

Manitoba's Pork Value Chain: Where is it Going and What is Driving it?

Report prepared for
Market and Industry Services Branch of Agriculture
and Agrifood Canada, Winnipeg

Ed Tyrchniewicz and Heather Gregory

June 2003

Foreword

The Canadian agriculture and agri-food sector faces many new challenges and opportunities for continued prosperity. Federal, provincial and territorial Ministers of Agriculture have pledged to meet today's challenges by jointly developing a comprehensive Agricultural Policy Framework (APF) for the 21st century. The objective of the Agricultural Policy Framework (APF) is for Canada to become the world leader in food safety and food quality, innovation and environmentally-responsible production. To contribute to these goals, Agriculture and Agri-Food Canada (AAFC) has an ongoing research program to evaluate changing market conditions and provide information on how agricultural policy can contribute to meeting these challenges and contributing to sustainable value added food chains.

Although continued rapid growth in the industry in Manitoba is anticipated, the industry also faces several new challenges which may affect its future success, including processing capacity, environmental concerns, market access, and hog production competitiveness. Other factors may have to do with the competitiveness of the finishing in Canada, notably the changes in the feed market in terms of availability and cost relative to the cost to finishers in competing US locations.

The report was commissioned to assess these issues. The analysis focuses on four components of the chain, feed market supply, hog production, environment, hog processing. The overall objective was to better understand the opportunities and constraints affecting the efficiency and competitiveness of the Manitoba pork production value chain.

Any policy views, whether explicitly stated, inferred or interpreted from the contents of this report do not necessarily reflect the views or policies of AAFC.

Manitoba's Pork Value Chain: Where is it Going and What is Driving it?

Ed Tyrchniewicz and Heather Gregory

1. Introduction

Background

Changes in Canadian agricultural policy have removed the previous bias toward grain and oilseed production for export markets in Manitoba and Saskatchewan. Production of hogs has grown substantially in Manitoba increasing from less than 3 million head in 1995 to 6.4 million head in 2002. The expansion of the hog industry has resulted in a significant expansion of exports of live hogs to the US. Another consequence of the production expansion has been increased investment in livestock slaughter and processing capacity in the region. The new economic environment has been widely expected to favour the expansion of livestock production with an increasing share of the grain and oilseed production being used in feeder or finishing enterprises.

Although the Manitoba hog industry has developed rapidly in recent years, it is now being challenged by a number of domestic and international factors which may affect its future success and structure, including:

1. **Feed market situation.** Hog finishing costs are affected by the availability of feed and its cost compared to US finishing operations. Feed availability and costs have been affected not only by drought conditions and the expansion of the prairie livestock industry, but also by the presence of fusarium in Manitoba.
2. **Challenges to expanding hog production.** The hog industry has become more integrated with processors developing linkages to guarantee some consistency in their supply volumes. It has been estimated that a significant portion of the hogs sold in Manitoba are under contractual arrangement with local processors. In addition, some producers have sought out contractual arrangements with US operations and processors. In 2002, almost 2 million head moved to the northern US states for feeding. In addition, almost 900,000 slaughter hogs also moved to US packers. Given the large outflow of hogs to the US market, it is important to understand what is driving the development of relationships with the US and what action, if any, can, or should, be taken to encourage more hog-based value-added activity in Manitoba.
3. **Environmental considerations.** The Province has introduced changes to the approval process for intensive livestock operations. Some of the changes are effective immediately while others will be phased in. This study will document the revised process and assess the potential impact these changes may have on the development and

expansion of a sustainable hog sector in Manitoba and the increased demands of the slaughter industry.

4. **Hog processing capacity.** Processing capacity is “lumpy”. For example, adding a second shift at the Maple Leaf plant in Brandon raises a number of issues. These include labour availability and wage rates, processing efficiency and infrastructure capacity.
5. **Trade and promotion policies.** Manitoba’s hog industry may also be greatly impacted by policies such as the US Farm Bill requirement for country of origin labeling and current Canadian policy to promote identity preservation. This and other similar issues provide important context for this study but are being examined in detail elsewhere.

Study Objectives and Procedures

This study is being undertaken for Agriculture and Agri-Food Canada’s Market and Industry Services Branch Regional Office in Winnipeg. The overall study objective is to assess the challenges and opportunities facing Manitoba’s pork production value chain over the next ten years. The report provides a snapshot of where the industry is currently at and how the industry could ultimately evolve, and could be useful in assisting the development of a provincial hog strategy. The report is organized along the following lines:

- Overview of Manitoba’s pork value chain
- Feed market situation
- Challenges to expanding hog production
- Impact of environmental regulations
- Current and future hog processing capacity
- Putting it all together

Information for this study was drawn from two major sources: existing studies and relevant material from government sources, and interviews with key stakeholders. Producers, feed companies, processors and others were interviewed about the current situation, how they see the situation evolving over time, what actions they are taking or anticipate taking and what they would like to see happen from an industry perspective. A list of organizations and people interviewed is included in Appendix A. To put some focus on these discussions, a series of questions were developed. These are outlined in Appendix B.

2. Overview of Manitoba’s Pork Value Chain

Current Situation and Recent Trends

Total hog production in Manitoba has increased from 3.2 million hogs in 1996 to almost 6.4 million in 2002. See Appendix C for a more detailed description of the Manitoba and Canadian hog situation. On January 1 2003, Manitoba has 19.5 % of total hog inventories while Quebec

and Ontario have 29.1% and 24.9%, respectively. The three Prairie Provinces have 42.4% of total Canadian inventories.

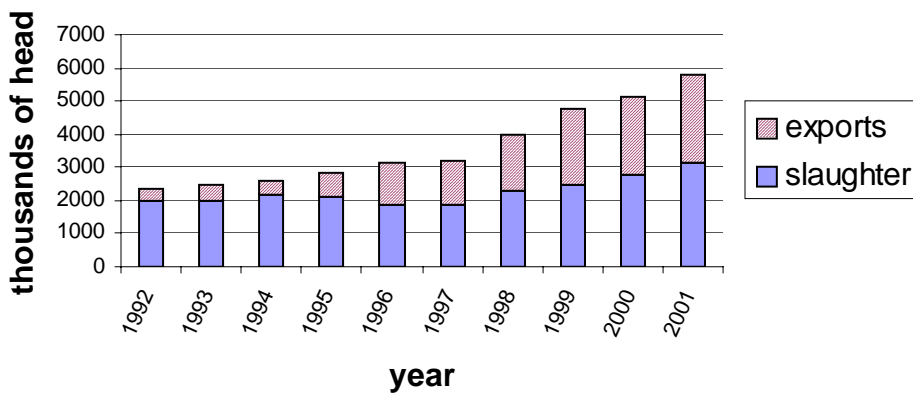
Between July 1 1996 and January 1 2003, the number of hog farms in Manitoba has declined by about 20% from 2,064 to 1,660, while the average number of hogs per farm has approximately doubled, increasing from 861 head to 1,729 head. Manitoba Agriculture and Food has estimated that almost 60% of the hog farms had the majority of their income from hog sales. Of the commercial hog farms in Manitoba, it is estimated that 19% are farrow-to-weanling operations (0-23 kg), 33% are farrow-to-finish operations (0-113 kg) and 48% are feeder-to-finish operations (23-113 kg).

Manitoba slaughter volumes have increased from 1.9 million head in 1996 to 4.4 million head in 2002 with most of this being in federally inspected plants. About 885,000 of the pigs slaughtered in Manitoba came from Alberta (525,000) and Saskatchewan (360,000). Manitoba currently has a slaughter capacity of 6.9 million hogs. The large difference between actual and potential slaughter capacity for Manitoba is related to the unused capacity at Maple Leaf’s Brandon plant. This plant has the possibility of running two shifts but is currently only operating one shift.

In 2002, Manitoba exported approximately 2.9 million live hogs to the United States. Weanling exports (less than 50 kg category) have increased continuously and in 2002 approached the 2 million head level. Feeder and slaughter hog exports (50 kg and over category) have increased slightly in 2002 but are generally in the 900,000 head range. Manitoba accounted for 52% of Canadian weanlings exports and 45% of slaughter hog exports to the US. Purebred breeding stock exports are highly variable from year-to-year but in general account for less than 1% of total live hog exports. In terms of value of pork exports, pork meat exports were forecast to be \$487 million in 2002, while live hog exports were valued at \$246 million. Manitoba’s 2002 pork exports through November were 54% chilled, 37% frozen and about 6% offal on a value basis.

Figure 1 summarizes the trends in Manitoba’s production, slaughter, and exports for the period 1992 - 2001.

Figure 1: Manitoba Hog Production



Forces Driving the Development of Manitoba's Hog Sector

A number of factors have encouraged the expansion of the hog industry in Manitoba over the last decade. In summary, these factors include:

- Changes in world grain trade resulting in relatively static volumes of grains being sold at ever declining prices (constant dollars) due to technology improvements
- Change in grain transportation policy in 1995 on export grain resulting in farmers facing the full freight bill and lower (at least initially) feed grain prices
- Growth in world demand for meat due to rising incomes
- Desire by producers to diversify their production base and thus reduce risk and fluctuations in farm income
- Government programs encouraging rural diversification
- Improved animal genetics and production technologies
- Integration of various components in the supply chain to reduce costs, share the risks and improve profits
- Concerted effort by the Government of Manitoba to expand hog processing capacity in Manitoba

Another factor encouraging expansion has been the major restructuring that has occurred in the slaughter and processing industry with on-going development of vertical integration and strong linkages between the producer and the consumer throughout North America. In the United States, five firms control about 65 percent of the daily kill capacity. In Canada, the top four processors accounted for 61 percent of the average daily hog slaughter in 2001 compared to 51 percent in 1993. This concentration in the industry has developed because economies of scale are now dictating that plants must be able to slaughter four million hogs annually based on a double shift operation.

In 1996, the Government of Manitoba eliminated mandatory marketing of hogs through a marketing board and allowed producers to sell hogs directly to packers. Direct contracting with producers in Manitoba has permitted established facilities to guarantee a certain percentage of their daily slaughter requirements. It has also resulted in processors developing affiliations with others in the supply chain to ensure production of the type and quality of hogs desired for specific markets. However, smaller hog producers appear to have more difficulty with direct selling to packers.

With the rapid expansion of hog production in Manitoba and increased concentration of control over production, public pressure against hog expansion also grew. In March 2000, the Government of Manitoba formally announced its Livestock Stewardship Initiative with the aim of ensuring the sustainable development of Manitoba's livestock industry. In essence, this means giving consideration to environmental stewardship and social factors as well as to economic viability.

In June 2000, The Livestock Stewardship Panel was appointed by the Government of Manitoba and was given the mandate to seek the views of Manitobans on the expansion of the livestock industry in Manitoba, and to present these views to government to guide future policy

development. Of the 30 or so recommendations presented in the report, about two-thirds addressed the involvement of the provincial government directly in the intensive livestock industry. The overarching recommendation from the Panel stressed the need for the commitment of staff and financial resources by government to be devoted to two tasks: first to gain a full understanding of the present situation of such operations in the overall milieu of agriculture in the province, and secondly, to provide a regulatory framework and a monitoring and enforcement effort in which expansion could take place without damage to Manitoba's people or the environment. The Panel's key conclusions and recommendations (presented in December 2000) are summarized in Appendix D.

In July 2002, the Government of Manitoba announced a number of initiatives in response to the Report. These are summarized in Appendix E. Some of these initiatives are explored later in the report.

3. Feed Market Issues

This section of the report examines the factors impacting the availability of feed grains and the cost competitiveness of the industry. Starting with requirements and availability of feed grains for the hog industry (including an assessment of Manitoba's self-sufficiency in feed in the future), this section goes on to comment on: fusarium and availability of fusarium resistant feed sources, the impact of weather and climate change, alternative feed sources, ethanol development, and the US Farm Bill.

Feed Grain Requirements and Availability for Manitoba's Hog Production

The Market Analysis Section of Manitoba Agriculture and Food (MAF) has estimated that total Manitoba hog production could be about 8.1 million head by 2006. Beyond 2006, the status quo is assumed for hogs due to several variables impacting future production levels. MAF has determined similar production estimates for beef and dairy cattle, sheep and lambs, horses, laying hens, chickens and turkeys. Based on this estimated production, they have generated a series of tables identifying the feed requirements for the total livestock population and specifically for hogs. See Appendix F for details of the analysis and estimates.

These feed consumption requirements are based on Statistics Canada's livestock feed usage tables, the estimated numbers of livestock for each category and production budget guidelines for specific feed requirements (volumes consumed per animal). MAF has adjusted the feed mix to reflect the shift from barley to more corn and meal usage. For 2002, MAF estimates that the livestock industry will consume about 2 million tonnes of feed grains, 60% of which is barley. The hog industry consumed about 1.3 million tonnes in 2002 or about 65% of the feed grains used. By 2010, feed grain consumption by the hog industry is estimated to be 1.6 million tonnes, with more than 70% being barley and almost 30% being corn, with negligible amounts of other feed grains.

Table 1 indicates the shortfall in barley and corn supplies when the hog sector's needs for feed rations are compared to the available supply of feed barley and corn produced within Manitoba. These statistics assume that Manitoba will continue to designate 40% of its barley crop for export/other uses and that the total supply of feed barley and corn is used solely by the hog sector. Based on MAF's estimates regarding available feed grains, a shortfall will exist in all crop years even if these supplies are made available only to the hog industry. Even if crop yields and production improve to more normal levels, it is anticipated that the demand for feed grains will exceed available supplies once barley exports are taken into account. It is worth noting that if one considered all production of barley in Manitoba and did not adjust for export and other uses, then a small "surplus" amount of barley would be available for other livestock once the hog sector had absorbed its needs. The excess barley under these circumstances would still remain less than the livestock industry's needs, necessitating imports from other provinces and/or states.

Table 1: Comparison of Hog Sector Feed Requirements and Total Feed Barley and Corn Supplies, 2002/03 to 2010/11 (thousands of tonnes)

Crop Year	Hog Feed Barley Requirements	Hog Feed Corn Requirements	Available Manitoba Feed Barley Supply	Available Manitoba Feed Corn Supply	Barley Shortfall	Corn Shortfall	Total Shortfall
2002/03	964.4	369.5	652.3	354.4	-312.1	-15.1	-327.2
2003/04	1033.8	396.1	800.6	402.3	-233.2	6.2	-227.0
2004/05	1085.6	415.9	818.9	405.4	-266.7	-10.5	-277.2

Canada. Kraft and Rude also analyzed the current feed grain balance for Saskatchewan and Alberta. They concluded that Saskatchewan was in a surplus situation to the extent of approximately 1.95 million tonnes, while Alberta was in a slight deficit of 225,000 tonnes. Assuming growth in the livestock industry in both of these provinces, Manitoba will have competition for Saskatchewan's surplus feed grain. Clearly, US corn will have to play an ever-increasing role in supplying feed grain to Manitoba's hog production sector. Variations in exchange rates will have a definite impact on the affordability of US corn to Manitoba hog feeders.

Other factors that will influence the supply of local feed grains in the future are discussed below.

Impact of Fusarium and the Availability of Fusarium Resistant Feed

Since 1994, fusarium has become a major factor in feed availability. The incidence of fusarium head blight has increased over the years from minimal in 1994 to having it present in virtually 100% of the wheat and barley. Presence, however, does not necessarily translate into damage. Hogs can only tolerate 1% infested grain in their diet because of the toxins present. Beef cattle can tolerate 14% infected grains. Some recent research by House, et al, (2002) suggests that barrows can tolerate up to 2ppm of deoxynivalenol (DON) in the final feed formulation; however, the same conclusion cannot be drawn for gilts.

It has been estimated that the impact of the presence of fusarium has been:

- Yield losses amounting to \$20 to \$40 million/year in the eastern prairies
- Quality losses of \$10-30 million/year
- Lost opportunities as grain is not eligible for malting barley or Durum wheat
- Constrained expansion of the hog industry
- Additional marketing challenges (e.g. finding markets, segregating, etc.)

The economic impact of fusarium on Manitoba's hog production is very clear. Sourcing fusarium-free barley has been identified as a significant uncertainty. Some hog producers are turning to corn and soybeans, but supplies of these feeds are limited. The added cost of production to bring feeds in from other areas has been estimated at \$5/animal. As hog production expands, fusarium-free feed supplies will have to be brought in from greater distances and at a higher cost. The impact on the competitive position of Manitoba's hog sector is explored in more detail later in this report.

A critical question is: what is the likelihood of fusarium-free feed in the foreseeable future? A new strain of feed wheat, HY644, which exhibited a significantly higher resistance to fusarium head blight, as well as improved yields, was denied licensing because of its inability to meet kernel visual distinguishability (KVD) requirements. This, and the recent denial of licensing for Alsen – a hard red spring wheat variety with resistance to fusarium head blight, has raised serious questions about the fundamental structure and objectives of the variety licensing system in Western Canada. Under this system, the emphasis appears to be on setting standards and

market incentives based on human market needs, with feed market needs being met largely from “rejects from the primary market”.

The Canadian Grain Commission has initiated an analysis of the concept of utilizing variety eligibility declarations in conjunction with KVD to enable production of non-distinguishable grain varieties for special use. This is still at a preliminary stage of discussion, so it would be speculative to suggest that this will resolve some of the concerns about variety licensing. Interestingly, licensing of varieties in Eastern Canada does focus primarily on the needs of the feed market. Plant breeders have suggested that, realistically, we are at least five years away from having a feed wheat variety with qualities similar to HY644, and as much as ten years away from having a fusarium resistant feed barley.

Many observers have suggested that research efforts need to be intensified towards solving this problem, and also serious consideration needs to be given to modifying the focus of the grain variety licensing system to recognize the growing importance of the Prairie region as a feed market relative to the human grain market. Clearly, the lack of a foreseeable adequate supply of fusarium resistant feed has the potential to significantly constrain the development of not only Manitoba’s, but also the entire Prairie region’s, hog sector.

Impact of Weather and Climate Change

Droughts during the last two years on the Eastern Prairies have significantly reduced crop yields and correspondingly the availability of locally grown feeds for the hog industry. With drought also comes the need to set priorities on the use of water. The Province and municipalities will have to establish priorities among agricultural, industrial, residential, and recreational demands. Within agriculture, there will be competition between irrigated crops (e.g. potatoes), hog production, and processing activities. There is anecdotal evidence suggesting that hog operations are unlikely to be the accorded the highest priority for scarce water.

To the extent that we are witnessing a trend towards a drier climate in Manitoba, water may well become one of the major constraints to hog expansion. The challenge to hog production will be to reduce the volumes of water used in hog production, especially in manure management systems.

One of the ironical side benefits of a drier climate is the reduction in the presence of fusarium head blight and easier manure management.

Other Feed Market Issues

There are a variety of other factors that might influence the feed market in Manitoba. Three of them include: alternative feed sources, development of an ethanol industry, and the US Farm Bill.

Alternative feed sources

Alternative feed sources, such as local corn, soybeans and peas are being used by a number of hog producers to a limited extent, largely on a “spot” basis rather than a continuous basis. The major constraint to their use is the lack of a consistent quantity and quality of product. In the case of corn, the target market is the human consumption market, and the feed market gets the residual, much as the case with barley grown primarily for malt. The likelihood of crops such as soybeans and peas growing significantly in the future to have a major impact on the livestock feed market is small.

Development of an ethanol industry

The Province of Manitoba is enthusiastically promoting ethanol as a fuel additive to reduce greenhouse gas emissions. To the extent that there is a growth in ethanol production in Manitoba, one possible impact on the hog industry is increased competition for barley and wheat for use as a feedstock for ethanol. It should be noted that ethanol can also be made from straw by-products. Distiller’s dry grain (DDG), a byproduct of ethanol production, has also been mentioned as a potential source of feed, but it too suffers from a small and inconsistent supply. Furthermore, the process of producing DDG does not remove any fusarium that may be present in the feedstock. The potential use of DDG in the hog industry appears to be quite limited because of the fusarium issue as well as the cost of drying. Since Saskatchewan is also developing its ethanol industry quite aggressively, the likely source of feedstock for Manitoba’s ethanol sector would be US corn.

US Farm Bill

Although much of the discussion of the impact of the US Farm Bill on Manitoba’s pork value chain is focused on the Country of Origin Labeling (COOL) provision, another likely impact will be that subsidies will keep corn prices artificially low and supplies plentiful. This will certainly be a benefit to US hog producers, but it will also result in corn surpluses that will be readily available to Canadian hog producers at lower than normal market prices. These prices, however, will still be higher than those paid by US hog producers because of transport costs.

4. Challenges to Expanding Hog Production

This component of the report assesses some of the important challenges to the development of the hog farrowing and finishing sector. This includes: trends in production contracting, Manitoba’s cost competitiveness relative to other hog producing regions, border issues (closure because of disease threats and COOL), production standards (Canadian Quality Assurance program and traceability to the farm level), biotech housing, animal welfare considerations, and potential new production technology.

Trends in production contracting

With the significant expansion in Manitoba's hog industry and the larger size of production units, the Canadian hog industry has, like its US counterpart, embraced production contracts as an effective way of selling hogs. Some observers have commented that the expansion of production contracts was triggered when the Manitoba hog producer board lost its sole marketer status and the Manitoba Pork Council and Manitoba Pork Co-operative Inc. were established. Others have said that the expansion of production contracts was simply a natural outcome as the industry underwent rapid expansion and the size of the hog production units increased accordingly. What is certain is that the dominant packer in Manitoba insists that a significant portion of its slaughter volumes are delivered under contractual arrangements, many of which are linked through the company's feed division.

Analysis by Key and McBride (2003) of US hog industry production contracts confirms that this trend is a North American situation. Between 1992 and 1998, the number of feeder operations using production contracts increased from 11% to 34% while the amount of production under contract rose from 22% to 63%. The rapid increase in the use of production contracts has gained popularity for a number of reasons. Some of these reasons are:

Contracts ensure better risk management from price volatility. For new or expanding producers who have less tolerance for risk, contracts allow them to enter into production without the price risk.

Contracts minimize the capital investment required by having the producer finance mainly barn and equipment costs. The contractor often provides the weanlings and feed with the producer feeding the hogs on a fee per hog basis. Studies in the US have indicated that although the dollar investment is the same for independent producers versus contractual operations, the independent producers have smaller sized operations because of the larger amounts of money needed to purchase feed, weanlings and capital assets. Contracting therefore promotes larger scale operations.

Contracts often integrate various players in the industry. Feed companies and/or processors have the ability to provide technical expertise and information on new technologies thereby enhancing overall production performance and allowing better use of inputs. Purchased feed may be superior to on-farm milled feeds due to more consistent quality.

Contracts allow the less experienced producer to focus on the issues of hog production rather than marketing. The result is that contracting may lower transaction costs associated with researching markets and negotiating price.

Because of greater consistency in inputs such as feed and technical support, contracts can result in more uniform pork quality.

Processors like contracts because they allow for better co-ordination of deliveries with plant processing needs.

This study concluded that contract operations have 20% more output for an average farm compared to a similar sized independent production unit. We conclude, based on discussions with the Manitoba hog industry, that Key and McBride's findings are equally applicable in Manitoba. The number of larger sized farms in Canada has increased with these farms handling more production (see Table 2). Manitoba producers have embraced the use of contractual arrangements to share the market risk. The most recent purchase of Dynamic Pork by Manitoba

Pork Co-operative Inc. was an effective means of ensuring that the Co-operative would continue to handle sufficient volumes of hogs as the smaller farms exit the industry and are replaced by larger, more integrated units.

Although many producers have contractual arrangements with Canadian processors, other producers have cultivated relationships with US feeding operations and US packers. The reasons often cited for these US linkages by the interviewees were:

Better prices were available in the US.

Desire by producer to have a broader buyer base for their hogs thereby ensuring more competition for hogs and, hopefully, a better average price

Canadian management expertise was recognized because of its higher productivity per sow for the more labour intensive sow-weanling operations, including the iso-weanling operations. These are weanling in a barn that requires shower in and changing clothes to minimize exposure to disease. The disease-free status of these weanlings results in a price premium.

US operators could capitalize on their cheap feed grains by focusing their production on feeder-finisher operations. Given the skill levels required and labour commitment, US operations preferred to be finishing operations.

Table 2: Percentage of Hog Farms by Size and Production by Farm Size, 1996 and 2000

	1-527 pigs		528-2,652 pigs		2,653 pigs and over	
	1996	2000	1996	2000	1996	2000
Percentage of Hog Farms by Size Class						
Quebec	41.1	31.9	52.1	57.5	6.8	10.5
Ontario	77.6	68.8	20.5	27.6	1.9	3.6
Manitoba	68.5	56.7	23.1	30.7	8.5	12.6
Saskatchewan	90.6	84.9	6.8	9.3	2.6	5.8
Alberta	81.7	74.1	14.9	18.4	3.5	7.5
Canada	75.1	64.9	21.2	28.3	3.6	6.8
Percentage of National Production by Farm Size						
Quebec	7.6	4.6	57.2	51.9	35.2	43.5
Ontario	24.8	13.4	52.3	51.1	22.9	35.5
Manitoba	12.3	6.9	28.7	28.1	58.9	65.0
Saskatchewan	23.0	9.1	26.9	15.4	50.1	75.5
Alberta	17.2	8.2	41.8	32.6	41.1	59.2
Canada	15.6	8.6	46.7	41.9	37.7	49.5

Source: Canada Pork Council, Statistics Page at www.cpc-ccp.com/stats.html

Manitoba's Cost Competitiveness

The George Morris Centre (1999) concluded that Manitoba had a cost advantage in farrow-to-finish operations and sow farrowing operations. Because of changing economic circumstances, the Centre undertook a follow-up study in October 2001 to determine the new economic realities facing hog operations in the Western Prairies (Eastern Alberta), the Eastern Prairies (Southwestern Manitoba) and Southern Minnesota. The analysis considered two types of hog operations - a 1,200 sow farrowing operation and a 1,200 sow farrow-to-finish operation. Table 3 summarizes the results for hog profitability for farrow-to-finish operations, averaged over 1999-2001 for the Western Prairies, Eastern Prairies, and Minnesota.

Table 3: Hog Profitability for Farrow-to-Finish Operation, Average for 1999-2001
(Western Prairies, Eastern Prairies, and Minnesota) Canadian \$

	Western Prairies	Eastern Prairies	Minnesota
Feed cost per head	56.84	58.26	51.44
Total variable cost per head	102.86	100.18	99.95
Prices per 100 kg	151.85	162.16	164.05
Gross margin per head	30.76	42.52	44.95

Source: George Morris Centre, Relative Profitability of Hog Production in Western Canada and the US Midwest, October 2001.

The 2001 study indicated the following changes in circumstances that have negatively affected the cost competitiveness of the Eastern Prairie region:

The prevalence of fusarium in wheat and barley production has been increasing over time. The result has been that a larger percentage of the wheat and barley grown in Manitoba is unsuitable for hog rations. Achieving acceptable levels of fusarium in the hog ration requires blending with fusarium-free feed grains. The George Morris Centre estimated that the additional cost of importing vomitoxin-free feed grains from the Western Prairies to the Eastern Prairies was \$13.50/tonne.

Drought in Western Canada has reduced the available supplies of feed grains to be fed to livestock. This reduced supply in combination with the demand for fusarium-free feed grains has increased feed grain prices.

The US Farm Bill has ensured that the policy of cheap US corn will continue into the near future. This policy has resulted in significant cost advantages for feed costs in Southern Minnesota.

US hog prices are higher than in Western Canada. The net result of higher hog prices and lower feed costs is that Minnesota has the highest profit margin, among the three regions, for farrow-to-finish operations.

The Western Prairies continues to have the lowest fixed costs with the result that it has a cost advantage in growing weanlings for the US market.

Discussions with people in the industry indicated that new varieties of corn are now higher yielding and better suited to the Manitoba climate. The result has been a significant increase in

corn acreage in Manitoba with prospects for more corn production in the near future. Despite the increase in local corn production, the shortfall in local feed grain supplies necessitates the importation of US corn. Manitoba hog producers have a disadvantage compared to their US counterparts, given that the price for US corn landed in Manitoba is higher than US corn prices once the exchange rate and transportation costs are taken into account, as suggested in the Section on Feed Market Issues.

In general, it can be concluded that Manitoba has lost the competitive cost advantage it enjoyed several years ago. It is also unlikely that the cost advantage relative to Minnesota will be regained.

Border Issues

As indicated earlier, Manitoba exports a significant amount of live hogs and pork to the United States. In 2002, almost 2 million weanlings/feeder pigs and 1 million slaughter hogs were exported from Manitoba to the US. This movement represented 50% of total Canadian live hog exports to the US. In addition, Manitoba exports 55% of its pork products to the US market. Any disruptions in trade either due to a disease outbreak or non-tariff barriers would seriously compromise export movement and the profitability of the Manitoba industry.

Closure due to disease outbreak

One of the most worrisome threats identified by the Manitoba hog industry during the consultations was the impact an outbreak of disease would have on live hog exports. Because the Manitoba processing industry could extend its shifts to accommodate additional slaughter hog volumes (e.g. Saturday kills), the major issue became the movement of weanlings and feeder hogs. Manitoba accounts for 51% of Canadian feeder hog/weanling exports and the closure of this market would result in having to find a “home” for almost 38,000 hogs each week.

Many producers expressed the point of view that it would be two days maximum before the Manitoba hog industry would be in chaos as the province lacks sufficient barn space to accommodate these additional hogs and it would take considerable time to obtain the necessary approvals and construct the facilities. With so many hogs and few alternative markets, large numbers of hogs may have to be destroyed. Manitoba’s rendering capacity would be unable to deal with these additional volumes given current capacity levels. The result would not be dissimilar to the foot and mouth problem encountered in the United Kingdom, if the border remained closed for any length of time.

Many producers stated that they were concerned with the potential of trade disruptions on live hog movement and for this reason had been reducing their dependence on the US market by expanding their finishing operations and entering into contractual arrangements with Canadian processors.

All industry representatives identified the need for a more proactive approach involving the federal and provincial governments, along with industry. This would entail developing various “what if” scenarios to determine the appropriate action plans to minimize the spread of disease, to effectively handle the loss of export markets, to ensure that border restrictions exist for the shortest time possible and, if in effect, to ensure that zoning/regionalisation arrangements are implemented to minimize the impact on export sales. Clearly, expanding the ability to finish hogs in Manitoba would provide some further flexibility.

Country of origin labeling

One of the most contentious issues of the US Farm Bill has been Country of Origin Labeling (COOL). Under this provision of the bill, only fresh produce, fish, peanuts, livestock and meat products that are produced/born, raised and slaughtered/processed in the US will be permitted to be designated “Product of the USA”. All other products will have to bear the appropriate label reflecting their origin, e.g. born in Canada, raised and slaughtered/processed in the US; or born and raised in Canada and slaughtered/processed in the US. The guidelines also require identification of originating countries based on volume of product. For example, ground beef would have to identify the country of origin by share of volume; this can change quite frequently depending on the lowest cost supplier. These voluntary guidelines shall apply to all products sold in retail outlets, with the hotel/restaurant/institution trade being excluded. The guidelines will become mandatory after September 30, 2004.

The onus will be on the retailer to have an audit trail to ensure the label reflects the actual origin of the product. This provision will force the retailer to demand that the packing plant provide a guarantee. Packers in the US are already advising local producers that they will have to provide an auditable trail that has been verified by an independent third party if they wish to deliver to their plant.

The need for a verifiable audit trail is one of the most critical components of COOL. COOL will force US packers and retailers to segregate and label their inventories according to the various label designations. It is anticipated that the additional costs associated with labeling and inventory management will be borne by US packers who would then offer lower prices for live animals. Given fines of \$11,500 or more and jail terms if a product is mislabeled, intentionally or not, packers will have an incentive to ensure that US livestock producers also have the supporting documentation to satisfy the US packers’ demands for an independent, verifiable auditable trail. Analysis done for the National Pork Producers Council (Hays and Meyer 2003) has suggested that the on-farm cost of production of pork would rise 10% with the total farm-to-retail costs being \$10.22 per head, or \$1 billion for the hog industry.

The reactions of the various people interviewed can be summarized as follows:

The US will continue to demand Canadian pork because of its excellent quality. “Product of Canada” may help brand this pork and thus gain further premiums from the marketplace.

Canadian producers have been concerned about the negative trade environment with the US and have already been shifting their live hog exports away from the US with more feeding being done locally.

Most of the Manitoba contracts in the US are with one processor who has feeding operations and also takes Canadian slaughter hogs. This processor will adjust his plant operations to have only selected sites kill “Canadian” hogs and/or have certain plants kill “Canadian” hogs on specific days. The problem is that the US packer would have to segregate live Canadian hogs and all their pork.

If the US does not import Canadian hogs and pork, the void will have to be filled by less US pork products being exported. This will provide alternative export market opportunities for Canadian pork, in effect Canada would gain market share in other markets generally serviced by the US. The key would be to expand finishing capacity in Canada.

COOL will be a reality as there is no desire in Congress to open up the Farm Bill. It may just not become mandatory as pressure from the US industry comes to bear, or a variety of “special exemptions” might be introduced. In effect, the result would be “death by a thousand cuts”.

Clearly, the jury is out on the impact of COOL but it would appear that the legislation may have more of a negative impact on the US industry than on the Canadian industry.

Production Standards

Pressures from consumers relating to food safety and from packers for uniformity of product have resulted in a number of industry responses. Two of these are: the Canadian Quality Assurance Program and traceability to the farm level.

Canadian Quality Assurance Program

The Canadian Quality Assurance (CQA) program is based on the internationally recognized HACCP (Hazard Analysis Critical Control Point) program, a scientifically based method to ensure food safety. The system consists of a method of identifying potential hazards within an operation or program, and then determining the critical points at which controls are necessary to ensure safety and compliance. To processors, it is a guarantee that animals have been produced under stringent standards. To consumers, it means the products they choose are safe and wholesome. For the hog producer, the CQA program provides a competitive edge in developing and maintaining markets at home, across the continent, and around the world. In Manitoba, the program involves a partnership between the Canada Pork Council, the Manitoba Pork Council and Manitoba Agriculture and Food. Although it is a national program, the administration and delivery are done at the provincial level.

Under the CQA program, the producer follows good production practices and keeps detailed records on the care the animals have received. To maintain quality and consistency, participating producers maintain specific records on rations used on the farm, medication and vaccine usage and follow prescribed protocols on needle and injection techniques, possible feed contamination,

and market hog and cull sow transportation. Independent validators sanctioned by the Manitoba Pork Council scrutinize those records. These validators are veterinarians.

With accurate records, it is easier to control the quality of the final product. Many interviewees indicated that ultimately the program will save them time and money because they will have the information they need to monitor their own performance, regularly improve their product and stay ahead of their competitors. Also processors confirmed that they look to CQA as a means of assuring the customer a safe, high quality product. Since November of 2001, the major packers have been discounting hogs that are not validated. In addition, the larger packers have indicated that contracts are only made with CQA approved farms.

At the end of 2002, 1,544 producers were registered under the CQA program in Manitoba, representing over 90% of the hog production. The number of producers that have been validated was 732 with the validation process to gear up further with 46 approved validators.

Traceability to the farm level

Producers currently use tattoos to identify their hogs. In addition, the Manitoba Pork Council has distributed complimentary broken needle ear tags and Tag and Tell adhesive stickers under the CAQ program to identify physical hazards. The problem is that once the animal is slaughtered and the carcass cut, it is impossible to identify the farm of origin. Producers interviewed recognized the consumer preference for food safety and product traceability. Concerns were expressed on liability and their lack of control of processes beyond the farm gate.

Packers recognize that consumers are looking for increased traceability from gate to plate as a mechanism to ensure food quality and quick response to health issues. Research is currently underway on using DNA as a mechanism to identify hogs throughout the supply chain. The packers also realize that the ability to trace back to farm will provide a unique opportunity to differentiate their product in the marketplace. They believe the consumer will pay a premium for this service.

Maple Leaf Foods recently announced that it is involved in a DNA traceback project that will permit traceability of fresh pork cuts and eventually processed products containing pork back to the farm. This should be operational in one of its plants within two years. The advantages of such a system are quite clear:

- It would allow the company to quickly trace the history of a product back through the food production chain.

- It could be beneficial in the event of a disease outbreak in Canada's hog herd by pinpointing where the disease originated, thus zoning the affected area and permitting pork exports to continue from other regions.

- It would assure customers that the pork they buy came from hog operations that followed accepted standards of production. Customers would have a way to audit how their pork is produced in terms of feed and other production practices such as medications used in hog production.

The cost of developing and maintaining a traceback system, and who should pay for it, is difficult to ascertain. One can legitimately conclude that a large number of small volume shipments would require more documentation than a few shipments of larger volumes. This reality may drive the system towards more contractual marketing from larger farming operations. Traceability could well become the “price of entry” to ship hogs to participating packers. The demand by the consumer for more quality assurance, validation and enforcement will drive the system over time but the result may be that any premium in the marketplace will compensate for only a portion of the costs incurred.

Biotech Housing

Biotech housing, also known as hoop shelters, can be used for feeding hogs or as housing for pregnant sows. Biotech houses are quonset-shaped, non-insulated buildings approximately 30 feet wide and 80 feet long with each end opened to allow natural ventilation. Barns may have dirt or concrete floors with straw used for bedding and warmth. Straw is added on a regular basis for the pigs to root in and for bedding. Because the barns are operated as an all in - all out system, the facility is cleaned out once the hogs have been shipped. The resulting straw/manure mixture can be composted.

Producers have favoured use of these structures as they require minimal capital investment (about \$15,000) and can be built in a short period of time. It should be noted that recent changes in provincial environmental regulations will require future structures to have concrete floors to militate against seepage from the manure/straw bedding. Other advantages of these structures are:

- Increased flexibility as the facilities can be used for storage during a price downturn,
- Reduced leg problems due to less confinement of animals,
- Less dense animal populations mean less chance of major disease outbreaks,
- Healthier lungs in the pigs,
- Less aggression by animals,
- Lower energy costs due to no heating except for the watering system,
- Environmentally sound composting of manure and less smell when spreading manure;
- Lower municipal taxes and insurance costs.

Hoop structures do have negative features. The most common complaints are the increased use of feed due to the animals having to use more feed to generate heat in a non-insulated barn, increased labour associated with straw bedding and handling/sorting pigs, increased variation in the herd due to dominant animals overfeeding and bullying and greater health management requirements because of the contact between pigs. Variable costs of biotech shelters can be up to 20% more than conventional barns.

Producers interviewed included those who used biotech shelters and those who did not. Those who used them like them because it provided the flexibility to feed out additional hogs rather than market them as weanlings. They viewed the capital cost savings as overcoming any negative features associated with higher feed grain consumption and labour costs. They also considered the composting of the manure a bonus as it eliminated the need for additional manure

storage units and the associated governmental approvals. Producers who indicated they did not use them stated that the range in consistency of size of animals was a concern. They also felt that the labour and feed costs were deterrents in adopting this system.

Animal Welfare Considerations

Animal welfare is shifting from a matter of personal ethics to one of societal ethics. Media coverage continues to abound on the use of sow gestation stalls. These stalls have been banned in Britain and the Netherlands since the late 1990's with other EU countries restricting or limiting their use. The recent referendum in Florida banning the use of gestation stalls has intensified the pressure on North American agriculture to adopt similar animal welfare practices.

The Winnipeg Humane Society and other animal welfare groups have lobbied the industry and government to ban gestation stalls and incorporate loose housing systems. Animal welfare issues are forcing the livestock industry, including slaughter facilities, to become more accountable to society as a whole for the manner in which their animals are cared for and to incorporate new "animal friendly" practices in the production and processing systems.

Producer groups have responded by keeping producers informed of the latest welfare-handling practices through articles in their newsletters, on their website and in easy reference brochures. Manitoba Pork Council and the Manitoba Farm Animal Council have also used agricultural displays such as the Touch the Farm display at the Red River Exhibition to provide the general public with information on present day livestock farming methods.

Producers interviewed consistently stated their interest in animal welfare. They stated some existing practices are being used for logical, humane reasons such as less aggression amongst sows and less potential for a sow crushing a weanling when it rolls. Although they continue to try and educate the general public on management practices, they felt it was an up-hill battle. They also indicated that the consumer demanding these changes would be unwilling to incur the additional losses/costs associated with specific practices. In effect, the market premium would be less than the cost of adopting the practice. Producers and other industry partners could only use these practices as a marketing feature to try and gain market share.

Potential new production technology

Considerable expenditures on research and development are being made on identifying new technology that will make hog production more efficient as well as reduce the negative environmental impact of hog production. Of particular relevance to Manitoba is work taking place at the Prairie Swine Centre and the increased emphasis on hog research at the University of Manitoba, especially the recently established Centre for Agroecological Production Systems. Industry funding directly and through the Manitoba Livestock Manure Management Initiative is also growing.

Discussions with researchers and research managers indicate there do not appear to be any “magic bullets” in the innovation pipeline at this time. As well, much of the emphasis is on environmental technology, largely driven by tighter environmental regulations or the expectation of tighter regulations. This type of technology almost invariably increases rather than decreases costs of production. To the extent that the Government of Manitoba is contemplating stricter environmental standards, this would worsen the competitiveness of Manitoba’s hog production sector, especially if neighbouring provinces and states do not follow suit.

5. Environmental Considerations

This section provides a snapshot of the proposed changes to environmental regulations under which Manitoba’s hog industry must operate and their likely impact. A number of specific issues are also addressed. These include: water quality, odour, and phosphorus and nutrient management. Some comments are made about evolution of environmental regulations in other jurisdictions.

Changes in Manitoba’s Environmental Regulations relevant to Hog Production

A summary of Manitoba’s land use planning regulations pertaining to hog production can be found in Appendix G to this report. Here we focus on changes that were announced in July 2002, or are currently under discussion. In July of 2002, the Province announced that it intends to require that all municipalities prepare and adopt development plans clearly identifying areas where livestock operations will be permitted, restricted or prohibited (See Appendix D). This will necessitate the adoption or revision of development plans to include a livestock operation policy. The timeframe for implementation is 18 to 24 months from the July 2002 date. The municipalities will have to negotiate and obtain provincial approval of the new policies.

In addition, other policy changes were announced including:

Effective the spring of 2003, all new livestock operations of 300 animal units or more will have to have manure management plans and no winter spreading of manure on land will be permitted. Established operations with 300 or more animal units will have to register their manure management plans by February 2004. No winter spreading of manure will be permitted after November 2010.

The Province will introduce provincial standards on the siting, setback and separation distances that municipalities will use in livestock operation decision-making. These standards will provide more consistency in local decision-making. Provincial standards will be based on existing farm practices guidelines and will override any existing by-laws. Municipalities will have the ability to vary the provincial standards by a small percentage to take into account local circumstances.

The conditional use process will be replaced by a standard review process which will require all livestock operations of 300 AU or greater to publish a public notice, have a

local hearing and have a technical review committee report to assist the decision-making process. Council will make a decision as to whether or not to vary the provincial standard, the need for a development agreement and other conditions. There will not be an appeal mechanism to the decision of council. The main purpose of the local hearing will be to deal with the specifics of the livestock operation, land use policy considerations having been dealt with under the development plan.

In January 2003, the Department of Conservation initiated a consultation process on amendments to the Livestock Manure and Mortalities Management Regulations that follow from the July 2002 announcements. The amendments have the objective of enhancing the environmental performance of the livestock industry in Manitoba. In February 2003, the Department of Intergovernmental Affairs also initiated a consultation process with municipalities on amendments for planning for livestock operations. These also follow from the July 2002 announcement. At this time, the revisions (if any) arising from the consultations are not yet known. However, many industry observers had some reactions and these are summarized below.

Several general themes emerged from discussions about environmental regulations with industry observers. One of these was that, for regulations to be effective, government had to commit sufficient resources for monitoring and enforcing the regulations. Although the Manitoba government has increased regulatory staffing over the last several years, this is still generally deemed to be inadequate, especially in the area of manure management plans. There is also a belief that rural municipalities are inadequately staffed to monitor and enforce local bylaws.

Another theme was the widely held view that tougher environmental regulations will hasten the departure of small-scale farm operators. Larger farm operations are in a better position to have the financial resources, technical knowledge, and human resources to know and follow increasingly complex regulations. An example often cited was the regulation to reduce the threshold level for requiring a manure management plan and prohibition against winter spreading from 400 to 300 animal units. This would result in many of the farmers in the 300 to 400 animal unit range exiting hog production. It was also suggested that the impact of this regulation might impact the cattle sector even more than the hog sector. This creates a dilemma for provincial government policy makers who, on the one hand, are advocating policies to protect the small family farm while, on the other hand, also advocating increased regulations to protect the environment.

A third theme was the concern that regulations add to the cost of production and decrease the competitiveness of the Manitoba hog production sector. The issue was one of the Province of Manitoba not getting too far out in front with its regulation of the livestock industry relative to competing jurisdictions in Canada and the US. It appears that a number of jurisdictions that are competitors in hog production with Manitoba are in the process of implementing stricter environmental regulations for livestock production. These include Ontario, Quebec, Iowa, and Minnesota. Alberta has recently introduced new environmental regulations for livestock, but these do not appear to be as restrictive as Manitoba's regulations. Saskatchewan is developing a hog sector strategy, but has not yet altered its environmental regulations. Summaries of these six jurisdictions' environmental regulations relating to livestock can be found in Appendix H.

Water Quality

During the public consultations by the Livestock Stewardship Panel, fears were often mentioned of deteriorating surface water and groundwater quality due to established and potential ILOs. Concern focused chiefly on large hog operations, and included both potentially leaking manure storages, be they constructed of steel, concrete, or earth, and on contamination of both surface water and groundwater due to manure application to land. Fears of water contamination in areas with a preponderance of porous, sandy soil were often mentioned. The regulation of manure spreading according to nitrogen content rather than phosphorus content, which can lead to an over-application of phosphorus and the potential for eutrophication, was also frequently mentioned, as was contamination of fields with the parasites and pathogens contained in the manure. Many of these issues are still very much before us several years later.

Generally speaking, the negative effect of specific large livestock operations on water quality has not been scientifically demonstrated. However, cumulative effects, likely from various sources including other agricultural activities, are producing deteriorating water quality in, for example, the Assiniboine River and Lake Winnipeg. The situation regarding eutrophication of Lake Winnipeg is particularly urgent. A recent report from Manitoba Conservation on nutrient loadings in Lake Winnipeg (Bourne et.al. 2002) raised many issues, especially the role of all agricultural operations and not just hogs in contributing to nutrient loadings. On February 18 2003, the Province of Manitoba announced a Lake Winnipeg Action Plan that had, as one of its thrusts, the establishment of a Lake Winnipeg Stewardship Board to help Manitobans identify further actions necessary to reduce nitrogen and phosphorous to pre-1970 levels in the lake by 13 per cent or more, subject to further findings of the Nutrient Management Strategy (See Appendix I for more details).

Unfortunately, inadequate monitoring of current livestock operations, and cutbacks in the 1980's and 1990's to both federal and provincial government water quality monitoring programs have resulted in an inability to adequately assess the water quality effects of large livestock operations. The current level of monitoring and the system for coordinating and reporting monitoring results are insufficient to give the public confidence that the current intensification of agriculture is environmentally benign. To what extent the Lake Winnipeg initiative will have a real impact will depend on the commitment of financial and human resources.

A water related matter that should be of some concern to hog producers is the volume of water that is used in hog production, especially manure handling systems. A recent study by Clarence Froese of DGH Engineering suggested that water consumption could be reduced by up to 50%. This could translate into a saving of about \$24,000 in manure hauling costs in a 600 sow farrow-to-finish operation. In addition to the economic advantage of a more water conserving approach,

this would position large-scale hog barns to better to respond to water shortages, should they arise in the future.

Phosphorus and Nutrient Management

The development of intensive livestock production in Manitoba has changed the dynamics of phosphorus movement. Grain containing the phosphorus that was previously exported to Europe or Asia is now being fed to livestock here at home. As manure from this livestock is applied to cropland, the phosphorus that previously would have been lost from the production system through export is now being recycled. One possible effect of this recycling is an increased phosphorus escape from soil to water and an accompanying increase in algal blooms, causing a decline in water quality. One manifestation of this effect may be the current situation in Lake Winnipeg where large algal blooms have begun appearing in the north basin whereas in the past they appeared only in the south basin. However, the relative importance of manure, inorganic phosphorus and municipal sewage to water quality in Lake Winnipeg is not well understood. A more detailed explanation of how phosphorus moves from land to water is found in Flaten (2002).

The Livestock Stewardship Panel (2000) recommended that the Province should move toward regulating manure application according to phosphorus content of soil and manure, and future ILOs should be located in order to provide sufficient acres for manure application according to phosphorus content. One of the outcomes of that recommendation was the launch of a study by Flaten et al (2002) in 2002 with the objectives of the study being to review and adapt the bodies of existing knowledge on the role and fate of phosphorus in livestock and crop production systems specifically relevant to Manitoba, and identify gaps in knowledge and briefly describe what should be done. This report should be completed by the end of April 2003, and will likely influence the direction for Manitoba's approach to phosphorus regulation in agriculture.

There is a growing awareness that nutrient management (that is, balancing the use of manure and inorganic fertilizers for crop production) is a skill that must be mastered if the phosphorus build-up in soils is to be dealt with. A matter of some concern is the imbalance of nitrogen and phosphorus in soils where manure is applied along with commercial fertilizer. A recent study by DGH Engineering (2002) provided a preliminary assessment of the nutrient balance in four municipalities – LaBroquerie, Hanover, Roland and Sifton. Each municipality had a different set of livestock/crop/soil type mixes. A general conclusion was that in areas that have a concentration of intensive livestock operations the import of large quantities of livestock feeds is contributing to a build up of nutrients, both nitrogen and phosphorus, in the soil. This increases the risks of nutrient losses to water resources.

The matter of how to deal with the phosphorus issue received a number of suggestions from industry observers. These included:

Regulations should focus on nutrient management rather than manure or phosphorus management. Nutrient management is a more realistic approach than environmental farm planning.

Phosphorus should be viewed on a watershed rather than an individual farm basis. It is premature to regulate manure distribution based on phosphorus, given the lack of adequate Manitoba relevant science to do so. This is especially the case if a “P index” is to be used. Before regulating based on phosphorus, more research should be done on the use of phytase and other feed additives to reduce the phosphorus content of manure. Before moving towards phosphorus regulations, Manitoba should monitor the effectiveness of recently introduced phosphorus based regulations in other jurisdictions.

Odour

Probably the most emotional reaction to hogs is related to issues of air quality, often in the context that “pigs stink”. The concerns raised range from odours impacting the quality of life of neighbours, to health hazards for barn workers, to disease transmission from animals to humans. The challenge is to separate largely emotional reactions to the nuisance of odors from genuine health hazards. A related factor is that odor has become the focal point for people (both urban and rural) who are opposed to large scale farming operations, especially those where the owners/investors do not reside in the immediate vicinity of the farm.

Odours are among the hardest contaminants to manage because of the inherent subjectivity associated with measuring and defining what constitutes unacceptable levels. People who are worried about odour from livestock operations probably will never accept assurances from government or industry that odors are not a problem unless it is possible to actually measure intensity at a site rapidly, with results that can be reproduced. Public tolerance is modified by the duration of an event and how often it is repeated. Different kinds of odor from swine, poultry or cattle, for example, produce different psychological and physiological reactions. All these factors challenge research and the development of practical measurement devices while the industry addresses the task of reducing the strength of odours and arranges its infrastructure so that the worst can be avoided. It is also important to note that the reduction of odours often runs in parallel with the protection of health. A clean and well-ventilated barn means healthier pigs and fewer pathogens for potential transfer to workers, as well as a less offensive aroma.

Odours originate from barns, manure storage and manure spreading. Minimizing their impacts is very much a management consideration, management that includes a commitment to maintaining the best possible relationships with neighbours. Looking to the immediate future, covering manure storage either with straw or fabric, using feed additives to reduce odour production in the animal, and swift incorporation of manure into the soil promise better air quality at the least cost. There remains the fact that aerobic treatments such as aeration and composting, though more effective in odour control as compared with slurry systems, are less convenient and more costly. Similarly, effective measures to reduce nitrogen loss by covering manure storage or direct injection of manure into the soil are also accompanied by odour reduction. Current research into the quality of the nutrient and its mode of distribution is also likely to lead to some odour reduction.

The utmost care in managing the sources of odour will always be required. While improvements in reduction of odours based on a steady research effort can be expected, it is unlikely that odour complaints will decrease. The idea that manure is a smelly waste rather than a resource continues to linger in our psyche. One can speculate that this attitude is not yet wholly purged from the industry, let alone from the general public!

Notwithstanding some sympathy for the "right-to-farm" advocates and bearing in mind that new ILOs will be more effective in odour control than those of the past, the initial siting decisions should receive very careful analysis of potential air quality issues that can be assembled by the municipality before each decision is rendered. This should take into account how the operator intends to cover the storage and how and when the manure will be spread. Local climate and landscape might be as important in odour distribution as distance to neighbours in some parts of the province. Considerations of cumulative impacts should include the effects of on-site expansion in the future as well as the general regional air quality to which clusters of ILOs contribute.

Odour is probably one of the most challenging issues facing the hog production sector, not only in Manitoba, but also throughout North America. This will require a concerted effort by industry and government to identify technology and regulations that will be acceptable to all stakeholders including the public.

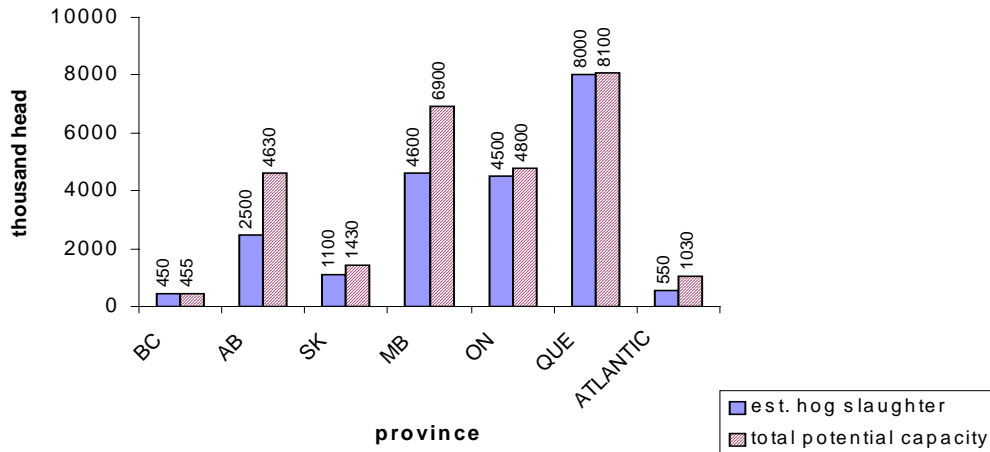
6. Hog Processing in Manitoba

This part of the report assesses the most important factors impacting expansion of hog processing capacity within Manitoba, including labour supply, the volumes of hogs required to achieve a second shift, environmental concerns, and COOL.

Current Hog Processing Situation in Manitoba and Other Prairie Provinces

As shown in the figure below, significant excess slaughtering capacity exists in Western Canada once one considers the potential for additional shifts at Olymel's Red Deer, Alberta plant and Maple Leaf's Brandon, Manitoba plant. For the three Prairie Provinces, the existing capacity is almost 13 million head while only 8.2 million hogs currently are being slaughtered.

Hog Slaughter and Capacity By Province, 2002



Manitoba has four major and two minor federally inspected plants and 29 provincially inspected plants. Manitoba hog slaughterings for 2002 totaled 4.42 million head – 4.28 million in federally inspected plants and 0.14 million head in provincial plants. The federal slaughterings were 6.4% higher than in 2001 while the provincial figure was 11.2% greater than the previous year.

In general, the meatpacking industry has consolidated rapidly in the last two decades as today's leading firms build very large state-of-the-art plants and many independent packers disappear. This trend has been prevalent throughout North America. Analysis by USDA has concluded that slaughter costs per head for a large hog plant of 4 million head annually are more than 25% lower than the cost of a mid-sized plant of 1 million head and nearly 40% lower than a small commercial plant of 400,000 head. This concentration raises the issue of the degree of price competition for market hogs. The other side of the equation to keep in mind is the growing concentration of the retail trade and the limited bargaining power processors/further processors have with this group.

Manitoba produces sufficient hogs for its local packing facilities but, because of the large numbers of live hogs exported to the US, approximately 750,000 hogs from other provinces are killed in Manitoba. The number of hogs imported from other provinces has been declining as Maple Leaf has been negotiating more contractual arrangements with Manitoba hog producers.

Manitoba, besides being the largest live hog-exporting province, is the second largest pork exporter in Canada. Approximately \$500 million of pork is exported to over 35 countries. Exports are approximately 54% chilled, 37% frozen and about 6% offal on a value basis. Comments expressed by the industry during interviews suggested that the Red Deer plant and the

Brandon plant were most likely candidates for a second shift. Smaller plants could be built to meet niche market needs but would not be significant competition for the larger industry players.

Prospects for the Brandon Plant

Rapidly increasing hog production in the province since the change in grain transportation policy in 1995 has resulted in expansion of the hog slaughtering/processing facilities in the province. Maple Leaf Pork opened a new world-class, state-of-the-art \$120 million facility in Brandon in September of 1999. The facility has a capacity of more than two million hogs per shift but continues to operate a single shift. Given the high fixed costs of this facility, a second shift is necessary to fully capitalize on its scale. There are a number of factors constraining expansion to a second shift.

Labour

Maple Leaf has had difficulties retaining a stable workforce at its Brandon plant. Focus has been on reducing employee turnover, absenteeism and work-related injuries as a means of improving productivity. Initially, employee turnover was running at 100% with average domestic recruitment costs of \$1,300 per employee, this turnover of 1,300 employees had substantial financial implications. Absenteeism had been reported in the 17% range.

Maple Leaf undertook a pro-active approach by surveying its employees to address the problems. Actions included opening up the collective agreement and implementing the wage rates scheduled for 2006 in September 2002. Base wages rose from \$8.65/hour to \$9.45/hour. Performance bonuses of an extra \$1/hour for perfect attendance in a four-week cycle and recruitment bonuses for employees who referred new workers. The net result has been a more stable workforce and an absenteeism rate of 6%.

Maple Leaf recognizes that unemployment rates are low in the province and in the Brandon area. Attracting new employees in Brandon means they must be drawn away from other jobs. It is difficult to attract employees to Brandon from the Winnipeg region because of the higher housing costs in Brandon and the different lifestyle. Because of this, they have recruited from outside the region drawing from First Nations communities, the Maritimes, Mexico, El Salvador and Guatemala. Currently, 70 employees are on a foreign worker permit.

A second shift at the Brandon plant would require at least 1,000 additional employees. It is difficult to determine where this number of employees would come from given the current situation. Maple Leaf acknowledges that it is difficult to recruit given people's perception of a slaughterhouse and misconceptions about living in a small city on the prairies.

Availability of Slaughter Hogs

In effect, Maple Leaf already has other slaughter facilities custom killing two-thirds of the weekly volumes they would need to have a second shift. These other processors would operate

at less than full capacity if Maple Leaf assumed a second shift. Maple Leaf would also continue to use contracts to increase the volumes of hogs committed to its facility and would purchase a small number of hogs on the cash market to top up the numbers. Hogs could also be contracted with producers in Saskatchewan and Alberta.

Availability of hogs may not be as much of an issue as the availability of markets. Maple Leaf will not expand to the second shift until it has a secure, consistent, reasonably priced market for the pork. As the US market is a dominant buyer of Canadian pork, the current situation regarding COOL and the bio-terrorism legislation has influenced Maple Leaf's decision to adopt a wait-and-see approach. Canada's recent stand on participation in the Iraq war may also add to uncertainties about the US market.

Environmental Considerations

When negotiating the original agreement with the City of Brandon, Maple Leaf clearly identified the need for sewage treatment handling facilities for two shifts. The City of Brandon must obtain provincial approval for the expansion of its treatment plant to accommodate the second shift. More fundamental is the issue of who will finance this treatment plant expansion. Neither the City of Brandon nor the Province has identified funds for this purpose.

Questions have also arisen as to the availability of water for further industry expansion. Should the second shift at the Maple Leaf plant become a reality, there would be no additional water resources for other industrial development.

Other Issues

Other issues raised by some industry observers were the availability of freezer space and the availability of containers for export shipping. The larger packers indicated they had adequate supplies of freezer space but that the industry had not expanded its capacity in a number of years. This situation may limit smaller packers in obtaining space within major centres. A more common complaint has been the lack of containers for shipping and lack of competition in servicing this market.

Impact of COOL

Although discussed in a previous section at some length, it would be wise to reiterate some of the basic comments stated by some industry observers. All felt that the net result of the COOL would be to encourage more slaughtering of hogs in Canada. The focus of the US industry to service its domestic market needs should result in the US pulling out of some export markets. Canada should be able to capitalize on these third country market opportunities. Some reports have suggested that the US could lose up to 40-50% of its export markets.

In addition, many felt that COOL will provide an opportunity for Canadian pork sold in the US in two ways. The first way is that it would allow the industry to further capitalize on branding

Canada as some Americans view Canadian pork to be of a better quality than their domestic product. The second way is that only minimal amounts of Canadian pork move into the hotel/restaurant/institution sector. As this sector is excluded from the COOL, the Canadian industry could target this market.

7. Putting It All Together

The last part of the report presents a vision for Manitoba's pork value chain, synthesizes the observations and conclusions, and makes recommendations as appropriate.

Prospects for the Future

The current "environment" for the Manitoba pork sector can best be described as one beset by uncertainties. Farm level hog production has been rising rapidly, but there are a number of dampening factors. The feed situation has been exacerbated by the prevalence of fusarium in barley and the impact of drought in the last two years. There is considerable excess hog slaughtering capacity in the province. Although current production could fill that capacity, approximately 45% of Manitoba's hogs go to the US for finishing and slaughter. The Country of Origin Labeling provision of the new US Farm Bill, however, raises questions as to whether that level of exports will be sustained into the foreseeable future. Even if these exported pigs remained in Manitoba, there would be challenges to starting a second shift in the Maple Leaf plant in Brandon because of labour shortages and environmental considerations.

At the same time, public opposition to large-scale hog operations continues to grow because of growing concerns about water quality impacts, odour, and community socioeconomic impacts. The uncertainty and concern is fueled by the Provincial government's seeming lack of a hog sector strategy, and its timid approach to introducing and enforcing guidelines and regulations that would encourage the sustainable growth of Manitoba's pork value chain.

The forecast for 2003 is an expansion of production to at least 7 million hogs in Manitoba compared to 6.4 million in 2002. The usual market forces including price, of course, will influence this. Beyond that, our most optimistic longer-term forecast of hog production, based on the various factors discussed above, would be 7.5 to 8 million hogs, an increase of 25% over current production levels.

Future development of Manitoba's pork value chain to achieve this level of production will have to take place in the context of principles for sustainable livestock development. These were outlined in the report of the Livestock Stewardship Panel (2000) and include:

Economic, environmental and social considerations must be integrated in public and private decision-making.

The concept of stewardship is paramount; that is, today's decisions must be balanced with tomorrow's impacts.

The long-term productive capacity and quality of our natural resources must be maintained.

Economic returns from production should enable an adequate standard of living to be maintained; furthermore, it should be sufficient to continue to attract replacement farmers and new capital.

Economic activity should not detract from human health or the quality of land and water; a balance must be struck between the size of production units consistent with technology and a social structure acceptable to all stakeholders.

Science based information must be an integral part of public and private decision-making. Where that information is inadequate, government and the private sector have a responsibility to support appropriate research activities.

Means to ensure that the results of the research are effectively communicated to farmers and decision-makers also are necessary.

Adequate resources must be allocated to monitor and enforce compliance with regulations and standards.

There must be sufficient transparency to stakeholders in the production, processing and regulation of the livestock industry to instill confidence that Manitoba's food is being produced in a safe and sustainable manner.

Significant challenges to a sustainable pork value chain

Feed availability and price

Manitoba is not, and is unlikely to become, self-sufficient in feed grains for the hog production sector. US corn will have to play an ever-increasing role in supplying feed grain to Manitoba's hog production sector. Prices of feed grains in Manitoba will increasingly shift to an import basis, and away from an export basis.

As hog production expands, fusarium-free feed supplies will have to be brought in from greater distances and at a higher cost. The likelihood of fusarium-free feed in the foreseeable future is not hopeful, particularly with the focus of the grain variety licensing system on kernel visual distinguishability requirements.

Droughts during the last two years on the Eastern Prairies have significantly reduced crop yields and correspondingly the availability of locally grown feeds for the hog industry.

An additional challenge for hog production under drought conditions will be to reduce the volumes of water used in hog production, especially in manure management systems.

The likelihood of crops such as soybeans and peas becoming significant sources of alternative feed for the hog industry in the future is small.

If ethanol production expands in Manitoba, this will result in more competition for barley and wheat as feedstock for ethanol and a resulting increase in feed grain prices. Distiller's dry grain, a by-product of ethanol production, is unlikely to be a major source of feed because of small volumes.

A likely impact of the US Farm Bill will be that subsidies will keep corn prices low and supplies plentiful for both US and Manitoba users.

Production competitiveness

Production contracts will be increasingly prevalent as a risk management tool for both producers and processors. Production contracts with US feeders and packers are essentially driven by market forces, namely better prices when available in the US, and a desire by producer to have a broader buyer base for their hogs.

Manitoba has lost the competitive cost advantage it enjoyed several years ago because of the growth in feed imports, namely US corn. It is also unlikely that the cost advantage relative to Minnesota will be regained.

One of the most worrisome threats to live hog exports to the US, especially weanlings and feeder hogs, is border closure due to an outbreak of disease.

The jury is out on the impact of COOL but it would appear that the legislation may have more of a negative impact on the US industry than on the Canadian industry.

At the end of 2002, 1,544 producers were registered under the CQA program in Manitoba, representing over 90% of Manitoba's hog production. Larger packers have indicated that contracts are only made with CQA approved farms. CQA certification will become a necessity over time if a producer wishes to sell his hogs locally.

The demand by consumers for more quality assurance, validation and enforcement will drive the system towards traceability. Traceability could well become the "price of entry" to ship hogs to participating packers.

Biotech or hoop housing has its proponents and detractors. The tradeoff appears to be between capital cost savings and higher feed grain consumption and labour costs. Biotech housing may be a useful stopgap measure to expanding feeding capacity over a short period of time.

The major animal welfare issue appears to be the use of sow gestation stalls. Given the trend towards banning these stalls in some jurisdictions, the industry must continually consider alternatives and test new approaches to animal housing.

Even though there is a significant research effort underpinning the hog industry and many incremental innovations are coming forward, there do not appear to be any "magic bullets" for cost reduction or alleviation of environmental concerns in the innovation pipeline at this time.

Processing capacity

Manitoba produces sufficient hogs for its local packing facilities but, because of the large numbers of live hogs exported to the US, more than 800,000 hogs from other provinces are killed in Manitoba.

Manitoba will need to expand its feeding capacity to retain hogs in Manitoba and ensure sufficient hogs are available for the excess processing capacity in the province.

There are a number of constraints to operating a second shift in Brandon: availability of labour, availability of slaughter hogs, and provincial approval for the expansion of the Brandon sewage treatment plant to accommodate the second shift.

There would be no additional water resources for other industrial development in Brandon if the second shift at the Maple Leaf plant becomes a reality.

Maple Leaf is unlikely to expand to the second shift until it has a secure, consistent, reasonably priced market for the pork from that shift.

Dependence on US markets

Manitoba's pork value chain, from production through processing, is highly dependent on US markets.

Increasing dependency on US corn will mean that Manitoba hog producers are unlikely to regain their competitive cost advantage in hog production.

The current situation regarding COOL and bio-terrorism legislation, as well as Canada's recent stand on participation in the Iraq war, may also add to uncertainties about the US market.

Pressures for Tougher Environmental Regulations

For regulations to be effective, government has to commit sufficient resources for monitoring and enforcing the regulations. Although the Manitoba government has increased regulatory staffing over the last several years, this is still generally deemed to be inadequate.

Tougher environmental regulations will hasten the departure of small-scale farm operators. Larger farm operations are in a better position to have the financial resources, technical knowledge, and human resources to know and follow increasingly complex regulations.

Tougher environmental regulations will add to the cost of production and decrease the competitiveness of the Manitoba hog production sector, particularly if Manitoba gets too far out in front of other jurisdictions.

Inadequate monitoring of current livestock operations, and cutbacks in the 1980's and 1990's to both federal and provincial government water quality monitoring programs have left us in the situation of not being able to adequately assess the water quality effects of large livestock operations. The current level of monitoring and the system for coordinating and reporting monitoring results are insufficient to give the public confidence as to whether the current intensification of agriculture is environmentally benign or not.

Regulations should focus on nutrient management rather than manure or phosphorus management. It is premature to regulate manure distribution based on phosphorus, given the lack of adequate Manitoba relevant science to do so.

Odours are very difficult to manage because of the inherent subjectivity associated with measuring and defining what constitutes unacceptable levels. The challenge is to separate largely emotional reactions to the nuisance of odours from genuine health hazards. .

Minimizing their impacts is very much a management consideration, management that includes a commitment to maintaining the best possible relationships with neighbours.

Society's attitude towards large scale agriculture, especially hog production

Public apprehension about ILOs generally is being driven by several factors: declining familiarity with what actually happens on farms, experiences in other jurisdictions, the occasional local “horror story”, and the perception of insufficient monitoring of ILOs. Fears about the quality of drinking water as a result of disasters such as Walkerton, and concerns about the health of lakes and rivers has led well-intentioned citizens to look for convenient scapegoats, and large scale livestock operations are frequently targeted as causes.

Probably the most emotional reaction to hogs is related to issues of air quality, often in the context that “pigs stink”. The concerns range from odours impacting the quality of life of neighbours, to health hazards for barn workers, to disease transmission from animals to humans. The challenge is to separate largely emotional reactions to the nuisance of odors from genuine health hazards.

Hog odour has also become the focal point for people (both urban and rural) who are generally opposed to globalization and large scale farming operations, especially those where the owners/investors do not reside in the immediate vicinity of the farm.

The likelihood of this type of fear and opposition diminishing is small, and the challenge for hog and other agricultural producers is to be good neighbors by complying with environmental regulations, using common sense in agricultural practices such as manure spreading, and most importantly educating people about their business.

Recommendations

Research efforts need to be intensified towards solving the fusarium problem, and also serious consideration needs to be given to modifying the focus of the grain variety licensing system to recognize the growing importance of the Prairie region as a feed market relative to the human grain market.

Expanding the ability to finish hogs in Manitoba would provide some further flexibility in the event of border closures due to disease outbreaks. It also would contribute to more processing/value-added in Manitoba.

Before moving towards phosphorus regulations, Manitoba should monitor the effectiveness of recently introduced phosphorus based regulations in other jurisdictions.

The Manitoba pork value chain should concentrate on reducing its dependence on US markets.

Concluding comment

Notwithstanding the challenges cited above, we are confident that Manitoba's pork value chain has a good prospect to be a viable and sustainable component of Manitoba's economic and social

fabric. However, it will require a commitment by the Provincial government and the livestock industry to deal with many concerns about the impact of hogs on Manitoba's environment and rural landscape.

List of References

DGH Engineering, **Study of Regional Nutrient Balances in Four Municipalities in Manitoba**, October 2002

Flaten, Don, **The Risk of Phosphorus Transfer from Agricultural Land to Water**, October 2002

Flaten, Don, et al, **Acceptable P Levels in Soils and Impact on the Risk of P Transfer from Manure Amended Soils to Surface Waters**, research project funded by the Manitoba Livestock Manure Management Initiative, 2002

George Morris Centre, **Relative Profitability of Hog Production in Western Canada and the US Midwest**, October 2001

George Morris Centre, **Country of Origin Labeling: Implications for Manitoba's Hog Industry**, December 2002

Hayes, Dermot J. and Steve R. Meyer, **Impact of Mandatory Country of Origin Labeling on US Pork Exports**, Report prepared for National Pork Producers Council, February 2003

House, J.D., D. Abramson, G.H. Crow, and C.M. Nyachoti, **Feed Intake, Growth and Carcass Parameters of Swine Consuming Diets Containing Low Levels of Deoxynivalenol from Naturally Contaminated Barley**, Canadian Journal of Animal Science, 82:559-565, 2002

Key, Nigel and William McBride, **Production Contracts and Productivity in the U.S. Hog Sector**, American Journal of Agricultural Economics, 85(1): 121-133, 2003

Kraft, Daryl and James Rude, **Feed Grains and Ethanol Processing in Manitoba**, presentation to Manitoba Ethanol Advisory Panel, September 2002, and personal correspondence

Livestock Stewardship Panel, **Sustainable Livestock Development in Manitoba: Finding Common Ground**, Report prepared for the Government of Manitoba, December 2000

USDA, Economic Research Service, **Consolidation in Meatpacking: Causes & Concerns**, Agricultural Outlook, June-July, 2000

List of Appendices

- APPENDIX A List of Organizations and People Interviewed
- APPENDIX B Questions Used in Interviews
- APPENDIX C Canada and Manitoba Current Hog Situation
- APPENDIX D Key Recommendations and Conclusions of the Livestock Stewardship Panel (2000)
- APPENDIX E Government of Manitoba Response to Livestock Stewardship Panel report (July 2002)
- APPENDIX F: Analysis of Feed Grain Supplies and Feed Requirements in Manitoba
- APPENDIX G Land Use Planning and Environmental Regulations in Manitoba
- APPENDIX H Environmental Regulations in Other Jurisdictions
- APPENDIX I Provincial Announcement on Lake Winnipeg Action (February 18 2003)

APPENDIX A

List of Organizations and People Interviewed

Industry

Alberta Pork Ed Schultz
Canada Pork Council Martin Rice and Eric Aubin
Canada Pork International Jacques Pomerleau
Hutterite Brethren James Hofer and several others
Hytek Ltd. Paul Vielfaure, Henry Van de Velde, Grant Lazaruk
Keystone Agricultural Producers Weldon Newton and David Rolfe
Manitoba Pork Council Marcel Hacault and Karl Kynock
Manitoba Pork Marketing Cooperative Gerry Friesen
Maple Leaf (including Elite Swine) Michael Detlefson, Lance Mistelbacher, Bill McLean, Dickson Gould, Scott Dick, Barry Tomiski
Puratone Corporation Kerry Church
Saskpork Neil Ketilson

Government of Manitoba

Agriculture and Food Don Zasada, Dave Donaghy, Dori Gingera-Beauchemin, Janet Honey, Carol Gunvaldsen, Ian Seddon, Darrel Demetruk, Andrew Dickson, Gordon McKenzie, Ron Marchenski, Michael Knudson
Intergovernmental Affairs Heather MacKnight, Christine Burton, Ed Sawatzky
Conservation Dennis Brown, Al Beck, Sylvio Tessier, Mike Kagan
Clean Environment Commission Terry Duguid

Agriculture and Agrifood Canada

Cereal Research Centre Jim Bole
Marketing and Industry Services Branch Dave Wasylyshen
PFRA John Fitzmaurice

Research and Academic

DGH Engineering Ltd Doug Small
Manitoba Livestock Manure Management Initiative Garland Laliberte and Ron Johnson
Manitoba Rural Adaptation Council Bob Hoffman

Prairie Swine Centre John Patience
University of Manitoba Jim House and Daryl Kraft
University of Saskatchewan Ernie Barber

Other

Association of Manitoba Municipalities Stu Briese, Gary Wasylowski, Ron Bell, Joe Masi, Richard White,

Cam Brown

CIBC Barry Smith

Credit Union Central Bernard Carling, Dave Kaminsky, Eric Klippenstein, Doug Shumilak

Farm Credit Canada Bonnie Hagborg, Roland Kirouac, Charles Koch

Hogwatch Fred Tait

APPENDIX B Questions Used in Interviews

The following list of questions was used to bring some structure to discussions with key stakeholders. Not every stakeholder necessarily commented on every question.

Feed Market Situation

1. What do you see happening to Manitoba's barley production over the next ten years?
2. Do you see Canadian and/or Manitoba barley exports decreasing over time? If so, why?
3. Will Manitoba be able to access sufficient supplies of feed grains in Western Canada?
4. Given current prices of feed grains, do you see these prices continuing into future? If so, for how long? What would be the most likely scenario for a price decline?
5. Have you bought feed grains from other provinces or states in the last three years? If yes, from which ones? What have been the major factors affecting where you sourced your feed grains?
6. What do you see as the impact of fusarium on the hog industry in Manitoba? If you are a hog producer, has the presence of fusarium affected your feeding regime and the prices you must pay for feed grains? If yes, how? Is fusarium resistant grain the answer to the problem? How can the grain industry and the regulatory system best respond to make fusarium resistant grain more accessible? How do we address concerns regarding its non-distinguishability from other grain and maintain the integrity of the grain system?
7. Do you think the drought and climate change affect Manitoba's ability to grow or access feed grains from within Canada? In the short term? In the long term?
8. Will the US Farm Bill result in farmers changing their cropping patterns in Canada? If so, what changes do you see occurring? Will these changes impact the livestock sector? Will this necessitate more reliance on imported feed grains?
9. Given the recent announcements of new ethanol plants being built in Saskatchewan and Manitoba, how will this affect the availability of feed grains for hogs in the region? Will you be able to use the by-products of these plants in your feeding rations? Why or why not?

Challenges to Expanding Hog Production

1. It is estimated that 40% of hog production in Manitoba is sold under contractual arrangements with Manitoba processors. What are the advantages/disadvantages for hog producers entering into production contracts with hog processors? Do you see this trend continuing?
2. A number of weanling and feeder hog producers have entered into contractual arrangements with the US industry. How have these contractual arrangements been changing over time? Are they becoming more important? Will they continue to be important in the future? What will drive change?

3. Manitoba exports a large volume of live hogs to the US. What has contributed to this growth in US demand (i.e. contractual arrangements; stricter US regulations; outstanding quality)? Will this trend continue?
4. Does the US hog producer have a production advantage over the Canadian producer? If so, what are these advantages and do you see them changing over time?
5. What would be the implications to the Manitoba industry and individual producers if the US border were to close for any number of reasons, e.g., a disease outbreak or a trade dispute? How can the industry best address this before it happens?
6. How do you view the Country of Origin Labeling in the US impacting Canadian hog and pork exports? What should be Canada's reaction to this legislation?
7. Food safety is becoming increasingly important with consumers demanding traceability back to the farm level. Traceability to the farm level would also help source disease outbreaks. Does the Canadian industry have a sophisticated enough system to be able to trace a hog back to the farm? How can we best implement/improve on this? Who should pay for the system?
8. What new technologies/farming practices related to hog production do you see having a significant impact on hog production in the near to long term? What would entice producers to implement these technologies?
9. Some hog producers consider hoop structures as the best way to enter or expand production because of the minimal capital investment. Will the use of hoop structures increase over time and will this impact the supply of hogs by causing more variability?
10. Should the hog industry be concerned about animal welfare issues? Do you see a need for an industry-wide response? What should that response be? What should be the response at the individual producer level?

Environmental considerations

1. How will changes in environmental regulations impact the hog industry in Manitoba? How will they impact your operation?
2. Has the province been more effective in monitoring and enforcing its environmental regulations in the last two years? Is it able to keep up with an industry that has grown rapidly?
3. How do you see the regulatory process changing over time? What is the best way for the industry and the individual farmer to respond?
4. The Government of Manitoba is planning to implement the 300 animal unit limit for conditional land use permits to all species (i.e. cumulating across species). What is likely to be the impact of such a regulation on hog production in Manitoba?
5. Have regulatory developments and anti-hog lobbying activities at the municipal level impacted the siting and growth of hog production units? What other factors might impact siting decisions?
6. What impact would the requirement for environmental farm plans, as well as manure management plans, have on the expansion of hog production in Manitoba?
7. The drought situation in Western Canada has resulted in a depletion of water supplies/reserves in all Prairie Provinces due to diminished waterway flows and lower aquifer levels. Given the expansion of Manitoba's hog industry to date, can existing

supplies of water sustain the current size of the industry? Will availability of water be a major constraint on future expansion of the hog production and processing sectors? How might scarce water supplies be allocated among competing demands for water for agriculture and other uses?

8. How can the industry better utilise water resources? What role should government (municipal, provincial and federal) play?

Hog Processing Capacity

1. What are the major factors affecting the competitiveness of the Manitoba hog processing industry currently and in the future? How do you see this changing over time?
2. With the changes that have occurred in the last few years in the hog slaughtering industry in terms of the players and their sizes of facilities, has this impacted where Manitoba hogs are fed and slaughtered?
3. Are there sufficient hogs to meet all the needs of the various players?
4. What are the advantages for processors of using contractual arrangements to guarantee a portion of their slaughter hogs? How might this change in the future?
5. Maple Leaf is planning to add a second shift at its Brandon plant. What would be the major factors impacting the feasibility of this expansion (e.g., hog, supplies, labour availability, water supplies, environmental concerns)?
6. It has been suggested that freezer space in the province is limited. Has the availability of freezer space impacted processor operation or plans for expansion?
7. Where do you see the growth markets for pork? How critical are these growth markets for Manitoba's expanding hog industry? What are the major impediments to accessing these markets, and what might industry and government do to make Manitoba pork more competitive in these expanding markets?

APPENDIX C Canada and Manitoba Current Hog Situation

Canadian Situation

Canadian Hog Inventories

Table 1 indicates hogs on farms in Canada and major hog producing provinces on January 2002 and 2003. Manitoba had the largest increase in total hog numbers recording a 6.8% expansion. Both Alberta and Quebec had virtually no change in total inventories, while Ontario increased by 3.9%. Manitoba producers continue to expand their production base, increasing their breeding herd inventory by 3.3%, although this is lower than Ontario at 6.2%. Manitoba has 19.5% of total hog inventories while Quebec and Ontario have 29.1% and 24.9%, respectively. The three Prairie Provinces have 42.4% of total Canadian inventories.

Table 1: Canadian Hog Inventories, January 1, 2002 and 2003

	BC	AB	SK	MB	ONT	QUE	CANADA
<i>Total Hogs & Pigs on Farms</i> <i>Thousands of Head</i>							
2002	167.6	2125.1	1180.1	2688.1	3525.0	4290.8	14367.1
2003	162.0	2139.9	1230.0	2870.0	3661.4	4280.2	14726.3
% change	-3.3	+0.7	+4.2	+6.8	+3.9	-0.2	+2.5
<i>Female Breeding Herd</i> <i>Thousands of Head</i>							
2002	18.8	214.9	110.0	316.7	363.1	402.8	1462.8
2003	18.1	213.8	113.6	327.2	385.7	413.5	1506.9
% change	-3.7	-0.5	+3.3	+3.3	+6.2	+2.7	+3.0
<i>Market Hogs</i> <i>Thousands of Head</i>							
2002	148.0	1901.1	1065.3	2363.6	3149.2	3880.2	12859.9
2003	143.2	1917.5	1111.7	2534.8	3263.0	3859.8	13176.4
% change	-3.2	+0.9	+4.4	+7.2	+3.6	-0.5	+2.5
<i>Farrowing Intentions April to June</i> <i>Thousands of Head</i>							
2002	9.0	111.5	58.2	180.5	208.3	199.2	785.7
2003	9.0	114.0	58.0	181.5	218.5	205.1	804.7
% change	nc	+2.2	-0.3	+0.6	+4.9	+3.0	+2.4

Source: Statistics Canada

Canadian Hog Slaughter

Preliminary numbers for federal and provincial slaughterings in Canada to December 28 2002 are shown in Table 2. Table 3 indicates the origin of the hogs slaughtered. These two tables indicate that BC and Manitoba import hogs from neighbouring provinces as the number of

slaughter hogs originating in the province is less than the federal/provincial slaughter reported for the province. Similarly, Quebec imports approximately 775,000 hogs from Ontario and the Atlantic region.

Table 2: Canadian Hog Slaughter (Federal and Provincial) to December 28, 2001 and 2002

Province	Jan-Dec 2000	Jan-Dec 2001	Jan-Dec 2002	% change Jan-Dec 2001/2002
	number of head			
BC	346,356	451,171	504,683	+11.9
Alberta	2,091,472	2,218,087	2,589,184	+16.7
Saskatchewan	922,334	1,040,278	1,129,332	+8.6
Manitoba	3,923,880	4,147,548	4,418,068	+6.5
Ontario	4,039,243	4,256,837	4,628,639	+8.7
Quebec	7,653,040	7,840,993	8,123,732	+3.6
Atlantic	508,492	535,649	543,677	+1.5
Canada	19,484,817	20,490,563	21,937,315	+7.1

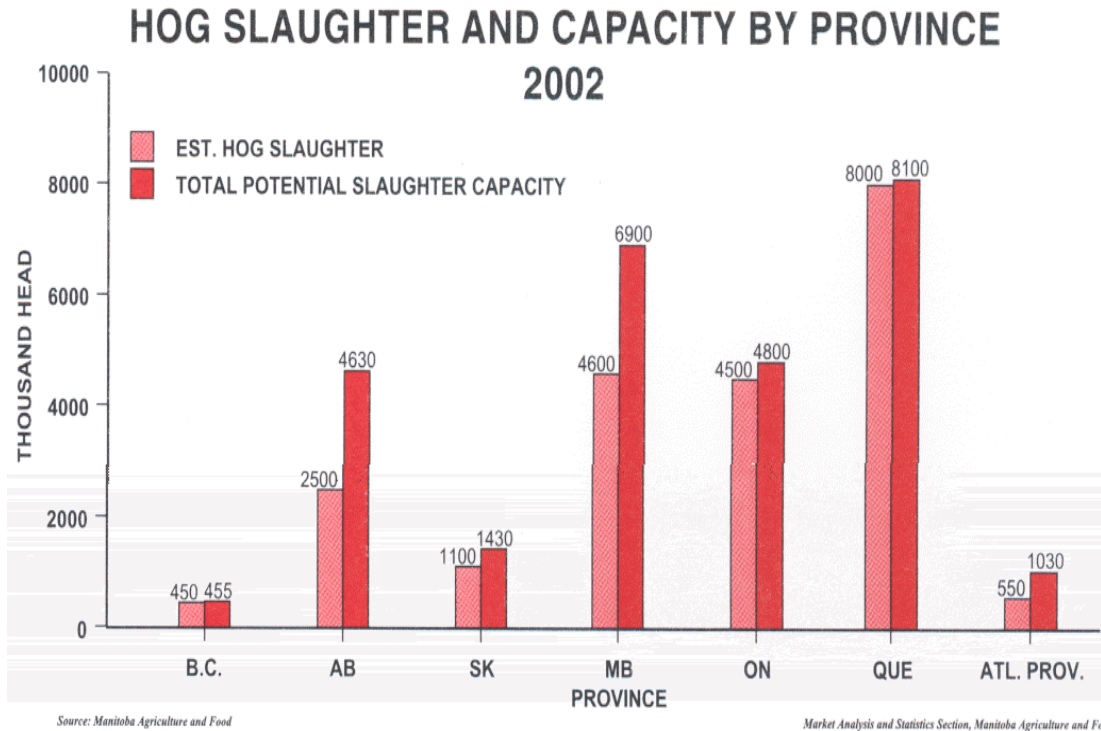
Source: Agriculture and Agri-Food Canada, Red Meat Section, Livestock and Meat Trade, 2001 Table 31 and Hog Statistics at a Glance, December 28, 2002.

Table 3: Canadian Hog Slaughter By Province of Origin to December 28, 2001 and 2002

Province	2001	2002	% change
	number of head		
BC	226,093	251,524	+11.2
Alberta	3,016,333	3,377,508	+12.0
Saskatchewan	1,184,983	1,404,801	+18.6
Manitoba	3,422,834	3,607,254	+5.4
Ontario	4,944,312	5,298,945	+7.2
Quebec	7,038,118	7,349,378	+4.4
Atlantic	657,890	647,905	-1.5
Canada	20,490,563	21,937,315	+7.1

Source: Agriculture and Agri-Food Canada, Red Meat Section, Hog Statistics at a Glance, December 28, 2002.

The figure below indicates potential slaughter capacity in each province as compared to its estimated annual slaughter volume. The large difference between actual and potential for Manitoba is related to the unused capacity at Maple Leaf's Brandon plant. This plant has the possibility of running two shifts but is currently only operating one shift.



Canadian Exports

Canadian live hog exports are primarily to the US. Exports of hogs less than 50 kg and those 50 kg or more have increased dramatically between 2000 and 2001. The increase in the under 50 kg category is the direct result of Canadian producers supplying weanlings to their US counterparts. Some Canadian operations have joint ventures in the US for feeding pigs with further arrangements with US packers.

Table 4: Live Hog Exports, \$000's and number of head

Item	1999	2000	2001	2002
Hogs less than 50 kg				
Value (\$000's)	75,959	109,052	160,126	170,476
Number	2,083,426	2,335,848	3,168,770	3,757,366
Hogs 50 kg or more				
Value (\$000's)	259,865	336,252	387,106	312,971
Number	2,052,625	2,018,517	2,152,298	1,967,417
Purebred breeding stock				
Value (\$000's)	1,320	1,846	9,251	4,423
Number	1,265	5,317	23,171	16,580

Source: Statistics Canada, CATS Database

Table 5 indicates Canadian pork exports. Growth continues to occur in the offal and chilled pork categories especially. Increases have also occurred in most other categories with the exception of cured and prepared meats.

Table 5: Canadian Pork Exports, \$ 000 and tonnes

Item	1999	2000	2001	2002
<i>Chilled</i>				
Value	578,448	862,468	1,044,673	976,312
Tonnage	211,023	266,003	285,969	321,989
<i>Frozen</i>				
Value	418,799	518,691	695,012	720,622
Tonnage	159,451	173,996	213,465	263,641
<i>Offal</i>				
Value	45,785	68,932	114,542	103,837
Tonnage	57,644	84,670	112,887	111,848
<i>Fat</i>				
Value	20,019	29,752	36,474	19,938
Tonnage	26,556	35,580	37,130	27,575
<i>Cured</i>				
Value	84,050	131,621	127,867	128,839
Tonnage	22,916	29,796	28,901	32,079
<i>Prepared</i>				
Value	161,451	185,521	191,923	202,391
Tonnage	43,250	46,757	42,132	47,598
<i>Total</i>				
Value	1,308,552	1,630,016	2,210,492	2,151,939
Tonnage	520,843	636,802	720,484	804,725

Source: Statistics Canada CATS database

Manitoba Situation

Manitoba Inventories

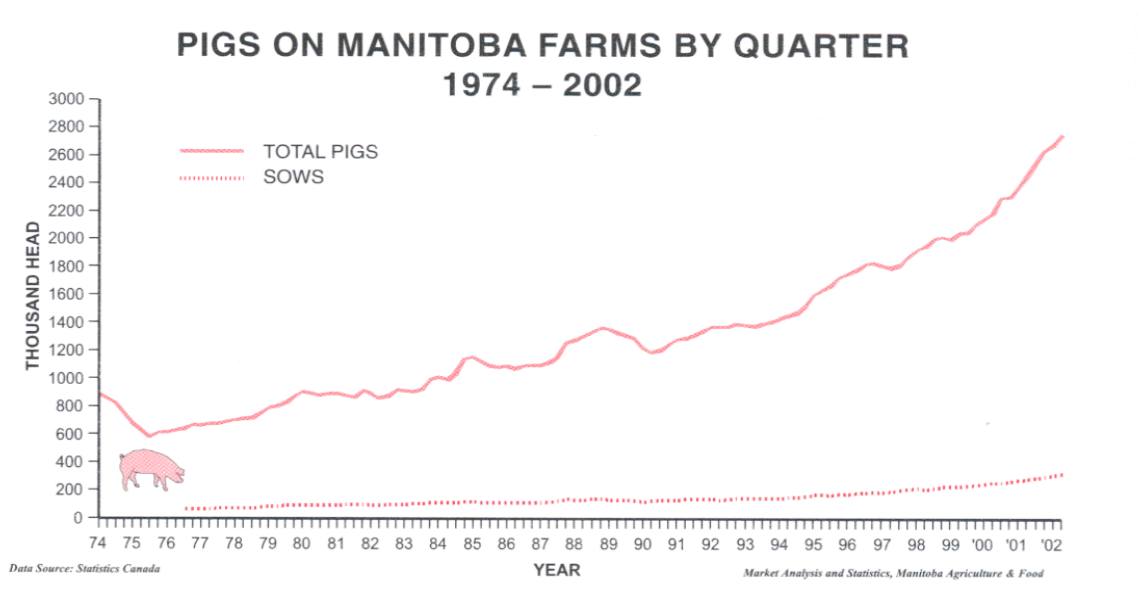
Table 6 indicates the detailed information on Manitoba hogs on farms. The industry is continuing to expand its breeding stock. Farrowing intentions for the April to June, 2003 period is projected to be 0.6% more with 181,500 sows being farrowed.

Table 6: Comparison on Manitoba Hog Numbers on Farms, Thousand Head

Category	Jan/02	Oct/02	Jan/03	Change from Oct to Jan.
Sows & Gilts for Breeding	316.7	321.5	327.2	+1.8
Boars	7.8	8.0	8.0	NC
Total Market Hogs	2363.6	2545.1	2534.8	-0.4
<20 kg	835.8	891.0	885.2	-0.7
20-60 kg	789.7	820.0	835.5	+1.9
>60 kg	738.1	834.1	814.1	-2.4
Total Hogs	2688.1	2874.6	2870.0	-0.2

Source: Statistics Canada

The figure below indicates the steady increase in Manitoba hog inventories since 1974. The elimination of the Western Grain Transportation Act provided added incentives to expand livestock production as feed grain prices at the farm gate declined once the higher transportation costs from the elevator to port position were taken into account. Manitoba has tended to focus on the hog industry.



The trend towards larger and fewer farms has been prevalent for a number of years. This consolidation process is demonstrated by the following example: on July 1, 1996, Manitoba had 2,064 hog farms with an average of 861 pigs per farm. By July 1, 2002 the number of farms had declined to 1,668 with the average number of pigs increasing to 1,523 per farm. It has been estimated that as of January 1, 2003 Manitoba had 1,660 hog farms with an average 1,729 hogs per farm. Manitoba Agriculture and Food has indicated that approximately 970 farms had 51% or more of their income from hog production. The pork industry in Manitoba is 19% farrow-to-weanling operations (0-23 kg), 33% farrow-to-finish operations (0-113 kg) and 48% feeder-to-finish operations (23-113 kg).

With the increase in exports has come a concern about the potential a disease outbreak would have on the provincial hog industry. Should the Canadian/American border be closed due to a disease, the federal and provincial governments would be liable to pay compensation to producers for the lost market. Given the 60%: 40% cost sharing arrangement and the large volume of Manitoba exports, concern has been expressed that the compensation package would bankrupt the Province.

Prices in Winnipeg hit an all time low in late 1998 when hog numbers exceeded hog slaughter/processing capacity in the US late in the year. The resulting excess supply over capacity resulted in low market prices with many farmers declaring bankruptcy. Concerns had been expressed that a similar situation may occur in the fall of 2002 but recent data from the USDA suggests that the volumes of market hogs will be less than processing capacity. It should be noted that Canadian live hog imports (weanlings, feeders and slaughter hogs) account for 5% of US slaughterings.

Table 7 indicates Manitoba exports of live hogs and pork. Weanling exports (less than 50 kg category) have increased continuously and in 2002 could approach the 2 million head level. Feeder and slaughter hog exports (50 kg and over category) have increased slightly in 2002 but are generally in the 900,000 head range. Purebred breeding stock exports are highly variable from year to year but in general account for less than 3% and usually less than 1% of total live hog exports. In terms of pork exports, Manitoba's exports are usually 50% chilled, 40% frozen and about 6% offal on a value basis. Total exports of pork in 2001 were valued at \$517 million while hog exports were valued at \$247 million. The US is the destination for 45% of Manitoba hogs and pork followed by Japan and Mexico.

Processing in Manitoba

Maple Leaf Pork built a state of the art \$120 million facility in Brandon in 1998. It commenced operation in September of 1999. Although it is capable of processing two-shifts of 45,000 hogs per shift per week, the plant has continued to operate one-shift only. Access to labour and retaining staff have been issues with Maple Leaf as evidenced by the recent importation of workers from Mexico. In March 2001, Maple Leaf purchased the J.M. Schneider hog slaughter and pork processing plants in Winnipeg. As of 2002, there are were four major and two minor

federally inspected plants and 29 provincially inspected plants in Manitoba. These plants killed about 4.2 million hogs, including 0.79 million head from Alberta, Saskatchewan, BC and Ontario. The number of hogs brought into plants from other provinces declined 20% over the level recorded in 2000 as more production in the province occurred. Concerns have been expressed by some of the smaller processors regarding the availability of freezer space and their access to existing space.

The average carcass weight of Manitoba hogs continued to increase in 2001 to over 90 kg. An estimated 373 million kg of pork and pork products (carcass weight) were produced in 2001 with an estimated wholesale value of \$1.1 billion.

Table 7: Manitoba Exports of Hogs and Pork, 1999-2002

	Value\$000's				Quantity no. of head or tonnes			
	1999	2000	2001	2002	1999	2000	2001	2002
Hogs less than 50 kg	47,131	66,367	88,665	92,082	1,350,309	1,439,361	1,720,329	1,934,011
Hogs 50 kg and up	116,183	140,420	151,892	153,988	934,228	900,477	889,613	944,963
Purebred	0	603	6,928	164	0	2,472	18,637	369
Total Live Hogs	163,314	207,390	247,485	246,234	2,284,537	2,342,310	2,628,579	2,879,343
Chilled pork	109,772	220,200	270,854	262,762	46,479	71,045	75,597	90,179
Frozen pork	107,206	145,468	197,207	182,668	29,931	44,403	53,232	59,374
Offal	3,021	11,865	32,208	30,161	3,640	14,259	32,239	34,608
Fat	1,835	3,731	3,482	673	2,672	4,108	2,921	1,020
Cured pork	384	427	289	1,143	169	187	134	224
Prepared pork	17,776	16,680	12,960	9,275	5,252	4,258	2,341	2,006
Total Pork	239,994	398,371	517,000	486,682	88,143	138,260	166,464	187,411

Source: CATS Database

APPENDIX D Key Recommendations and Conclusions of the Livestock Stewardship Panel (2000)

Synthesis of Key Conclusions

Many conclusions were drawn throughout the report. What follows is a synthesis of key themes.

Public apprehension about ILOs is being driven by several factors: experiences in other jurisdictions, declining familiarity with what is happening on farms, the occasional local “horror story”, and the perception of insufficient monitoring of ILOs.

The government is seen as the custodian of public interest in the environment. The public needs to be confident that government is ensuring that “things are being done right”, and must have access to information to be assured of this.

Current regulations and guidelines for ILOs, for the most part, are adequate; however, monitoring and enforcement are not.

Progress towards sustainable livestock development in Manitoba must be based on reliable information, and not emotion. This information should be drawn from research and practical experience, and must be relevant to the Manitoba situation.

Manure is a valuable product, capable of replacing expensive inorganic fertilizer and improving the soil, and should not be treated as a waste.

The Panel believes that expansion of ILOs can be sustainable in Manitoba, provided that Government follows the recommendations contained in this report.

Synthesis of Key Recommendations

The Panel has identified four key recommendations that are critical to achieving sustainable livestock development in Manitoba. These are followed by a series of supporting recommendations.

Role of Provincial Government in Sustainable Livestock Development

Of the 30 or so recommendations presented in this report, about two thirds address the involvement of the provincial government directly in the intensive livestock industry. It is not surprising, therefore, that the overarching recommendation from the Panel stresses the need for the commitment of staff and financial resources to be devoted to two tasks: first to gain a full understanding of the present situation of such operations in the overall milieu of agriculture in the province, and secondly, to provide a regulatory framework and a monitoring and enforcement effort in which expansion can take place without damage to Manitoba's people or environment.

In this regard, the Panel strongly recommended that:

Government focus substantially increased resources on the intensive livestock industry in Manitoba to provide analysis, guidance, inspection, monitoring, enforcement and

technological assistance that can accommodate the present scale of the industry and anticipate its expansion.

Capability to undertake comprehensive analysis of the potential impact of new or expanded ILOs upon both local and larger area environments should be enhanced immediately in order to lead to strong critical decisions.

Government develop and make public the policy framework through which livestock expansion will take place, stressing its concern for sustainability.

Publicly Available Information

Policies for the future are shaped by past experience, knowledge of present circumstances, and reliable information. This reliable information must be available not only to government and industry, but also to the concerned public. The Panel recommended that the Government of Manitoba should accumulate all relevant data concerning livestock operations in a central openly available information system in a GIS format to provide Manitobans with a realistic assessment of the sustainability of current operations and their effect on both the local and provincial environments.

Role of ILOs in Rural Development

The Panel believed that ILOs can play an important role in rural development through generation of employment and income, but they should not be seen as the only option. Farmers who wish to produce and market animals without going the ILO route should be assisted. The Panel recommended that in light of socio-economic concerns about livestock expansion, the Government of Manitoba should take a two-pronged policy approach to encouraging sustainable livestock development in Manitoba:

For large scale livestock operations, monitor and enforce environmental and health regulations with a view to enabling these farms to be competitive in export markets while ensuring environmental stewardship

For farmers in transition and those who currently derive limited income from farming, develop a package of programs that will enable these farmers to adjust their farming operations to a level that will provide them with an acceptable quality of life. This could also include a greater focus on higher animal welfare production systems.

Decision Process for Siting ILOs

The Panel regarded a carefully considered decision on the siting of ILOs to be of prime importance in sustainable livestock development, particularly in protecting the environment. It is essential that local circumstances, especially as pertaining to land use, be very thoroughly thought through. It is also essential that the province, being in a better position to assess environmental factors in depth on a larger area basis, have a say in the siting of ILOs. The Panel recommended that new and expanding ILOs should require formal approval by both the host

municipality for compliance with land use by-laws, and the province for environmental impact before construction is allowed to begin.

Supporting Recommendations

What follows is a summary of supporting recommendations that were especially relevant to the hog industry in Manitoba.

Planning for Sustainable Livestock Development

New or expanding ILOs should not be permitted in municipalities lacking land-use zoning by-laws until such by-laws have been formally adopted.

The provincial government should designate or appoint an appropriate Board or Panel empowered to investigate and rule on an appeal of a provincial decision to allow or disallow the establishment of any new or expanding ILO in Manitoba, and that the decision of that Board or Panel be final.

The province should recognize the value of GIS and act promptly to find the means to facilitate its use as a planning tool in municipal government as well as in provincial government departments and agencies that need alternative approaches to the exercise of their mandates.

Water Quality

Water quality monitoring must be greatly increased to provide an assessment of the impact of livestock production on soil and water. A critical constraint to achieving this is the inadequate level of staffing for monitoring.

Additional enforcement effort is required to ensure compliance with current regulations, particularly concerning manure management and storage, and penalties for infractions must be increased.

The province should move toward regulating manure application according to phosphorus content of soil and manure, and future ILOs should be located in order to provide sufficient acres for manure application according to phosphorus content.

The province should continue to implement the recommendations of the recently released Drinking Water Advisory Committee Report, especially recommendations for a drinking water coordinating center that is properly staffed and supported.

Threshold Level for Regulation of ILOs

The calculation of animal units should be cumulative across species.

In view of the lower threshold level in other provinces and some municipalities in Manitoba, the Livestock Manure and Mortalities Regulation should be modified to require manure management plans for all new and existing operations of 300 AUs or more, and that winter spreading of manure be prohibited for all new and existing operations above 300 AU.

This reduction should be phased in over a reasonable period and should be coupled with an expanded monitoring effort, expert advice, and, possibly, incentives to encourage revamped manure management structures.

Health Issues

Strong research and development emphasis should be placed on the monitoring of pathogens and the mechanisms by which they are transferred from animals to humans, and upon factors such as the design of barns, manure storages, and spreading practices that minimize such transfer.

Government, in conjunction with the industry, review the in-barn environment with a view to:

- establishing a monitoring regime and ensuring compliance with existing regulations, especially those affecting the health and safety of workers,
- assessing the training needs of barn workers, and
- identifying research priorities which bear upon the health of operators, workers and the nearby public.

All barn workers should be strongly encouraged to wear proper masks.

Greater attention should be paid by the industry and government to familiarizing the public with the in-barn environment and precautions that are taken to raise healthy animals.

As a matter of responsibility to Manitobans, government and the industry should make clear why and how the industry uses antibiotics.

Manure Management

Educational institutions, in cooperation with industry and government, should re-assess the training requirements for professionals and technicians in the nutrient management field.

The provincial government should move towards the formal certification of commercial nutrient applicators.

For reasons of odor control, reducing greenhouse gas emissions, and maximizing nutrient capture, ILOs should be encouraged to implement covered manure storage and injection.

Performance Bonds

Industry representatives and government should explore sources of performance bond insurance, the levels that are appropriate, and the regulations that are required to provide the public with assurance that costs of environmental problems with a specific ILO are not borne by the public.

Performance bonding should be a condition of approval for new and expanding ILOs, and that such a condition for all ILOs over 300 AUs be phased in over a reasonable time period.

Demonstration Sites

Manitoba Pork should coordinate the development of a state of the art hog production site and manure handling facility that can test the latest techniques to improve sustainability of the hog industry and improve the in-barn environment. Such a site would play a vital role in technology transfer to current and prospective hog producers, as well as have a primary function in education of municipal councils and the general public.

Research

Government should maintain a pro-active role and sustained leadership in mounting research related to environmental stewardship. It should be prepared to read signals (such as the consequences of climate change) and "blue-sky" and "what if". It should have strong regard for the precautionary principle.

Research should be encouraged into the development of portable manure nutrient measurement equipment.

Research into the application of electromagnetic spectrometry (EMS) to detect leakages in manure storages, already being tested in the field by PFRA, should be extended to support a strong monitoring and inspection effort. Further, an EMS profile of each new manure storage facility should be obtained as a baseline before initial filling.

A systematic study should be made of the experience of Manitobans living near ILOs, with a view to improving the criteria upon which municipalities base siting decisions. The Farm Practices Guidelines should strongly stress the uncertainties in general recommendations on setbacks and the need for very careful on-site assessments.

A long-term study should be initiated on the behavior and quality of water (including nutrients and pathogens) running off fields in a natural state and those fertilized with livestock manure and/or inorganic fertilizers, and that this research be tailored to demonstrating the results to the public.

Research should be undertaken on the impact of air quality on animal health and production to indicate the financial benefits of maintaining clean air and less odor through nutritional management and different feeding strategies.

Research should be conducted into animal housing in ILOs, with a view to more closely matching the inclinations of the animal to enhance the acceptability of animal confinement in the public mind.

The Government of Manitoba should initiate a research and development program aimed at identifying technology and management practices appropriate for smaller farmers; such a program should not be predicated on cost sharing.

APPENDIX E Government of Manitoba Response to Livestock Stewardship Panel report (July 2002)

PROVINCE OUTLINES COMPREHENSIVE PLAN FOR SUSTAINABLE GROWTH OF LIVESTOCK SECTOR

Manitoba's Livestock Stewardship Initiative continued to move forward today as the provincial government announced the next phase of its plan to develop a sustainable livestock industry.

Through the Livestock Stewardship Initiative and guided by the Livestock Stewardship Panel's report and recommendations, the provincial government plans to improve the land use decision-making process for livestock operations, enhance the operations and build Manitoba's research and information base for livestock operations.

"Livestock has been and continues to be an effective means of diversification for farmers and an economic growth mechanism for rural communities," said Agriculture and Food Minister Rosann Wowchuk. "Livestock is one of the fastest growing areas of opportunity for Manitoba farmers and is generating \$250 million to \$300 million in investment each year."

The province has proposed changes to the approval process that will:

- Provide clarity, consistency and predictability to land use decisions;
- Respect local land use decision-making;
- Introduce provincial standards to guide local land use decision-making; and
- Clarify the roles and responsibilities between the province and local government with respect to the environment and land use.

Some of the changes have been undertaken to date and others will be implemented over the next 12 to 18 months.

"Our government has always believed that local land use planning is the best mechanism through which local governments can manage development, including intensive livestock developments," said Intergovernmental Affairs Minister Jean Friesen. "Our proposed changes to the approval

process will ensure local control over land use, while giving the industry a sense of clarity and predictability."

Conservation Minister Oscar Lathlin said the proposed changes to the approval process will be backed up by enhanced management of livestock operations and expanded research and monitoring of the long-term impacts of the operations:

Effective next spring, all livestock operations over 300 animal units (AU) will be required to submit annual source water tests conducted by an accredited laboratory; and New studies will look at phosphorus levels in soils, the cumulative impact of livestock production on the environment and the views of Manitobans living near these operations.

"Better access to scientific and technical information will enable sound decisions to be made on the siting of livestock operations," Lathlin said. "A practical research, monitoring and enforcement program will provide ongoing assurance that our environment is protected."

Lathlin noted that the province recently introduced legislation that would strengthen drinking water quality standards. Other initiatives include establishment of the Office of Drinking Water, reintroduction of subsidized water testing for private well owners, certification of drinking water operators and an investment of \$31.2 million in provincial funds to upgrade water systems in Manitoba since April 2001.

The provincial government will further improve the management of livestock operations through:

- Certifying of commercial manure applicators;
- Phasing in of a lowered animal unit threshold;
- Requiring third parties preparing manure management plans to be professional agrologists; and
- Providing the Farm Practices Protection Board, which mediates nuisance disputes arising from practices of legally established agricultural operations, with a higher profile through a revised Web site outlining its mandate, activities and decisions.

"We recognize that, despite these improvements in our approach to sustainable development of the livestock sector, there will continue to be challenges ahead," said Wowchuk. "We want to thank the Livestock Stewardship Panel and representatives of producers, environmental groups and local governments for their advice and assistance throughout this process. We will continue to work with them and others over the long-term as we ensure the environmental and economic sustainability of the livestock industry in Manitoba."

BACKGROUNDER

Improved management of livestock operations

Legislation introduced last spring will require all commercial manure nutrient applicators to be formally certified and licensed. The Manitoba government is working with Assiniboine Community College to develop a curriculum for certification.

The government previously announced its intention to apply manure management regulations to more large operations by lowering the regulatory threshold from 400 animal units (AU) to 300 AU. The new threshold will be phased in over eight years:

Next spring, all new livestock operations over 300 AU will be required to have manure management plans and will be prohibited from spreading manure in winter.

Existing operations over 300 AU will be required to register manure management plans by February 2004. They must stop winter manure spreading by November 2010.

The government will also evaluate the methods and impact of calculating AU cumulatively across species, to ensure that mixed family farms are not unduly affected during the transition.

The government has introduced legislation requiring that any third party preparing a manure management plan must be registered with the Manitoba Institute of Agrologists.

Building Manitoba's research and information base for livestock operations

Improved access to information and research will be facilitated through revamped Web sites:

Improved access to information on livestock and manure management research will be provided on the Manitoba Agriculture and Food Web site.

More publicly accessible information will provide a higher profile for the role and function of the Farm Practices Protection Board, which mediates nuisance disputes arising from practices of legally established agricultural operations.

Improving land use decision-making

The province intends to:

Require mandatory local planning and more effective livestock operations policy in the development plan. All local planning authorities will be required to prepare and adopt development plans that will include a livestock operations policy identifying areas where livestock operations will be permitted, restricted or prohibited. (Development plans require the approval of the minister of intergovernmental affairs. The livestock operation policy will, therefore, be negotiated and approved in partnership with the province through the existing development plan approval process under The Planning Act.) Municipalities will have about 18 to 24 months from the time of adoption of such requirements to prepare and adopt or revise their development plans to include a livestock operation policy.

Introduce provincial standards on the siting, setback and separation distances that municipalities will use in livestock operation decision-making. These standards are intended to provide more consistency in local decision-making. Provincial standards will be based on the existing farm practices guidelines and will override any similar siting, setback and separation distance requirements in existing zoning by-laws. Municipalities will have the ability to vary the provincial standards by a small percentage to take into account local circumstances.

Introduce a standard review process for livestock operations to be used by local authorities to replace the current conditional use process for livestock operations. All

livestock operations 300 AU or greater will require public notice, a local hearing and a technical review committee report for municipalities to make a decision. Council will make a decision as to whether to vary the provincial standard, the need for a development agreement and other conditions. There will not be an appeal mechanism to the decision of council on a livestock operation. The main purpose of the local hearing process will be to deal with the specifics of the livestock operation, land use policy considerations having been dealt with under the development plan.

Clarify local land use decision-making perimeters. Clarify the conditions and terms of a development agreement that a municipality can require for approval of a livestock operation.

Other initiatives taken to date under the Livestock Stewardship Initiative include:

Since 1999, the provincial government has created 20 more positions and allocated \$2.6 million more toward monitoring, inspection and enforcement. As a result, the government is inspecting 500 more manure storage facilities each year.

The majority of municipalities is now involved in planning as a result of provincial incentives for enhanced land use planning.

Technical review committee reports have been made mandatory for all development proposals over 400 AU.

Laws have been amended so that all provincial approvals must be in place before any construction can begin.

The recently upgraded groundwater database will be used as an additional tool for livestock siting decisions.

APPENDIX F: Analysis of Feed Grain Supplies and Feed Requirements in Manitoba

Manitoba's hog industry has increased production annually from 4 million hogs in 1998 to 6.4 million hogs in 2001. Manitoba Agriculture and Food (MAF) has estimated that production in 2006 could be in the 8.1 million head range (see Table 1). This report contains livestock production numbers beyond 2006, attributed to MAF. Due to several variables that may impact livestock production beyond 2006, MAF assumed the status quo for a number of livestock categories for this period of time and will project numbers only after the impact of these variables becomes better known.

The Market Analysis Section of MAF has undertaken to determine similar production numbers for beef and dairy cattle, sheep and lambs, horses, laying hens, chickens and turkeys. Based on their production estimates, they have generated the following tables identifying the feed requirements for the total livestock population and specifically for hogs. These consumption requirements are based on Statistics Canada's livestock feed usage tables, the estimated numbers of livestock for each category and production budget guidelines for specific feed requirements. MAF has adjusted the feed mix to reflect the shift from barley to more corn and meal usage. For calendar year 2002, MAF estimates that the livestock industry will consume 1,983,100 tonnes of feed grains, 60% of which is barley. The hog industry consumed 1,283,600 tonnes in 2002 or about 65% of the feed grains used. By 2010, feed grain consumption is estimated to be 2,450,300 tonnes.

Barley

Annually, the actual usage of corn relative to barley depends on a number of factors including:

- The price and availability of barley relative to corn and other substitute feed grains such as peas
- The prevalence of fusarium in the barley
- The amount of barley grading malt.

Traditionally, about 50% to 60% of the total barley produced in the province is used for feed. Manitoba Agriculture and Food staff believe the proportion used for feed purposes will increase to the 60% to 65% range over the next 7 to 8 years.

Since 1994, fusarium has become a major factor in feed availability. The incidence of the presence of fusarium head blight has increased over the years from minimal in 1994 to having it present in 100% of the wheat and barley. Presence does not necessarily translate into damage. Hogs can only tolerate 1% infested grain in their diet because of the toxins present. Beef cattle can tolerate 14% infected grains.

It has been estimated that the impact of the presence of fusarium has been:

Yield losses amounting to \$20 to \$40 million/year in the eastern prairies

Quality losses of \$10-30 million/year

Lost opportunities as grain is not eligible for malting barley or Durum wheat

Constrained expansion of the hog industry

Additional marketing challenges (i.e. finding markets, segregating, etc.)

Table 1: Manitoba Hog Production Estimates

	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Thousands of head								
Iso-weanlings to 10 lbs	1600	1700	1700	1700	1700	1700	1700	1700	1700
Feeder pigs to 50 lbs	400	400	300	300	300	300	300	300	300
Finished hogs to 250 lbs	4500	4885	5300	5510	5730	5730	5730	5730	5730
Breeding sows & gilts	326	340	350	360	371	371	371	371	371
Boars	8	8	8	8	8	8	8	8	8
Total Hogs	6834	7333	7658	7878	8109	8109	8109	8109	8109

Source: Manitoba Agriculture and Food.¹

Table 2: Grain Required to Feed Manitoba Livestock and Hogs, 2002 – 2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010
All Livestock	Thousands of tonnes								
Wheat	68.4	68.9	69.1	69.3	69.5	69.7	69.9	70.2	70.4
Barley	1180.2	1255.1	1330.3	1376.0	1423.9	1431.0	1438.3	1446.1	1454.3
Oats	325.8	336.7	348.1	359.8	372.2	385.0	398.4	412.5	427.4
Corn	408.7	435.0	462.2	478.0	494.6	495.5	496.3	497.3	498.2
Pigs Only									
Wheat	0	0	0	0	0	0	0	0	0
Barley	923.7	993.5	1062.6	1102.0	1143.2	1143.2	1143.2	1143.2	1143.2
Oats	6.0	6.5	6.9	7.2	7.4	7.4	7.4	7.4	7.4
Corn	353.9	380.6	407.1	422.2	438.0	438.0	438.0	438.0	438.0

Source: Manitoba Agriculture and Food. (See footnote in Table 1.)

Recently the portion sown to hulless barley, which has superior, lower fibre feed qualities has varied between 7.3% and 8.6%. About 6.2% of Manitoba's 2000 barley crop was selected for use by either the domestic or foreign food and beverage industries.

¹ This report contains livestock production numbers beyond 2006. Due to several variables that may impact livestock production beyond 2006, MAF assumed the status quo for a number of livestock categories for this period of time and will project numbers only after the impact of these variables becomes better known.

Barley production in Manitoba is usually between 1.5 and 1.6 million tonnes. Once the carry-in stocks of 0.2 to 0.3 million tonnes are considered, total supply in a normal year is between 1.7 and 1.9 million tonnes. Weather conditions in the last two crop years has resulted in production being only 1.2 million tonnes with total supplies being closer to 1.4 to 1.5 million tonnes.

Figure 1 compares total barley supplies to the volumes recorded in the supply/disposition tables as feed, waste and dockage. Feed, waste and dockage has increased from slightly over 600,000 tonnes to 1-1.1 million tonnes in 1996/97 to 1998/99. Feed usage in 1999/00 declined to 828,000 tonnes.

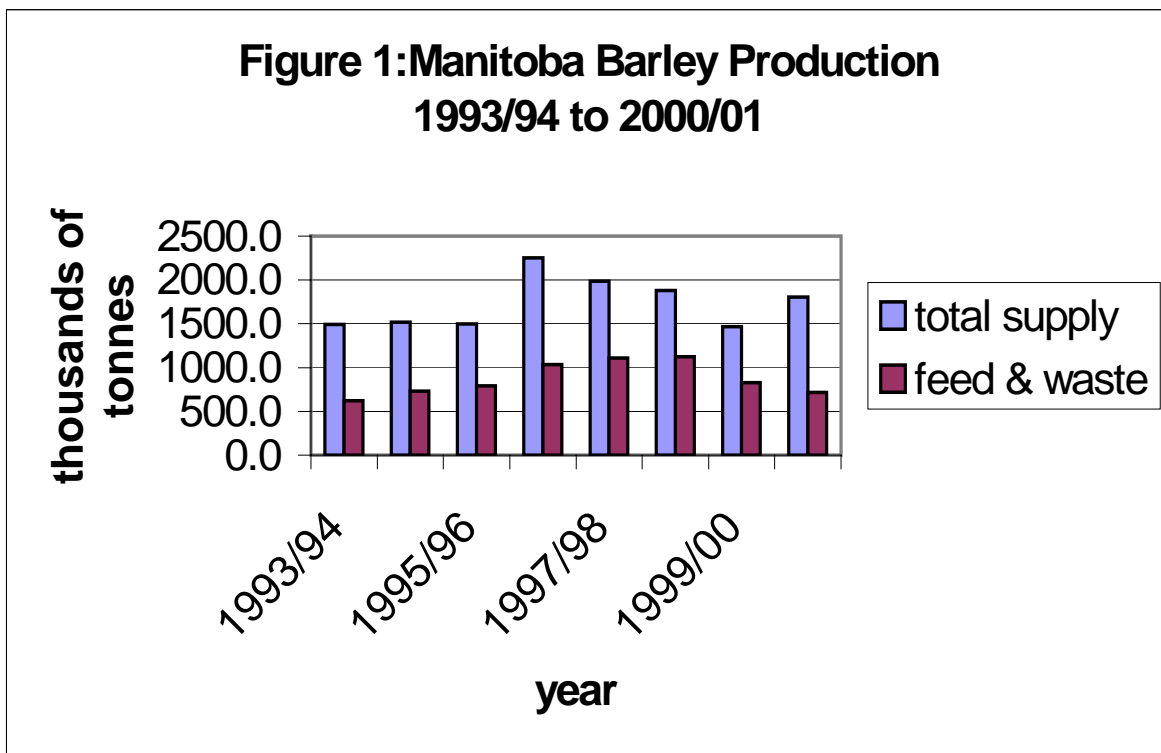


Table 4 indicates total available supplies of barley as estimated by the Grains and Oilseeds Analyst of Manitoba Agriculture and Food. Considering total available supplies (inventory change plus production), Manitoba would be in a net deficit position in 2004/05. The results suggest that even if Manitoba used all its barley for feed purposes, it would be necessary to import product commencing in 2004/05. The situation would be further aggravated once one takes into account that only 60% or so of the barley produced is used for feed. The feed barley deficit would increase to between 498,400 tonnes and 673,600 tonnes. The presence of fusarium

could also impact available supplies if it is more common in future years compared to the past then less of the barley supplies would be usable for feeding purposes

Table 5 illustrates the usage of barley by the hog industry based on Manitoba Agriculture and Food's analysis. Based on 60% of the available supplies being used for feed grain purposes, there would be a shortfall annually between 235,000 tonnes and 373,000 tonnes in the feed barley requirements of the hog sector and actual supplies available.

Table 4: Manitoba Barley Supplies Relative to Feed Requirements, 2002/03 to 2010/11

Crop Year	MB Production	Inventory change add (deplete)	Local Supplies	Livestock Needs	Surplus (Shortfall)	Est. MB Feed Supplies	Surplus (Shortfall)
2002/03	1153.9	-100	1253.9	1223.9	30	652.3	-571.6
2003/04	1310	-30	1340	1299	41	800.6	-498.4
2004/05	1320	10	1310	1357	-47	818.9	-538.1
2005/06	1320	0	1320	1404	-84	829	-575
2006/07	1290	0	1290	1428	-138	823	-605
2007/08	1190	-10	1200	1435.3	-235.3	772	-663.3
2008/09	1230	-20	1250	1442.9	-192.9	769.3	-673.6
2009/10	1310	0	1310	1450.9	-140.9	799.3	-651.6
2010/11	1310	0	1310	1454.4	-144.4	799.3	-655.1

Source: Manitoba Agriculture and Food. (See footnote in Table 1.)

Table 5: Hog Industry Barley Requirements, 2002/03 to 2010/11

Crop Year	Hog Feed Barley Requirements	Estimated Manitoba Barley Supply	Barley Shortfall
2002/03	964.4	652.3	-312.1
2003/04	1033.8	800.6	-233.2
2004/05	1085.6	818.9	-266.7
2005/06	1126.1	829	-297.1
2006/07	1143.2	823	-320.2
2007/08	1143.2	772	-371.2
2008/09	1143.2	769.3	-373.9
2009/10	1143.2	799.3	-343.9

2010/11	1143.2	799.3	-343.9
---------	--------	-------	--------

Source: Manitoba Agriculture and Food. (See footnote in Table 1.)

Corn

The livestock industry uses 400,000 to 432,000 tonnes of locally grown corn annually. In addition, Manitoba normally imports between 200,000 and 275,000 tonnes of corn from the US. In 2002, Manitoba had imported over 650,000 tonnes by August due to insufficient supplies of other feed grains.

Manitoba Agriculture and Food provided information on Manitoba supply and disposition of corn for 1999/00 to 2002/03. As no estimate was provided on corn production from 2003/04 on, it was assumed that the increase in corn production followed the same rate of increase as barley production. Table 6 indicates the estimated production compared to MAF's calculation of the corn used for feeding livestock.

Table 6: Local Manitoba Corn Supplies Relative to Feed Requirements for Livestock and Hog Sectors, 2002/03 to 2010/11

Crop Year	Manitoba Corn Production	Total Livestock Requirements	Total Livestock Surplus (Shortfall)	Hog Sector Requirements	Hog Sector Surplus (Shortfall)
Thousands of tonnes					
2002/03	354.4	424.1	-69.7	369.5	-15.1
2003/04	402.3	450.9	-48.6	396.1	6.2
2004/05	405.4	471.4	-66.0	415.9	-10.5
2005/06	405.4	487.7	-82.3	431.4	-26.0
2006/07	396.2	495.1	-98.9	438	-41.8
2007/08	365.5	496	-130.5	438	-72.5
2008/09	377.8	496.9	-119.1	438	-60.2
2009/10	402.3	497.8	-95.5	438	-35.7
2010/11	402.3	498.2	-95.9	438	-35.7

Source: Manitoba Agriculture and Food. (See footnote in Table 1.)

Other Grains

About 20,000 tonnes of feed peas are used in livestock rations [poultry and hogs]. In 2000, over 163,000 tonnes of feed wheat were fed to livestock. Some oats has been reported as fed to iso-weanlings because of its ease of digestibility. Although 16 million bushels of oats [about

APPENDIX G Land Use Planning and Environmental Regulations in Manitoba

The ultimate responsibility and authority to regulate land use rests with the municipality. The Planning Act is the main mechanism for land use planning at the municipal level and is guided by Provincial Land Use Policies Regulation to promote sustainable development. The land use plan will identify broad land use categories such as residential, commercial and agricultural and identify prime agricultural lands and areas for livestock operations within the municipality. The plan may establish criteria by which livestock operations may be evaluated. Most Manitoba municipalities have enacted development plans and zoning by-laws under the Planning Act or the Municipal Act to regulate development.

Once a development plan has been approved, a municipality must enact a zoning by-law that is consistent with the development plan. Such a by-law divides the municipality into various zones such as rural residential, highway-commercial and general agricultural and lists specific permitted and/or conditional uses within each zone. When a zone is a conditional use, an operation may be allowed if it meets the requirements of the zoning by-law and complies with any other conditions the council deems necessary. Municipalities responding to local pressures/interests have adopted a wide range of policies and zoning standards.

Under current conditions, proposed livestock operations of 300 animal units (AU) or more must seek land use approval from the municipal council. Municipal councils are required to send to the Minister of Intergovernmental Affairs a copy of every new application related to these 300 AU or more operations. The Minister then refers the application to a government appointed technical review committee made up of appropriate regional staff from the departments of Conservation, Intergovernmental Affairs and Agriculture and Food. They evaluate the environmental, agrolological and land use implications of the proposal based on land use policies, zoning, well logs, soil survey maps, hydrogeological studies and engineering standards. The Farm Practices Guidelines also assist the Technical Review Committee and the local council in evaluating the merits of the livestock development proposal. The TRC will make recommendations to the municipality for their consideration when determining whether or not to issue a development permit. Although Councils are encouraged to attach conditions on permits relative to the TRC recommendations, Councils have discretion on this matter.

Should the proposed operation be on land where livestock production is a permitted use, the Council will issue a development permit. Should the usage be subject to conditional use, a public hearing is required. The Council does not set the public hearing date until the findings of the technical review committee have been submitted and the report has been made accessible to the general public at the municipal office. The Council is required to have at least one public hearing notice in a local newspaper and send a notice to property owners within two kilometers of the affected property. The Council must notify the minister of its decision. If the approval is conditional use, the applicant must comply with all related conditions, laws and regulations. Conditional use has no expiry date and is only subject to review should the owner want to change the operation or expand it.

All provincial approvals must be in place before construction. All operations drawing more than 25,000 litres of water per day from surface or groundwater sources are required to obtain a license under the Water Rights Act from Manitoba Conservation. This licensing process would include a hydrogeological assessment of the capacity to supply the water and an assessment of the potential impacts on existing uses of these water sources. It should be noted that despite the licensing procedure there is not metering of water usage and no auditing.

The Farm Practices Protection Board, mandated under The Farm Practices Protection Act, has been established to consider nuisance complaints against agricultural operations from persons directly affected by the disturbance. The Board conducts an investigation to determine whether an operation is following standard farming practices as prescribed in the Farm Practices Guidelines. An order to cease or modify practices may be issued against operators who do not follow standard practices. The Guidelines have been developed with input from a broad cross-section of industry, academics, provincial specialists and consumer groups. They include technical information on siting of operations, odour control, manure storage planning, manure storage types, pollution prevention related to water and soil and dead animal disposal.

The Environment Act also regulates manure storage, transportation and application. It also addresses livestock mortality disposal. The regulation establishes maximum nitrate levels for soils to prevent an excessive build-up of nitrates and requires large-scale livestock operations to register annual manure management plans. Phosphorus is not regulated. Currently operations with 400 or more animal units of any one species must register manure management plans. Manitoba Environment is responsible for the monitoring and enforcement of manure management and livestock mortalities. The Livestock Stewardship Panel recommended that this be reduced to 300 or more animal units cumulative. The Province has agreed that the figure should be reduced but has decided to further study the implications of this recommendation. Another area of contention is the level of monitoring and enforcement being done by the Province on manure management. Although the Province has expanded staffing in this area, many complain that given the rapid expansion of the hog industry the Province is still lagging beyond on its monitoring and enforcement implementation.

Manitoba's Animal Care Act, proclaimed in 1998, imposes certain Codes of Practice as enforceable standards for caretakers and owners of animals. The Act has been revised in accordance with the national codes of practice and includes the transportation of animals.

Finally, The Farm Lands Ownership Act exists to limit speculation in farmland. The Act affects non-Canadians, organizations totally or partly owned by non-Canadians and publicly traded companies and other organizations whose ownership is open to non-Canadians. Under the Act, these parties must apply to the Farm Lands Ownership Board for an exemption to acquire an interest of more than 40 acres of farmland. The application is subject to a fee. The issue of corporate farm ownership is covered by separate legislation dealing with companies and taxation.

Appendix H Environmental Regulations in Other Jurisdictions

This material is taken from a draft report, entitled *Review of Legislation and Regulations regarding Phosphorus Management in Other Jurisdictions*, prepared by Ed Tyrchniewicz as part of a Phosphorus study for the Manitoba Livestock Manure Management Initiative.

Alberta

Amendments to the Alberta Agricultural Operation Practices Act were passed in the 2001 fall session of the Legislative Assembly of Alberta. The amendments enhance the province's ability to deal with nuisance, such as odour, noise, dust, smoke or other disturbances resulting from an agricultural operation. They also provide producers and other stakeholders with a one-window process for the siting of new and expanding confined feeding operations (CFOs). The Act also lays out a set of clear standards for manure storage and application for all farming and ranching operations.

Under the amendments, the Natural Resources Conservation Board (NRCB) is responsible for monitoring compliance and enforcement of province-wide standards. The NRCB will continue to be responsible to the Minister of Sustainable Resource Development. Alberta Agriculture, Food and Rural Development (AAFRD) will be responsible for updating the regulations to ensure they meet the needs of the livestock industry and the public. AAFRD will also take the lead role in providing extension services and technology transfer of applied research to the livestock industry.

Municipalities and counties will not issue development permits for CFOs, but will automatically be notified by the NRCB, which will seek their input on applications for new and expanding operations. They will be encouraged to develop land-use plans that identify where CFOs would not be compatible with current or future land uses, and to provide the reasons why that is so.

Minimum distance separation (MDS) provides an area of separation between CFOs and neighbours. MDS is measured from the outside walls of neighbouring residences (not property line) to the point closest to the applicant's livestock facility, manure storage facility, catch basin, feeding pen or barn, milking facility or compost area. Setback distances from water bodies and control of run-on and runoff are required. The legislation encourages operators to include odour suppression technology.

Agricultural operations must manage manure in accordance with the nutrient management requirements in the Standards and Administration Regulation (Sections 23 and 25). The rules also apply for composted manure but do not apply to manure to which the Fertilizers Act (Canada) applies. The NRCB may authorize a person to apply manure to land in accordance with a nutrient management plan (NMP) proposed by the person if the Board is satisfied that following the NMP will provide the equivalent or greater protection to the water and the soil.

Operations will have until the end of 2004 to comply with the new manure management standards. Operators must apply manure only to arable land and must maintain a sufficient land base for nutrient management as defined by the standards. Those who apply over 300 tonnes of manure annually are required to perform soil tests and keep records. Records of application and nutrient levels must be kept for five years. Regulations permit the application of manure on frozen or snow-covered ground, as long as the requirements are met for minimum setback distances and slope limitations. Incorporation of manure must occur within 48 hours of application. Operators will have three years to comply with the new manure management standards.

There do not appear to be any phosphorus-based regulations in Alberta. More information on environmental regulation of livestock-based agriculture in Alberta can be found at <http://www.agric.gov.ab.ca/navigation/livestock/cfo/index.html>.

Saskatchewan

A close working relationship exists between Saskatchewan Agriculture, Food and Rural Revitalization (SAFRR) and Saskatchewan Environment in administering the Intensive Livestock Provisions of the *Agricultural Operations Act (AOA)* and the *Environmental Assessment Act (EAA)*. SAFRR has included the Environmental Assessment Branch of Saskatchewan Environment in the ILO referral process since 1989. Applications for approval of large livestock operations, or where environmental sensitivities may exist, are provided to Saskatchewan Environment by SAFRR for review.

An intensive livestock operation is any confining of animals where space per animal unit is less than 370 square metres. Approval is required for any intensive livestock operation that has an earthen manure storage area or lagoon, involves rearing, confining or feed of 300 or more animal units, or confines more than 20 animal units but less than 300 for more than ten days in any thirty day period within 300 metres of surface water or 30 metres of a domestic water well

As part of the process to SAFRR approval, applicants must complete a workbook requiring a description of the animals, manure production, storage and utilization, nitrogen, phosphate and potassium production, nitrogen utilization, areas available for manure spreading and management of dead animals. Besides completing the workbook, the farmer must undertake a geo-technical investigation at the proposed site to ensure the soil and proposed crops are suitable for the amount and types of nutrients in the manure.

Manure must be applied according to an approved waste management plan at rates that supply crop nutrients equal to plant nutrient use. Manure information must specify the form of manure (liquid/solid/semisolid), annual volume or mass of manure, adjusted annual manure N, N utilized annually, and N, P and K yields and concentrations. This will maximize the fertilizer value of the manure and minimize the risk of pollution. The intent is to help the farmer balance nutrient production with crop usage and determine the size of the manure handling facility required.

There appear to be no phosphorus-based regulations in Saskatchewan. More information on environmental regulation of Saskatchewan livestock-based agriculture can be found at http://www.agr.gov.sk.ca/docs/livestock/pork/intensive_hog_operations/ILoreview2002.pdf.

Ontario

The Ontario Ministry of Agriculture and Food (OMAF) and the Ministry of the Environment (MOE) are responsible for the regulation for the *Nutrient Management Act 2002* that was enacted in late June 2002. The Act is a comprehensive, province-wide approach to nutrient management that protects water, the environment and the well being of communities in rural Ontario, while ensuring that farmers can invest in and operate their farms with confidence. As part of the Ontario government's Clean Water Strategy, the *Nutrient Management Act* provides for province-wide standards to address the effects of agricultural practices on the environment, especially as they relate to land-applied materials containing nutrients.

The legislation provides authority to establish province-wide standards for the management of materials containing nutrients and sets out requirements and responsibilities for farmers, municipalities and others in the business of managing nutrients. The sources of these nutrients include manure and other materials generated through agricultural operations, commercial fertilizers, biosolids generated by municipal sewage treatment and pulp and paper sludge. The land application of these materials is governed by an array of legislative and regulatory provisions, guidelines, voluntary best management practices and a patchwork of municipal by-laws.

This is enabling legislation that supports the implementation of a comprehensive regulatory framework regarding nutrient management and other related farm practices in Ontario. The key to this framework is the Nutrient Management Plan (NMP), which is a science-based tool identifying how manure, commercial fertilizers, other nutrients and existing soil fertility are effectively managed in an environmentally responsible manner. Different types of operations will have different requirements.

approvals. The Act also allows for the creation of local advisory committees to promote awareness of the new rules, and mediate local nutrient management issues that are not related to enforcement.

Administratively, the legislation provides for alternate delivery of the review and approval of NMPs and for the establishment of a registry for NMPs. It also provides the authority to establish fees for any activity undertaken. Initially, the province will review and approve nutrient management plans and other requirements for large livestock operations. The legislation requires the delivery of enforcement by the Ontario government. The Act re-affirms the ultimate authority of the *Environmental Protection Act*, the *Ontario Water Resources Act* and the *Pesticides Act*. It effects complementary amendments to these Acts, and the *Farming and Food Production Protection Act*.

Different categories of operations will be regulated in different ways, focusing a greater level of attention and resources where the risk to the environment is greatest. The Act provides for a framework to phase in standards over time, depending on the size of the operations and the kinds of practices that are carried out. Any number of sub-categories could also be defined to ensure that different types of operations would be regulated in the most effective way. All farms will eventually be governed by new regulations that incorporate best management practices and standards for the management of materials containing nutrients.

The Act establishes authority for a range of new approval and review requirements designed to minimize environmental risks. These will be most stringent for large livestock operations, which will need provincial certification, including approval for their NMPs. A team of provincial government staff who are knowledgeable in agriculture and the environment will inspect these operations. Mid-size livestock operations wanting to build or expand will be subject to provincial review. These and other agricultural and smaller livestock operations will be responsible for having up-to-date NMPs available for inspection and review. The Act provides authority for several functions including the review and approval of NMPs, education, training and certification.

The second-stage round of consultations is currently underway and is focusing on proposed requirements regarding:

- Categories of non-livestock, municipal and industrial generators of materials containing nutrients
- Content requirements of nutrient management strategies for municipal and industrial generators; construction and siting of barns and manure storages
- Setbacks and buffers from watercourses for land application
- Training and certification for anyone who prepares nutrient management plans and strategies, as well as haulers and applicators
- Quality standards for land-applied nutrients
- Nutrient management at feedlot operations
- Roles and responsibilities of local advisory committees
- Winter spreading
- Land application near municipal wells

Enhancements to the Ministry of the Environment's land application program.

Ontario Nutrient Management protocols under the *Nutrient Management Act* specify limits of phosphorus applications based on the Agronomic Balance Calculation for Phosphorus. Agronomic Balance is the total available phosphorus from all applied sources minus crop production requirements. To determine the application limits for phosphorus to a field the farmer must calculate the agronomic balance and if applicable the crop removal balance to determine the maximum allowable application rate of phosphorus to a field. If the soil test for phosphorus is greater than 30, the P-Index must be calculated to determine required separation distances from water sources. This tool is to be used in the context of nutrient management planning. The P-Index can be completed using the Nutrient Management Workbook, the NMAN computer program developed by OMAF, or OMAF Fact sheet 98-079.

More information on environmental regulation of Ontario livestock-based agriculture can be found at <http://www.gov.on.ca/OMAFRA/english/agops/index.html>.

Quebec

The Regulation for the Reduction of Pollution from Agricultural Sources (new regulations in 1998) was amended with more stringent requirements in 2002. The *Regulation respecting agricultural operations* replaces the *Regulation respecting the reduction of pollution from agricultural sources*. Its application also refers to the *Environment Quality Act*. The purpose of the *Regulation respecting agricultural operations* is to ensure increased protection of the environment, particularly water and soil, from pollution caused by certain agricultural activities. It focuses on the management standards for manure regarding its storage, spreading and treatment. It also focuses on nutrient management, the standards for the location of facilities for raising livestock and for storing manure, as well as livestock accessibility to bodies of water. The new regulation focuses on the soil support capacity and the actual fertilizing value of manure with the goal being to reach a balance between the soil support capacity in phosphorus and the amount of nutrient, especially manure, before 2010.

Some of the provisions of the new regulations that specifically mention phosphorus include:

Operations with solid manure management, whose annual production of phosphorus exceeds 1600 kg, must have access to watertight storage facilities for all livestock waste produced in them, or to any other equipment or building intended to prevent the contamination of surface and ground waters. This obligation applies as of April 1, 2010 for operations in existence on June 15, 2002, and as of April 1, 2005 for new operations. The spreading of manure and other fertilizers is only permitted on already cultivated parcels of land. It must comply with the provisions of an “agro-environmental fertilization” plan established in accordance with the regulation for each parcel of land to be fertilized. The plan must be signed by an agronomist and must list the amount of

fertilizers to be used for each of the parcels, the mode of spreading, and the duration and dates of spreading.

All new facilities whose annual phosphorus production will exceed 3200 kg. will require a certificate of authorization from the Ministry of Environment.

An operator must establish an agro-environmental fertilization plan in 2002 if the raising facility has a liquid manure system. Operators of solid manure systems with an annual phosphorus production above 1600 kg have until April 1, 2004 to produce this plan, provided that their phosphorus production does not exceed 3200 kg. The plan must consider the annual phosphorus count by establishing the annual volume of phosphorus production of the herd combined with all other fertilizers, as well as the amount of waste that can be spread on available land, while staying within the maximum levels listed in the regulations.

An operator must, at least once, arrange for the analysis of the nutrient content of the manure which is produced at his/her facility and which is intended to be spread onto cultivated land; this analysis is not required if the annual phosphorus production of solid manure does not exceed 1600 kg.

An operator must submit a phosphorus status report no later than June 15, 2003

An operator whose current raising facility (without an increase in the herd) has above-limit phosphorus levels, must take steps to reduce them within the following time frames: organization of land required for 50% or more of the phosphorus load by April 1, 2005, 75% or more by April 1, 2008, and 100% by April 1, 2010.

Because of the significant increase in pig farming operations over the past few years in some regions of Quebec and the environmental impacts stemming from these operations, particularly the degradation of the quality of several watercourses and the over fertilization of soils, the government has decided to impose strict limitations on pig farming for 18 months in 281 municipalities. This period will make it possible to carry out complete phosphorus balance checks on all Quebec farms, to compile the results, and, using the data thus obtained, to exercise better management and control over the growth of the pig industry.

Within these 281 municipalities, there are two zones: limited activity zones and outside the limited activity zones. Some of the regulations that apply within the limited activity zone include:

No new pig raising facilities will be authorized

In pig raising facilities in existence on June 15, 2002, sow or boar stocks of more than 250 pigs may be raised, under the condition that the livestock waste undergoes complete treatment and that the resulting products are used outside the limited activity zone

In pig raising facilities in existence on June 15, 2002, an increase of stocks of up to 250 pigs is permissible, if one of the following conditions is met: complete treatment of livestock waste and utilization of resulting products outside of the limited activity zone, or the cultivated parcels of land are less than 20 km away from the raising location. This authorization is a one-time certificate that must be issued before June 15, 2004, and is valid for one raising facility belonging to one owner.

Facilities for raising livestock other than pigs can only be authorized if one of the following two conditions is met: the livestock waste undergoes complete treatment and

the resulting products are used outside the limited activity zone, or, the livestock waste can be spread on the cultivated parcels of land owned by the farm operator of the raising facility.

Outside of the limited activity zones, the following regulations apply:

Authorizations for new pig raising facilities will only be granted if the waste undergoes complete treatment and if the resulting products are used outside a limited activity zone

In pig raising facilities in existence on June 15, 2002, sow or boar stocks of more than 250 pigs may be raised, if one of the following two conditions are met: the livestock waste undergoes complete treatment and the resulting products are used outside the limited activity zone, or, the livestock waste can be spread on the cultivated parcels of land owned by the farm operator of the raising facility.

More information on environmental regulation of Quebec animal-based agriculture can be found at <http://www.menv.gouv.qc.ca/sol/agricole-en/explagriANG6.pdf>

Iowa

The Iowa Legislature passed a bill in 2002 regulating animal production in the state, with an eye towards increasing environmental protection. The bill addressed a number of issues, including air quality and manure nutrient planning. Implementing the legislation will be a staged process, directed by the Iowa Department of Natural Resources (IDNR) via the rule-making process. It will be July 1, 2007 before all provisions are in place.

Regulation is based on facility size. In the past, there have been essentially two important size thresholds:

Manure management plans have been required of facilities with 200,000 pounds of bodyweight for swine and poultry, one-time capacity or more, 400,000 pounds for bovine

Construction permits have been required of facilities with 625,000 pounds of bodyweight (swine and poultry) capacity or more, and 1,250,000 pounds for bovine. The new legislation switches from regulating on pounds of bodyweight to animal units (AU).

Although AUs are not as precise as bodyweights, they are the method used by the U.S. Environmental Protection Agency.

Two very significant changes in manure management plans (MMPs) under the new legislation include the requirement to submit plans to IDNR annually, and the switch to phosphorus planning. In the past, manure management plans were only required to be submitted to IDNR once - when the facility was constructed. After that any changes were kept in the producers' files, but were not submitted to IDNR. Starting March 1, 2003, plans must be submitted to IDNR annually. Confinement facilities with 500 AUs or more must submit MMPs to IDNR annually. New confinements with 1000 AU or more also must obtain construction permits before building.

MMPs must be submitted to all counties in which manure will be applied, as well as the county in which the facility resides.

A significant change in regulations is that IDNR must implement a phosphorus index based on the current Iowa Natural Resources Conservation Service phosphorus index (PI). MMPs will then be based on the PI and associated rules. P planning will be phased in over several years, depending on when the first MMP was submitted. If an original plan was submitted before April 1, 2002, the PI will be required by July 1, 2007. If an original plan is submitted April 1, 2002, or after, but before September 1, 2003, the PI will be required by July 1, 2005. If an original plan is submitted after September 1, 2003, the PI will be required in the original plan. It's important to note that the current PI as used by the Natural Resources Conservation Service (NRCS) does not specify P application rates; IDNR will have to develop application regulations based on the PI via the rule-making process.

There is an interesting cautionary note attached to the Iowa P index. The P index is not intended to be an evaluation scale for determining whether land users are complying with water quality or nutrient management standards established by local, state or federal agencies. Use of this P index as a regulatory tool would be beyond the concept and philosophy of the working group that developed it. This P Index has been adapted to local conditions from appropriate regional and available in-state research. This version of the Index should be tested and modified periodically as new research data become available.

More information about the new Iowa legislation and the IDNR rule-making process, as well as environmental regulations relating to Iowa animal-based agriculture, can be found at the following Web site. <http://extension.agron.iastate.edu/immag/>

Minnesota

Minnesota's definition of intensive livestock operations proposed under the new rules of a concentrated animal feeding operation (CAFO) is a modification of the federal (US EPA) definition. This affects what facilities are required to apply for and obtain a NPDES permit in Minnesota. Federal regulations basically define a CAFO as having more than 1000 AUs or more than 300 AUs and meeting at least one of two discharge criteria. The proposed rule in Minnesota requires all facilities with 1000 or more animal units comply with the standards and permit application requirements as CAFOs. The proposed new rule would also establish an animal unit threshold at 300 AUs or more to distinguish facilities for purposes of the permitting program and technical standards.

With new rules, additional "technical" requirements are being placed on farms with lower AUs. For example manure management plans are required for all feedlots with 100 or more AUs. Animals, regardless of numbers present, must be restricted from lakes by October 2001. Animals on pastures (where vegetation is maintained) are prohibited from entering lakes unless an NRCS approved restricted access point is in place.

These regulations are covered in Minnesota Rules 7001, 7002, 7020. (Rules Relating to Animal Feedlots, Storage, Transportation and Utilization of Manure) and are administered by the Minnesota Pollution Control Agency (MPCA). Information about the new rules can be found on the MPCA website at: <http://www.pca.state.mn.us/hot/feedlot-rules.html>

Some of the regulations adopted for ILOs of 300 or more AUs include:

Operations of 1,000 animal units or more must not discharge manure or process wastewater to waters of the state. No discharge is allowed to a sinkhole, bedrock, well, tile intake, mine or quarry. If the feedlot does not meet the discharge standards, then requirements and timelines will be placed in an individual NPDES permit to correct the hazards.

Manure application rates must be limited so that the estimated plant-available nitrogen from all nitrogen sources does not exceed expected crop nitrogen needs for non-legumes and expected nitrogen removal for legumes. The rate determinations are to be based on the most recent publications of the University of Minnesota Extension Service or another land grant college in a contiguous state (some exceptions apply for rates above these levels).

The following testing, planning and record-keeping requirements must be met:

Manure Testing: Manure from all storage areas holding manure from more than 100 animal units must be tested for nitrogen and phosphorus at least annually for the first three years and at least once every four years thereafter. More frequent testing is required when management changes are expected to result in varying manure nutrient content.

Soil Testing: Soil phosphorus testing is required at least once every four years on fields receiving manure applications.

Manure Management Plans: Manure management plans must be completed for all operations with 1,000 animal units or more upon submittal of a permit application.

Record Keeping: Records must be kept of manure nutrient test results, field locations, rates and dates of application, available nutrients from manure and fertilizer, and soil test results.

Additional protective measures are required for application of manure in special protection areas, including land within 300 feet of lakes, streams, intermittent streams (excluding grassed waterways), public waters wetlands (e.g. over 10 acres) and drainage ditches without protective berms. Winter application is prohibited in these areas. In special protection areas without a 50 to 100 foot wide vegetated buffer, then the producer must maintain a 25 foot setback, incorporate the manure within 24 hours, and apply in ways that do not result in long-term soil phosphorus accumulation where phosphorus levels are already sufficient for crop growth. Manure must be incorporated within 24 hours if applied within 300 feet of an open tile intake (this does not apply to solid manure until October 1, 2005). Manure must also be incorporated within 24 hours when applied within 300 feet on the upslope side of a sinkhole. A 50 foot setback is required for all sinkholes, wells, mines, and quarries.

Some additional regulations apply to phosphorus specifically. Where manure from any size feedlot is applied in special protection areas to soils that have phosphorus test levels exceeding 21 ppm Bray P1 or 16 ppm Olsen, and no permanent vegetated buffers exist along the protected water, re-applications of manure must not occur until phosphorus from the most recent application is removed by subsequent crops as based on soil test results or crop phosphorus removal tables. In the case where manure from feedlots with over 300 animal units is to be applied outside of special protection areas to soils with phosphorus levels exceeding 150 ppm

Bray P1 or 120 ppm Olsen, or half of these levels inside Special Protection Areas and within 300 feet of open tile intakes, an interim permit application and manure management plan must be submitted to the MPCA or delegated county, describing how phosphorus is to be managed to minimize losses to surface waters before repeated manure applications occur in such areas.

APPENDIX I Provincial Announcement on Lake Winnipeg Action (February 18 2003)

A provincial action plan to help protect Lake Winnipeg, including the establishment of a new Lake Winnipeg Stewardship Board and new regulations to help maintain forests and vegetation along the Red and Assiniboine rivers, was announced today by Conservation Minister Steve Ashton.

"Including opposition to the controversial Garrison Diversion project which threatens to environmentally damage the Red River Watershed, our government is committed to ensuring that all possible measures are taken to maintain the quality and safety of one of our most valuable natural resources," said Ashton.

Action under the six-point plan includes:

- Establishment of a Lake Winnipeg Stewardship Board to help Manitobans identify further actions necessary to reduce nitrogen and phosphorous to pre-1970 levels in the lake by 13 per cent or more, subject to further findings of the Nutrient Management Strategy

- Introduction of new measures to help protect natural growth along the Red and Assiniboine rivers to prevent erosion and reduce nutrient run-off into the rivers to complement the Riparian Areas Tax Credit introduced in 2001

- Provision of a program to expand soil testing to ensure appropriate fertilizer application in both rural and urban settings

- Introduction of a new sewage and septic field regulation that will outline clear standards for the placement of systems

- Development of a shoreline protection project in partnership with Manitoba Hydro to help address erosion concerns

- Commencement of cross-border nutrient management discussions.

"Since 1999, \$75 million has been spent on improving flood protection, drainage and drinking water safety," said Ashton. "The province will continue to work with communities to strengthen local planning including increasing the number of conservation districts provincewide, a number which has already grown from nine to 16 in just three years."

Ashton noted that, as part of the province's work on developing a long-term water strategy, numerous water-related initiatives already underway include:

Introducing the Riparian Tax Credit which encourages the elimination of tillage and the limitation of grazing by livestock on lands adjacent to rivers and streams
Initiating a Nutrient Management Strategy to determine science based targets for nitrogen and phosphorus
Launching the Livestock Stewardship Initiative to ensure the sustainable development of the livestock industry including improving decision-making for land-use planning
Setting up an Assiniboine River Study to examine how much water flow is required to maintain healthy aquatic life
Introducing the Pesticides and Fertilizers Control Act which mandates the certification and training of commercial manure applicators for manure nutrient management planning
Becoming the first jurisdiction in North America to introduce drinking water legislation including establishing a central Office of Drinking Water.

Nutrients--mainly nitrogen and phosphorus--are essential for healthy water systems. However, when they are present in excessive amounts, they lead to the nuisance growth of algae and underwater plants which are primarily nitrogen and phosphorus derived from organic and inorganic waste.

Ashton added that the new Lake Winnipeg Stewardship Board will work with the Clean Environment Commission to implement the action plan to ensure public involvement.

"In addition to the initiatives announced today, we will continue to work with industries and municipalities to improve their waste water treatment systems and continue to tighten environmental licence requirements for nutrients as supported by ongoing scientific studies."