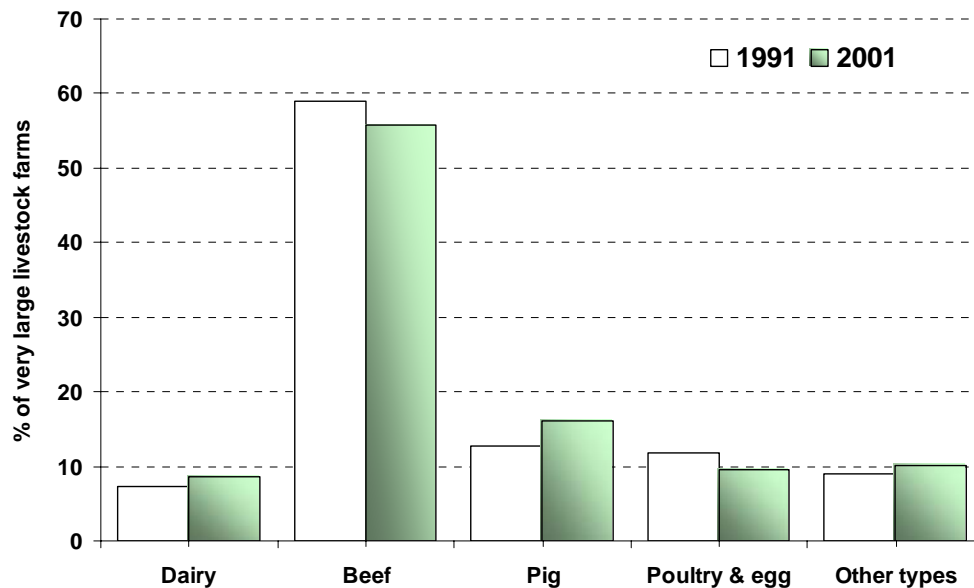
Source: Statistics Canada, derived from the 1991 and 2001 Censuses of Agriculture.

In 2001, very large farms accounted for 6.7% of Alberta’s total of 40,400 farms with livestock, and they had one-half of all animals. Ten years earlier, very large farms accounted for 4.0% of Alberta’s total, and they had 32.8% of all animals.

Cattle farms held the bulk of animals raised on very large farms

Of the 6,760 very large livestock farms in Canada in 2001, 55.7% or 3,760 raised beef cattle as their main line of business. The census counted more than 3.1 million animal units on these farms (Figure 4).

Figure 4^F: In 2001, most very large farms specialized in raising beef cattle



Source: Statistics Canada, derived from the 1991 and 2001 Censuses of Agriculture.

In 2001, 2,080 very large beef farms were in Alberta, where ranches and feedlots are usually large-scale operations. However, feedlots are more intensive with a large number of animals confined to a small area. Feedlot operators are more likely to purchase their feed grains, thus requiring a relatively small amount of land to operate. Other large beef farms (ranches, backgrounder farms, cow-calf farms) are likely to be more extensive and use a large acreage of farmland as grazing or pasture land.

Similarly, among the 6,760 very large farms in Canada, 1,090 or 16.2%, raised hogs. The 2001 Census counted 768,000 animal units on these farms.

Between the 1991 and 2001 censuses, the proportion of animals on very large farms by farm type changed in a few provinces. For example, in Quebec, there were relatively more animals on very large hog, beef and dairy cattle farms.

The 2001 Census of Agriculture also showed a downward trend in the number of very large hog farms in Quebec and an upward trend in other provinces. In 2001, Quebec had 28.7% of the nation’s animal units held on very large hog farms, compared with 33.3% in 1991. More stringent regulations, which initially targeted large livestock operations, were introduced in Quebec in 1998 to reduce pollution from agriculture sources. This may have limited expansion or even prompted some large hog

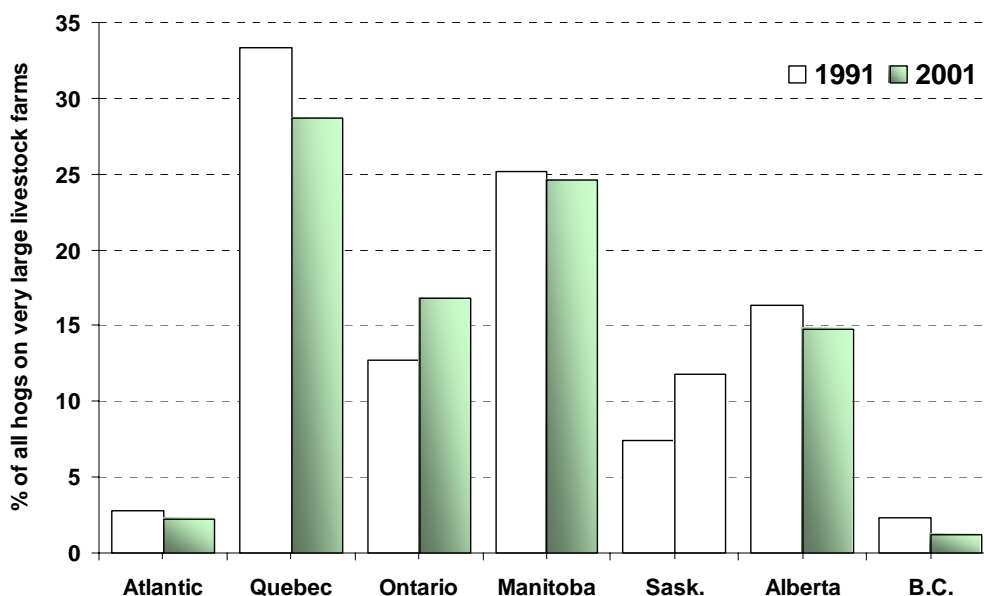
producers and promoters to consider expansion in other provinces where environmental regulations are relatively less stringent (Figure 5).

Other factors may also have influenced changes in the location of hog production. Hog production increased sharply in Manitoba between 1991 and 2001, fuelled by the opening of a large processing plant in Brandon and the removal of Western grain transportation subsidies. In 2001, Census shows that Manitoba

had 18.2% of all Canada's hogs, up from 12.6% a decade earlier. Furthermore, in 2001, 24.6% of Canadian animal units on very large hog operations were in Manitoba.

In Ontario, hog production on large scale operations had increased in spite of a decline in total hog production. This province had 24.8% of all Canada's hogs in 2001, down from 28.6% in 1991. About one-fifth of Canada's animal units on very large hog operations were in Ontario, up from 12.7% a decade ago.

Figure 5^f: Large-scale hog production heading West



Source: Statistics Canada, derived from the 1991 and 2001 Censuses of Agriculture.

Where these large farms popped up

Table 1 presents the top 30 regions with the highest number of very large farms (Text Box 3) on May 15, 2001. They accounted for 35.4% of all Canadian very large livestock farms.

The Fraser Valley Regional District in British Columbia topped the list with 146 large livestock farms, 88 more than in 1991. This was the largest increase in the number of very large farms in the 1991-to-2001 period.

The Fraser Valley Regional District also had the highest concentration of very large farms in the country. There were 30 large farms for every 100 square kilometres of farmland available in 2001. The Greater Vancouver Regional District placed second with 16.1 very large farms for every 100 square kilometres of farmland.

Manitoba's Hanover region (southeast of Winnipeg) also reported a high concentration of large farms in 2001. There were 8.1 very large farms for every 100 square kilometres of

farmland. The number of large farms soared to 58, up from 20 in 1991.

In the top 30 list, 17 areas were in Alberta. Lethbridge County was at the top in Alberta with 144 farms, or 2.1% of all very large livestock farms. In 1991, Lethbridge County had 104 large farms.

Ponoka County was in second position in Alberta with 117 farms, up from 55 a decade earlier. Red Deer County followed in third place with 111 farms in 2001, 51 more than a decade ago.

The top regions in Ontario were Huron, Oxford, Perth, Bruce and Wellington counties. The number of very large farms increased in the 1991-to-2001 period in all these settled rural areas.

Huron County in south-western Ontario had 102 large farms, more than double the 49 reported in 1991. Oxford County, had 83, compared with 31 ten years earlier. In 2001, Perth County was in third position with 75 farms, followed by Bruce (72 farms) and Wellington (64 farms).

Text Box 3: Regional impacts

Some may argue that the number of larger farms is a non-issue where there is a large land base to support the activity and where there are few neighbours to complain about potential nuisance. Large livestock operations are often very intensive and they may or may not have detrimental local impacts on their surrounding environment.

It is also very difficult to measure how livestock farmers and the people who live downwind of these large operations get along. Any measure of nuisance, acceptance and perception is subjective, influenced by local conditions and required much sophisticated surveys.

This regional analysis rather focuses on the number of large livestock farms. This is a rough indicator of where problems are more likely to emerge. Assessing whether livestock or large farm concentrations in certain regions have reached a point at which they could pose an ecological threat, or at which neighbours of these farms are negatively affected, was beyond the scope of this article.

Table 1^F: Areas with largest number of farms with 300 and more animal units, 1991 and 2001

Rank ^a	Province	Area	Number of very large livestock farms (300 and more a.u.)				Difference 1991-2001	Large farms per 100 km ² of farmland in 2001
			1991	Share %	2001	Share %		
	Canada		3,982	100	6,760	100		
1	British Columbia	Fraser Valley R.D. ^b	58	1.5	146	2.2	88	30.0
2	Alberta	Lethbridge County	104	2.6	144	2.1	40	4.8
3	Alberta	Ponoka County	55	1.4	117	1.7	62	4.3
4	Alberta	Red Deer County	60	1.5	111	1.6	51	2.8
5	Ontario	Huron County	49	1.2	102	1.5	53	3.5
6	Alberta	Willow Creek No. 26	67	1.7	95	1.4	28	2.1
7	Alberta	Rocky View No. 44	74	1.9	88	1.3	14	2.0
8	Alberta	Vermilion R.C. No. 24	48	1.2	88	1.3	40	1.5
9	Alberta	Lacombe County	50	1.3	87	1.3	37	3.1
10	Alberta	Special Area No. 2	62	1.6	86	1.3	24	1.0
11	Ontario	Oxford County	31	0.8	83	1.2	52	4.6
12	Alberta	Newell County No. 4	60	1.5	76	1.1	16	1.3
13	Ontario	Perth County	33	0.8	75	1.1	42	3.7
14	British Columbia	Cariboo R.D.	59	1.5	73	1.1	14	1.8
15	Ontario	Bruce County	47	1.2	72	1.1	25	2.9
16	Alberta	Stettler County No. 6	41	1.0	71	1.1	30	1.8
17	British Columbia	Peace River R.D.	37	0.9	69	1.0	32	0.8
18	Alberta	Mountain View County	56	1.4	68	1.0	12	1.8
19	Alberta	Wheatland County	47	1.2	67	1.0	20	1.5
20	Alberta	Cypress County	60	1.5	66	1.0	6	0.7
21	Quebec	Les Maskoutains	43	1.1	64	0.9	21	5.7
22	Ontario	Wellington County	46	1.2	64	0.9	18	3.4
23	British Columbia	Greater Vancouver R.D.	49	1.2	63	0.9	14	16.1
24	British Columbia	Thompson-Nicola R.D.	60	1.5	63	0.9	3	1.7
25	Alberta	St. Paul County No. 19	23	0.6	61	0.9	38	1.9
26	Alberta	Cardston County	51	1.3	59	0.9	8	1.5
27	Alberta	Wainwright No. 61	29	0.7	59	0.9	30	1.6
28	Ontario	Middlesex County	33	0.8	58	0.9	25	2.3
29	Manitoba	Hanover	20	0.5	58	0.9	38	8.1
30	Alberta	Pincher Creek No. 9	47	1.2	58	0.9	11	2.1
		Total 30 areas	1,499	37.6	2,391	35.4		

Notes: a. Rank based on decreasing number of large farms in 2001.

b. Regional District.

Source: Statistics Canada, derived from the 1991 and 2001 Censuses of Agriculture.

Conclusion

Census of Agriculture data showed that the concentration of large farms is a growing issue in certain areas of Canada.

New data show that the number of larger livestock farms is on the rise and the number of animals on these larger operations is soaring. These livestock farms have expanded within

some of Canada's more intensely settled rural areas.

Given the world demand for meat products and the decline in number of farms, there is no indication of any halt to the trend towards larger average farm size and larger livestock inventories.

Statistical tables

Table A1^F: Animal units by farm size, 1991 and 2001

		Animal units (a.u.)			
		Farm size			Total
		less than 200 a.u.	200-299 a.u.	over 300 a.u.	
		Share by farm size (percent)			
Canada	1991	69.3	10.1	20.6	100
	2001	52.8	12.1	35.1	100
Atlantic provinces	1991	76.0	11.1	13.0	100
	2001	62.6	12.4	25.0	100
Quebec	1991	81.7	7.2	11.1	100
	2001	66.1	10.8	23.0	100
Ontario	1991	79.7	8.6	11.6	100
	2001	68.0	10.9	21.1	100
Manitoba	1991	73.3	10.0	16.8	100
	2001	52.7	14.2	33.1	100
Saskatchewan	1991	72.9	9.7	17.4	100
	2001	59.3	13.2	27.5	100
Alberta	1991	55.4	11.8	32.8	100
	2001	38.3	11.6	50.1	100
British Columbia	1991	54.2	14.9	30.9	100
	2001	43.7	15.4	40.9	100

Note: Due to rounding, figures may not add up to totals.

Source: Statistics Canada, derived from the 1991 and 2001 Censuses of Agriculture.

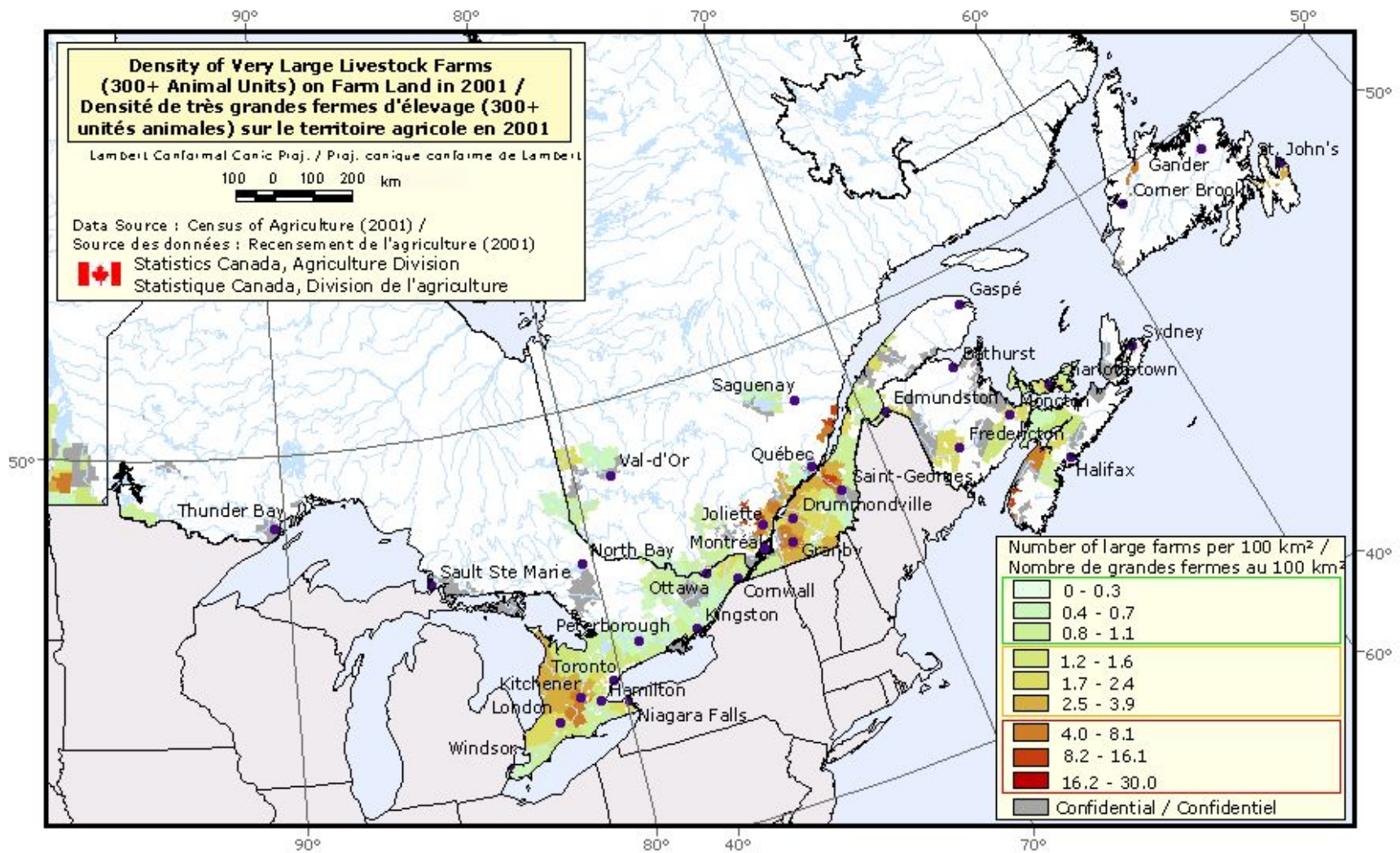
Table A2^f: Animals units on very large¹ livestock farms by farm type, 1991 and 2001

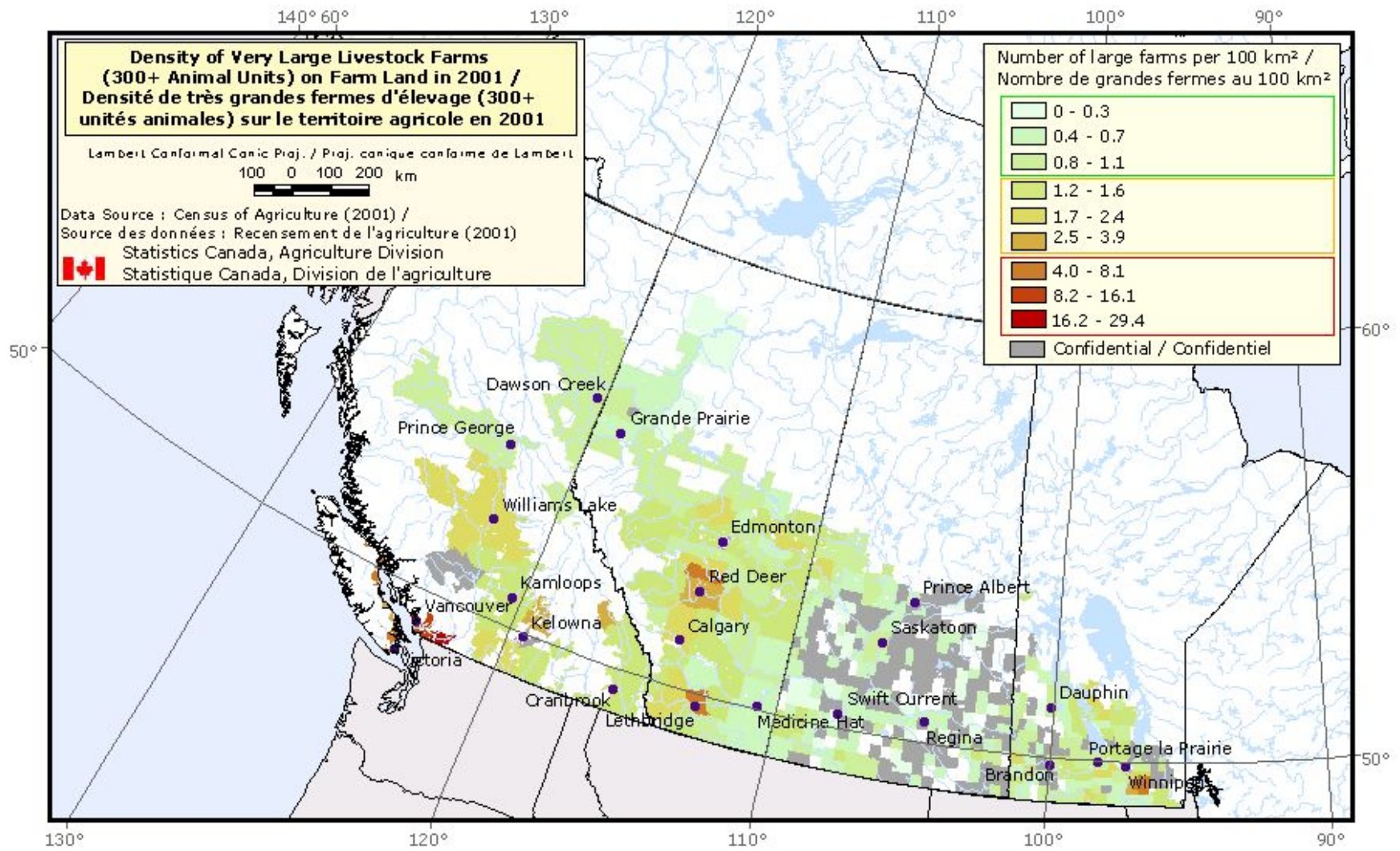
		Animal units (a.u.)					Total
		Dairy farms	Beef farms	Hog farms	Poultry and egg	Other types	
		Share by farm type (percent)					
Canada	1991	5.3	63.7	11.6	10.1	9.2	100
	2001	5.3	62.3	15.4	8.4	8.6	100
Atlantic provinces	1991	16.7	13.3	16.1	49.3	4.6	100
	2001	16.3	9.5	19.1	44.6	10.5	100
Quebec	1991	5.5	8.8	47.1	35.5	3.0	100
	2001	6.8	13.0	51.3	25.7	3.1	100
Ontario	1991	15.5	36.8	12.3	30.2	5.1	100
	2001	15.5	26.7	24.5	27.3	6.1	100
Manitoba	1991	3.7	31.2	41.9	5.8	17.4	100
	2001	4.6	40.5	40.8	3.7	10.3	100
Saskatchewan	1991	1.6	77.6	7.0	1.9	11.9	100
	2001	2.1	67.0	14.7	2.4	13.8	100
Alberta	1991	2.3	81.6	3.9	1.5	10.7	100
	2001	2.1	83.0	4.5	1.2	9.1	100
British Columbia	1991	11.7	69.6	3.0	12.9	2.8	100
	2001	15.8	59.3	2.8	18.8	3.2	100

Notes: Due to rounding, figures may not add up to totals.

¹ Farms with 300 and more animal units.

Source: Statistics Canada, derived from the 1991 and 2001 Censuses of Agriculture.





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