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October 2007

Audit of the Department of Conservation's Management of the Environmental Livestock Program

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OFFICE OF THE
AUDITOR GENERAL
MANITOBA

October 2007

The Honourable George Hickes
Speaker of the House
Room 244, Legislative Building
Winnipeg, Manitoba
R3C 0V8

Dear Sir:

I have the honour to transmit herewith my report titled, *Audit of the Department of Conservation's Management of the Environmental Livestock Program*, to be laid before Members of the Legislative Assembly in accordance with the provisions of Section 28 of The Auditor General Act.

Our audit was performed in accordance with value-for-money auditing standards recommended by the Canadian Institute of Chartered Accountants. The time period covered by our audit was the period from the enactment of The Livestock Manure and Mortalities Management Regulation on March 30, 1998 to June 30, 2005. Subsequent to the completion of our audit fieldwork, amendments were made to this Regulation and other progress has been made by the Government which impacts the Environmental Livestock Program. Our audit report includes detailed recommendations for improving administration under the Regulation, however we would like to acknowledge the effort that has already been made to strengthen management of the Program.

Respectfully submitted,

Original document signed by:
Carol Bellringer

Carol Bellringer, FCA, MBA
Auditor General

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Executive Summary

Livestock farms raise thousands of animals and generate enormous quantities of manure. Livestock manure must be managed properly to protect Manitoba's rivers, lakes, streams, and groundwater.

One of the methods that the Province uses to reduce the risk of environmental damage from livestock manure is through the *Livestock Manure and Mortalities Management Regulation* (42/98) (Regulation) under *The Environment Act*. Responsibility for administration of the Regulation is assigned to the Department of Conservation (Conservation).

The purpose of our audit was to evaluate Conservation's operational efforts to protect surface and groundwater from potential contamination caused by livestock operations.

Specifically, our objectives were:

- To determine whether the Regulation was generally comparable to legislation in other Canadian jurisdictions. **(Section 3.0)**
- To determine whether Conservation had adequate processes in place to ensure operators of livestock operations (operators) comply with the key provisions of the Regulation. **(Section 4.0)**
- To determine whether Conservation used information available to further its efforts to protect surface and groundwater from contamination. **(Section 5.0)**
- To determine whether Conservation was sufficiently consulting with the Departments of Agriculture, Food and Rural Initiatives, Health, Intergovernmental Affairs, and Water Stewardship, as well as municipalities, on common issues related to water quality. **(Section 6.0)**

Section 3.0 of our report concluded that legislation in the Province of Manitoba to ensure the protection of the environment from the potential harmful effects of livestock manure and mortalities was more comprehensive and proactive than in some other provinces. There were some areas that were not addressed in Manitoba's Regulation and some that were addressed more stringently in other jurisdictions. These areas included:

- Controls related to the application of manure by operations with multiple species;
- Minimum acceptable storage capacity for manure storage facility constructions;
- Controls to address the effects of chemical fertilizers combined with manure application;

- The submission of contingency plans to deal with potential emergencies related to livestock manure; and
- Controls related to the application of manure on frozen or snow-covered ground.

Section 4.0 of our report concluded that a number of processes were in place to address provisions of the Regulation. However, we found several processes requiring attention:

- issuing permits for construction, modification and expansion of manure storage facilities;
- monitoring of construction of manure storage facilities;
- post-construction monitoring;
- identification, assessment and approval of non-permitted manure storage facilities;
- monitoring of manure application to land; and
- utilization of the Department's information system.

Section 5.0 concluded that significant data was available from various elements of the Environmental Livestock Program. Conservation did not use this information to the extent they should have to further efforts in protecting surface and groundwater from contamination.

Section 6.0 concluded that Conservation had limited consultation with other government departments and municipalities on common issues related to water quality.

For each of these four sections, we provided Conservation with recommendations designed to guide the Department in meeting its responsibility of administering the Regulation. The recommendations are summarized in **Section 7.0** of the report.

1.0 Introduction

1.1 Audit Purpose

Livestock farms raise thousands of animals and generate enormous quantities of manure. Livestock manure must be managed properly to protect Manitoba's rivers, lakes, streams, and groundwater.

One of the methods that the Province uses to reduce the risk of environmental damage from livestock manure is through the *Livestock Manure and Mortalities Management Regulation* (42/98) (Regulation) under *The Environment Act*. Responsibility for administration of the Regulation is assigned to the Department of Conservation (Conservation).

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4. To determine whether Conservation was sufficiently consulting with the Departments of Agriculture, Food and Rural Initiatives, Health, Intergovernmental Affairs, and Water Stewardship, as well as municipalities, on common issues related to water quality. (**Section 6.0**)

1.2 Scope and Approach

Our audit was conducted between December 2004 and June 2005. The time period covered by our audit was the period from the enactment of the Regulation on March 30, 1998 to June 30, 2005.

Our work was performed in accordance with value-for-money auditing standards recommended by the Canadian Institute of Chartered Accountants, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

Our criteria, the conditions upon which we based the objectives, were based on the Regulation, departmental protocols and practices and good management practices. All criteria were reviewed with Conservation at the outset of our audit.

Our audit included examining records and conducting interviews with staff of the Environmental Livestock Program of Conservation. These interviews included staff located at Operations Headquarters in Winnipeg, as well as staff at various regional offices throughout the province.

In our examination of the issuing of permits for manure storage facilities and the monitoring of the construction of manure storage facilities, we looked specifically at the files for 26 or 5% of the 499 storage facilities constructed between March 30, 1998 and June 30, 2005. The 499 storage facilities represented facilities that fall under the Regulation enacted in 1998, taking earthen, steel and concrete storage facilities into consideration, as well as molehills.

To assist us in evaluating Conservation's efforts in protecting surface and groundwater from potential contamination caused by livestock operations, it was important to obtain information from rural municipalities. Through a survey sent to the Chief Administrative Officers in rural municipalities, we asked questions to help us confirm their understanding of the Regulation, and of their expectations of Conservation's administration of the Regulation. We obtained completed responses from 73 or 63% of 116 rural municipalities. An additional sixteen or 14% of the 116 municipalities informed us that, because they do not have livestock operations in their municipalities, the survey did not apply. The provincial distribution of the survey responses is represented in **Figure 1**.

Figure 1

Rural Municipality Survey Responses
May/June 2005

Rural Municipalities Responses	Number of Rural Municipalities	Percentage
Surveys returned completed	73	63%
Survey not applicable	16	14%
No response	27	23%
Total	116	100%

Appendix A contains a glossary of terms which are used in the report.

2.0 Background

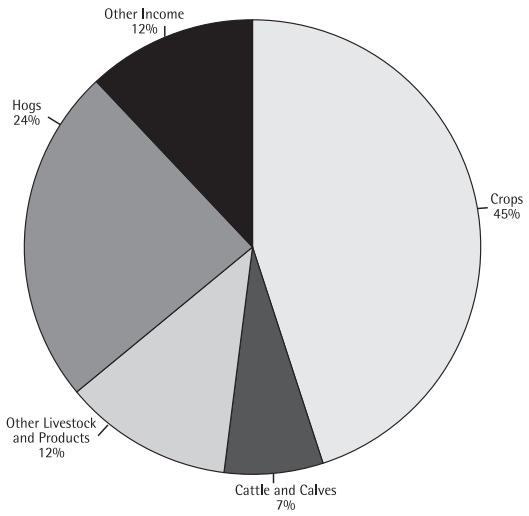
Because over 35% of the province's population resides in rural Manitoba, the effect of livestock operations on Manitobans is significant. With the simultaneous growth of agriculture and some rural communities, issues surrounding the cohabitation of livestock and humans in these areas have also grown, particularly issues surrounding livestock manure. Balancing the needs and rights of residents in rural communities with those of agricultural producers can be a challenge.

2.1 The Contribution of Agriculture to Manitoba's Economy

The agricultural sector plays a vital role in the Province's economy. According to Statistics Canada, Manitoba producers generated over $3.9 billion in total farm cash receipts in 2004, representing over 10% of the total cash receipts from farm income in Canada in that year.[1] In its *Manitoba Agriculture Yearbook 2004*, the Province's Department of Agriculture, Food and Rural Initiatives reported that, of this $3.9 billion, the livestock industry in Manitoba contributed $1.7 billion to farm income or 43% of total farm income. **Figure 2** illustrates the distribution of farm income, including the major livestock sectors.

Figure 2

2004 Manitoba Farm Cash Receipts



Source: *Manitoba Agriculture Yearbook 2004*

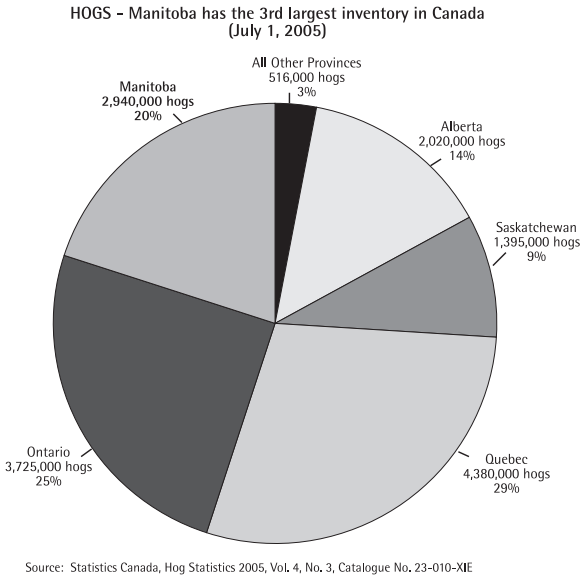
1 Statistics Canada, Farm cash receipts, May 2005, Catalogue No. 21-011-XIE

Manitoba ranks high nationally in a number of livestock categories. As shown in **Figures 3 through 7** (based on Statistics Canada livestock inventories by province) Manitoba, when compared to other provinces, had:

- the 3rd largest inventory of hogs;
- the 4th largest inventory of beef animals;
- the 5th largest inventory of dairy animals;
- the 5th largest annual poultry meat production (2004); and
- the 3rd largest annual egg production (2004).

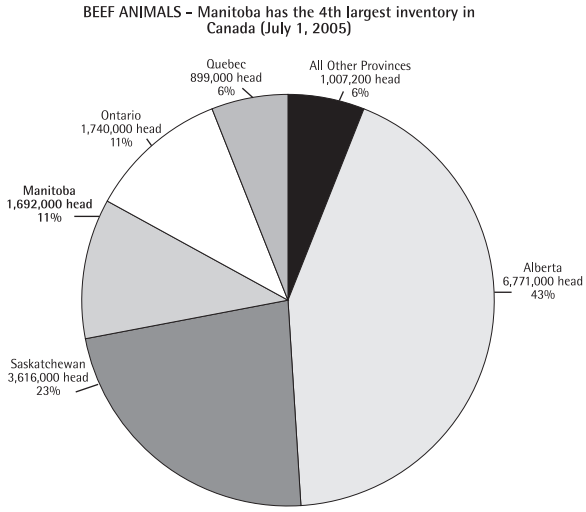
The statistics represented in **Figures 3 to 7** coincide with the period covered by our audit.

Figure 3



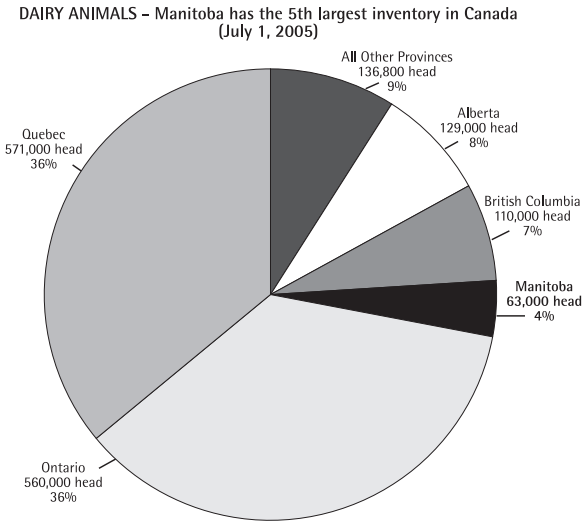
Source: Statistics Canada, Hog Statistics 2005, Vol. 4, No. 3, Catalogue No. 23-010-XIE

Figure 4



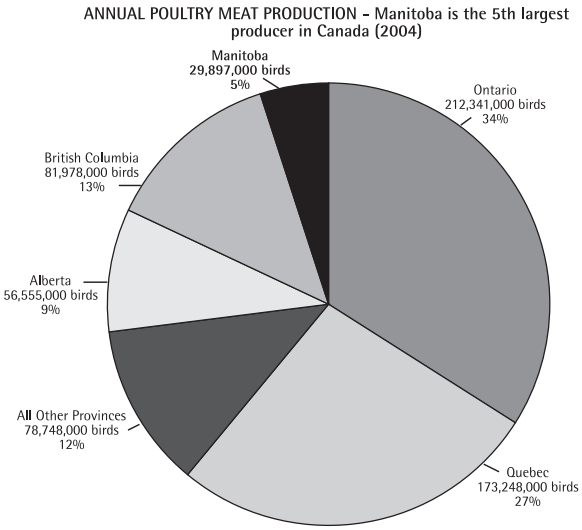
Source: Statistics Canada, Cattle Statistics 2005, Vol. 4, No. 2, Catalogue No. 23-012-XIE

Figure 5



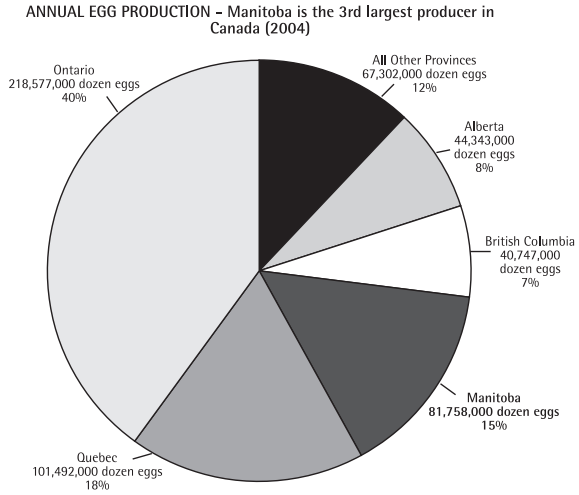
Source: Statistics Canada, Cattle Statistics 2005, Vol. 4, No. 2, Catalogue No. 23-012-XIE

Figure 6



Source: Statistics Canada, Poultry and Egg Statistics 2005, Vol. 2, No. 2, Catalogue No. 23-015-XIE

Figure 7



Source: Statistics Canada, Poultry and Egg Statistics 2005, Vol. 2, No. 2, Catalogue No. 23-015-XIE

2.2 Factors Contributing to Expansion of the Livestock Industry in Manitoba

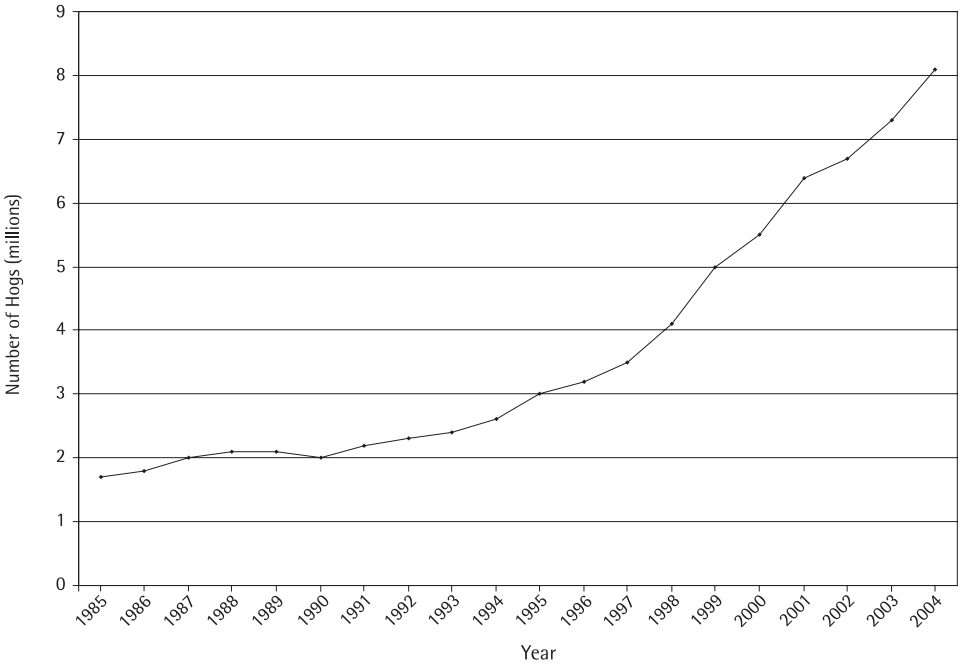
Livestock production has increased dramatically since the early 1990s. The rapid expansion in Manitoba can be attributed to several factors. In the 2000 report, *Finding Common Ground*, prepared for the Government of Manitoba by the Livestock Stewardship Panel, contributing factors were described as:

- Changes in world grain trade resulting in relatively static volumes of grain being sold at ever declining prices (constant dollars) due to technology improvements;
- Loss of the Crow Benefit on export grain resulting in farmers facing the full freight bill and lower feed grain prices (at least initially);
- 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; and
- Concerted effort by the Government of Manitoba to expand hog processing capacity in Manitoba.

As a result, hog production increased dramatically, as shown in **Figure 8**. At the end of 2004, hog production was close to five times what it had been twenty years before. The most rapid growth in this industry began in 1991. Between 1991 and 2004, annual hog production almost quadrupled, with a growth in hog numbers from 2.2 million to 8.1 million.

Figure 8

Hog Production In Manitoba Over Twenty Year Period
1985 to 2004



Source: Knowledge Management Branch, Manitoba Agriculture, Food and Rural Initiatives

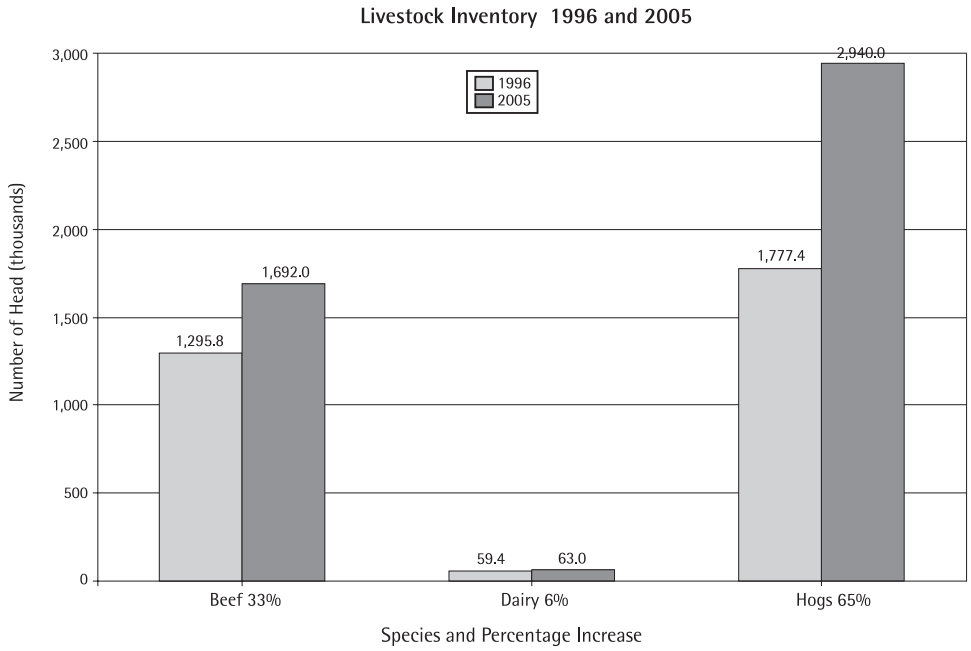
The closing of the Canada/United States border to ruminants in May of 2003 due to the Bovine Spongiform Encephalopathy (BSE) crisis also contributed to a growth in livestock inventories, particularly for cattle. The bison, sheep and goat industries were also affected. In 2004 Statistics Canada reported that Manitoba experienced a 10% surge in herd size in the year following the ban.[2] This was the largest percentage increase by any province in Canada in that year.

Figure 9 illustrates the change in livestock inventories in Manitoba from May 16, 1996 to July 1, 2005.[3]

2 Statistics Canada - The Daily, Thursday, August 19, 2004

3 1996 - Statistics Canada, 1996 Census of Agriculture - National and Provincial Highlights Tables, Catalogue No. 93F0033XIE; 2005 - Statistics Canada, Cattle Statistics 2005 Vol. 4 No. 2 Catalogue No. 23-012-XIE

Figure 9



Source: Based on Statistics Canada estimates of livestock numbers by province.

2.3 Increased Livestock Inventories Affect the Environment

With the growth in livestock inventories in both Canada and Manitoba in the last decade, livestock manure production has also increased. Manure contains a variety of plant nutrients including carbon (organic matter), nitrogen, phosphorus, potassium and sulfur. Other components in manure include: water (liquid manure contains over 90% water; solid manure contains 50% - 80% water); pathogens; salts; and metals (micronutrients such as copper, zinc, iron and other minerals).

Statistics Canada reported that in 1996 Canadian livestock produced an estimated 361 million kilograms of manure daily - over 132 billion kilograms annually.[4] Of this total, approximately 10% or 12.9 billion kilograms of manure was produced in Manitoba.

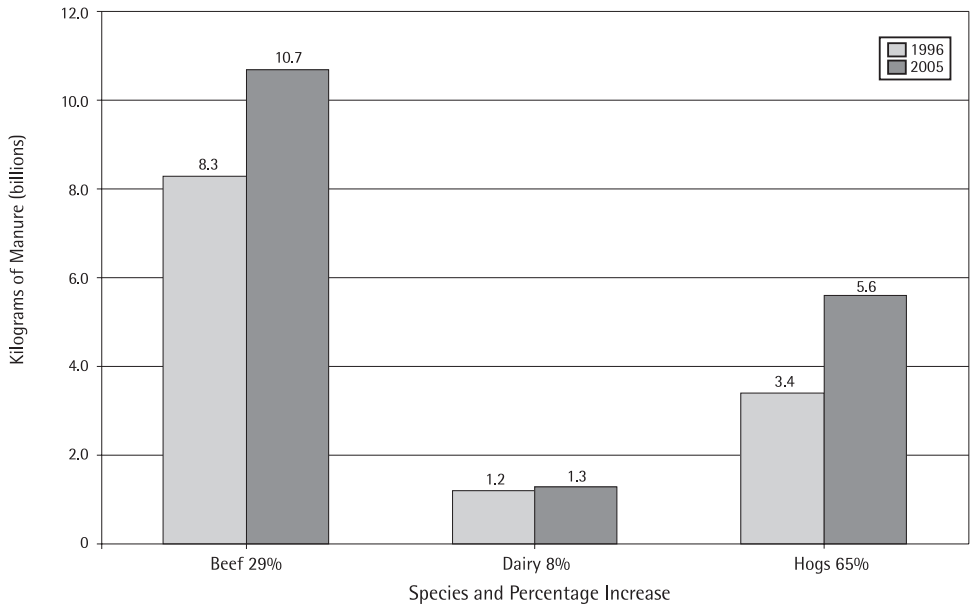
Based on the manure production rates calculated by Statistics Canada in 1996 and using the livestock data reported by Statistics Canada in July of 2005, we estimate that annual livestock manure production in Manitoba would have increased by 35% for cattle and hogs alone over this nine year period (1996 to 2005), as shown in **Figure 10**. Based on our calculation, approximately 17.6 billion kilograms of manure were produced in 2005 in Manitoba. Cattle and hogs account for 94%

4 Statistics Canada, A Geographical Profile of Manure Production in Canada, Catalogue No. 16F0025XIB

of the manure production in the Province, with the remaining 6% produced by poultry, bison, sheep, horses and other species.

Figure 10

Estimated Annual Manure Production 1996 and 2005



Source: Based on Statistics Canada estimates of livestock numbers by province and manure production by species.

Livestock manure is stored to allow its application as fertilizer at the most practical and beneficial time for crops. Its nutrients are valuable to producers who choose to use manure rather than commercial fertilizers. It is also stored to minimize any potential environmental impact, allowing producers to apply the manure at an appropriate time. Because liquid manure does not soak into frozen soil and can increase the likelihood of manure runoff into surface water during the spring melt if applied during the winter months, winter application of manure must be controlled.

Changes in technology have facilitated the move toward much larger farm operations to achieve economies of scale. Economic viability in the long term is now much more dependant on larger operations than it was a decade ago. What has not changed significantly is the land base to which the manure produced from these operations is applied. As a result, the rates at which manure is applied to land (known as manure application rates measured in kilograms per acre) have increased over time.

In 1996 five areas in Canada were identified as having high levels of concentration exceeding 2,000 kilograms of manure per hectare of total land.[5] One of the five areas identified was southern Manitoba. High concentrations of nitrogen and phosphorous were found in specific areas of southern Manitoba. The effect of high concentrations of nitrogen and phosphorous is discussed in **Section 2.4**.

In the 2001 Census, Statistics Canada listed thirty regions in Canada with the highest densities of livestock.[6] When the number of animal units (AU) was compared to square kilometers, Manitoba's Rural Municipality of La Broquerie was ranked the sixth highest in Canada with 129 AUs per square kilometer. This represented a 230% increase over the previous ten year period. The Rural Municipality of Hanover was eleventh on the list with 106 AUs per square kilometer, 71% higher than in 1991.

2.4 The Benefits and Drawbacks of Livestock Manure Production

Livestock manure production has both environmental benefits and drawbacks. Although manure is a valuable fertilizer for crop production, if it is not managed properly it can have a negative impact on the environment.

Proper manure management can reduce commercial fertilizer requirements by providing valuable nutrients for the soil including nitrogen and phosphorus. The Department of Agriculture, Food and Rural Initiatives estimated that a combined total of approximately 200 million kilograms of nitrogen and phosphorous are produced annually by livestock in Manitoba with an approximate fertilizer value of $200 million. Livestock manure can also reduce soil erosion and improve the water holding capacity of the soil.

Nitrates are found naturally in certain vegetables and are present in soil as part of the nitrogen cycle. They are important for plant growth. Although nitrogen can improve crop production, excessive amounts of nitrate may have detrimental effects on drinking water. It can lead to infantile methemoglobinemia or blue-baby syndrome. This disease may occur in infants under one year of age who drink water or formula made with water that has high nitrate levels. Kidney or spleen problems can also result from high nitrate levels.

Phosphorous is essential for aquatic and terrestrial plant growth. However, an overabundance of this nutrient can result in excessive algae in water bodies, making the habitat unsuitable for many forms of aquatic life.

5 Statistics Canada, A Geographic Profile of Manure Production in Canada, Catalogue No. 16F0025XIB
6 Statistics Canada, A Geographic Profile of Canadian Livestock, 1991-2001, Catalogue No. 21-601-MIE

In addition to the negative impacts caused by excessive nitrogen and phosphorous, some microorganisms found in livestock manure can cause illnesses and even death in humans through water contamination.

Water quality problems are the result of a number of factors. One of these factors is the quantity of manure produced, although this may or may not be the most important. Manure management practices and soil type can also influence water quality. Other factors include topography, climate and precipitation.

Manitoba's Department of Agriculture, Food and Rural Initiatives describes the potential impact of manure on drinking water on its website:

> *"Waterborne disease can occur if organisms in the manure migrate to surface water or groundwater sources that are used as a supply of drinking water. This could occur if manure is spread too near surface water or in areas of steep slope. Rapid movement to groundwater can also occur if manure is spread in areas where there are sinkholes, bedrock outcrops or the soils are very course."*[7]

The effect of livestock manure production on air quality is also of concern to many. Some view the odours generated from livestock manure merely as a nuisance which interferes with their enjoyment of rural life. Others view these odours as genuine health hazards resulting in nasal irritation, triggering symptoms in individuals with breathing problems such as asthma, or adding to personal stress. Often public tolerance of odours from livestock manure is dependant on the duration of an event and how often it is repeated. At any rate, the quality of air is always a consideration when discussing livestock manure.

2.5 How Manure is Stored

Manure storage facilities are used to store manure in various forms: liquid, semi-solid, and solid. The Department of Agriculture, Food and Rural Initiatives describes the storage of manure:

> *"Solid manure can be stored in piles that may be located in the farm yard or directly in the fields where spreading is intended.*
>
> *Semi-solid systems are sometimes used in dairy operations where producers add bedding to the pens or stalls of livestock but not enough to absorb all the liquids. This semi-solid manure cannot be piled or pumped. Therefore, it must be pushed through underground pipes to the bottom of a shallow structure referred to as a "molehill".*

7 (http://www.gov.mb.ca/agriculture/livestock/publicconcerns/cwa01s04.html)

Liquid manure storage structures are used by most pork producers and some dairy and egg-laying operations. These structures may be either in-ground (earthen structures or concrete tanks) or above-ground (concrete or steel tanks). In Manitoba, earthen manure storage structures are the most common. Concrete storage structures can be designed as under-barn, partially underground or above-ground structures. Steel structures are also available for above-ground liquid manure storage."[8]

Types of Manure Storage Facilities

Aerial view of earthen manure storage facility (2 cells – 1 cell is empty)

Earthen manure storage facility under construction

Above-ground concrete manure storage facility

Steel tank manure storage facility

Photos courtesy of the Department of Conservation

In 1994 the province enacted the *Livestock Waste Regulation* which required that permits for the construction of earthen manure storage facilities be obtained. Until that time, manure storage facilities were built throughout the province without the supervision or involvement of government. The Regulation was replaced in 1998 with the *Livestock Manure and Mortalities Management*

8 (http://www.gov.mb.ca/agriculture/livestock/publicconcerns/cwa01s13.html)

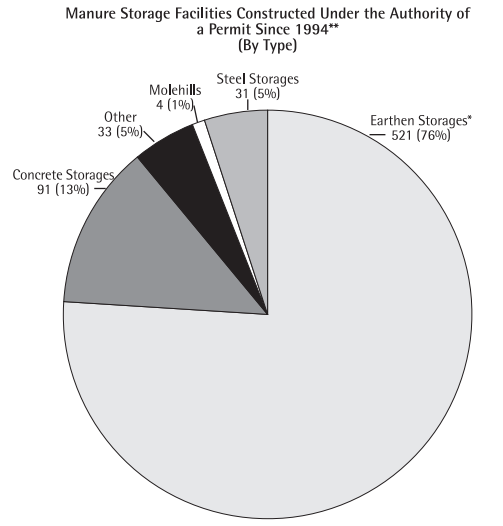
Regulation, which expanded the requirement to obtain permits to include all constructions, modifications or expansions of manure storage facilities.

Section 6 of the Regulation governs the permitting and construction of these facilities. The Regulation enacted in 1994 applied to earthen manure storage facilities only. In 1998, the Regulation was amended to include concrete and steel storage facilities as well as molehills.

Where possible, manure storage structures should be located in areas that are underlain by thick deposits of clay materials or should be adequately lined with compacted clay and/or synthetic liners to reduce or eliminate seepage. The permitting process requires test drilling at the site to evaluate geological conditions, and appropriate engineering design.

According to the database developed by Conservation to store permit information, almost 700 permits were issued between 1994 and 2005 for the construction of manure storage facilities, an average of 63 per year. A total of 198 of these permits were issued under the original *Livestock Waste Regulation* of 1994, with almost 500 more issued between 1998 and 2005 under the *Livestock Manure and Mortalities Management Regulation*. Eighty percent of the total permits issued for manure storage facilities were issued in the eastern part of the province out of Conservation's Steinbach office. The other 20% were issued in the western region out of the Brandon office. Seventy-six percent of the permits were for earthen manure storage facilities. **Figure 11** indicates the number of manure storage facilities constructed under the authority of a permit by type found in Manitoba.

Figure 11



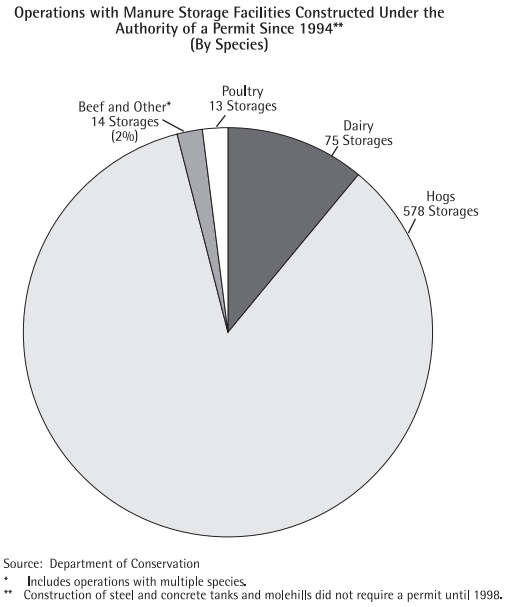
Source: Department of Conservation

* Earthen includes in-ground storages lined with compacted clay or various synthetic liners as approved by Conservation.

** Construction of steel and concrete tanks and molehills did not require a permit until 1998.

Eighty-five percent of the permits were for hog operations. **Figure 12** indicates the number of manure storage facilities constructed under the authority of a permit in Manitoba by species (livestock sector).

Figure 12



2.6 What the Province Has Done

The *Livestock Manure and Mortalities Management Regulation*, which is administered by the Department of Conservation, is only one of a number of cross-government measures that are used in the environmental management of livestock.

Other legislation, administered by other departments, act in concert with the *Livestock Manure and Mortalities Management Regulation* to help protect the environment. This legislation includes:

The Planning Act (Department of Intergovernmental Affairs and Department of Aboriginal and Northern Affairs)

The Act provides the legal framework for land use planning in Manitoba. A new *Planning Act* came into force in January 2006. It contains a number of provisions relating to livestock development including a mandatory technical review and public hearing for all new or expanded livestock operations involving 300 or more animal units. The new *Planning Act* also requires municipalities or planning districts to include a livestock operating policy in their municipal or planning district development plan.

The Farm Practices Protection Act (Department of Agriculture, Food and Rural Initiatives)
This Act, proclaimed in 1994, protects farmers who carry on normal farm practices from unreasonable court action. It also protects neighbours from disturbances of odour, noise, dust, smoke or other sources caused by unacceptable farm practices. The Act establishes a process for reviewing and mediating disputes through the Farm Practices Protection Board.

The Water Rights Act (Department of Water Stewardship)
This Act requires a Water Rights licence be obtained when water withdrawal (from either surface or groundwater sources) exceeds 25,000 litres per day. The water requirements of a livestock operation can exceed this limit. It is important that an application for a water rights licence is submitted prior to the development of a project as it may not be eligible for a licence as the water source may be at or near full allocation.

The Water Protection Act (Department of Water Stewardship)
This Act, which came into force in January 2006 includes provisions to establish:

- water quality standards, objectives or guidelines;
- water quality management zones and to regulate activities within the zones;
- local watershed development plans.

In addition to specific legislation in place, we have noted that the government has undertaken various other measures to aid in the management of the environmental impacts of livestock activities including:

- review of *The Planning Act* of 1976;
- establishment of the Manitoba Phosphorous Expert Committee in 2002 to examine issues surrounding phosphorous and livestock manure; and
- establishment of the Riparian Tax Credit in 2003 and subsequent enhancements to encourage proper management of the land adjacent to waterways to help prevent erosion and improve water quality.

2.7 What Conservation Has Done

In 1994, The Government of Manitoba enacted legislation for the handling of livestock manure under *The Environment Act*. The intent of the legislation was to ensure that livestock manure as well as livestock mortalities were handled in an environmentally sound manner. The Regulation, known as *The Livestock Waste Regulation* (81/94), included specifications for the construction of earthen manure storage facilities and the requirement to obtain a permit prior to construction. This type of structure is common in Manitoba because they can be affordably constructed to provide 400 to 500 days storage capacity and are an environmentally sound option when site conditions are suitable.

Earthen manure storage facilities are often incorrectly called "lagoons". A lagoon is a waste treatment facility designed to "digest" municipal sewage. Although earthen manure storage facilities and lagoons may look the same, a lagoon must be larger to allow for the biological activity required for treatment before discharge into surface water. Manure must not be discharged into surface water.

The *Livestock Waste Regulation* was repealed and replaced by the *Livestock Manure and Mortalities Management Regulation* (42/98) in 1998. This new regulation was enacted with the same purpose in mind, but provided more detailed direction for the handling of livestock manure and mortalities. The Regulation expanded the requirement to obtain a permit to include all manure storage facilities including earthen manure storages, concrete tanks, steel tanks and molehills.

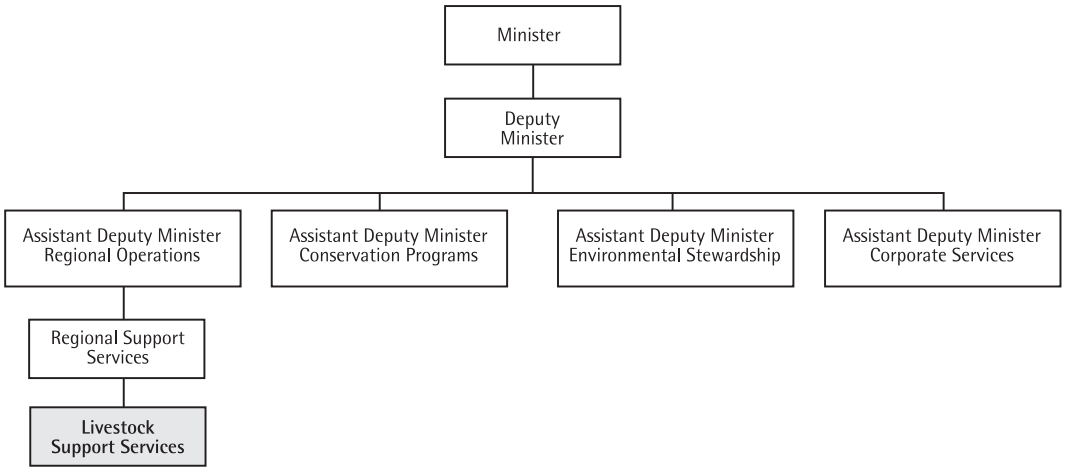
In March 2004, the *Livestock Manure and Mortalities Management Regulation* was amended, implementing more stringent requirements. Until the 2004 amendment to the Regulation, the specified minimum size of operations for the submission of manure management plans was 400 animal units. However, with the amendment, the number of animal units was reduced to 300, thus requiring more operations to submit manure management plans. See **Appendix B** for the definition of animal units and calculations of animal units by species. In addition, the Regulation as amended in 2004 required that all manure storage facilities constructed without a permit be registered by Conservation.

Administration of *The Environment Act* and the *Livestock Manure and Mortalities Management Regulation* is the responsibility of Conservation. **Figure 13** illustrates where the Livestock Program fits in Conservation's organizational structure. Within the Livestock Support Services Section, a team including Environment Officers and Environmental Engineers administers the Regulation. Team members are regionally based to provide local coverage, and centrally coordinated. Primary responsibilities include: investigation of complaints; annual inspection of permitted manure storage facilities; inspection of manure storage

facilities undergoing construction, modification, and expansion; and enforcement of regulations on management of manure and mortalities.

Figure 13

Department of Conservation
Organization Chart as at April 2005



Source: Department of Conservation

2.8 Subsequent to our Audit

Subsequent to the completion of our audit fieldwork in June of 2005, the *Livestock Manure and Mortalities Management Regulation* was further amended three times:

Regulation 194/2005 (December 2005)

- provided for certified crop advisers to prepare manure management plans;

Regulation 219/2006 (November 2006)

- included definitions for incorporation and injection of livestock manure into soil;
- incorporated provisions for the consideration of phosphorous in the application of manure to land;
- incorporated restrictions on winter manure spreading in a "regularly inundated area" (including the "Red River Valley Special Management Area" and areas subject to flooding on an average basis at least once every five years);
- incorporated restrictions on fall manure spreading in a "regularly inundated area"; and

- incorporated restrictions on setbacks from surface water features for manure application.

Regulation 238/2006 (December 2006)

- imposed a temporary restriction of the further growth of pig agricultural operations in Manitoba while the Clean Environment Commission conducted a review of the environmental sustainability of those operations in the province.

In addition to the regulation amendments noted above and in **Section 2.6,** we also noted other government actions including:

- repeal and replacement of the former Planning Act of 1976. The new Planning Act received Royal assent in June 2005 and came into force on January 1, 2006. The new Act requires municipalities to have development plans that would restrict where livestock operations are located depending on issues on soil type, proximity to water bodies and groundwater and whether to land is in a flood-risk area;
- January 2006 report and recommendations from the Manitoba Phosphorus Expert Committee which resulted in changes to the Livestock Manure and Mortalities Management Regulation to consider phosphorus in the application of manure to land; and
- expansion of the Riparian Tax Credit in 2007.

3.0 Strong Legislation Compared to that of Other Canadian Jurisdictions

Objective and Criterion	Conclusions
Our objective was: To determine whether the *Livestock Manure and Mortalities Management Regulation* (Regulation) was generally comparable to legislation in other Canadian jurisdictions.	Legislation in the Province of Manitoba to ensure the protection of the environment from the potential harmful effects of livestock manure and mortalities was more comprehensive and proactive than in some other provinces. There were some areas that were not addressed in Manitoba's Regulation and some that were addressed more stringently in other jurisdictions. These areas included: • Controls related to the application of manure by operations with multiple species;

Objective and Criterion	Conclusions
	• Minimum acceptable storage capacity for manure storage facility constructions; • Controls to address the effects of chemical fertilizers combined with manure application; • Submission of contingency plans to deal with potential emergencies related to livestock manure; and • Controls related to the application of manure on frozen or snow-covered ground.

Audit Criterion

In our assessment of how the Province's legislation for livestock manure and mortalities management compared to other Canadian jurisdictions, we found that many jurisdictions did not have specific legislation in place. Therefore, we focused our comparison on provinces that did have specific legislation in place. We specifically compared Manitoba's legislation to that of the provinces of Alberta, Saskatchewan, Ontario and Quebec.

Manitoba's Regulation includes controls for the construction, modification and expansion of manure storage facilities as well as controls for the application of manure to land. These controls address the impact of nutrients found in livestock manure.

Areas that were not addressed in Manitoba's Regulation, or that were addressed more stringently in other jurisdictions, were as follows:

Controls related to the application of manure by operations with multiple species

Animal units for operations with multiple species were not cumulative across species in Manitoba's legislation. Although a manure management plan was required if an operation had one species with 300 or more animal units, no consideration was given to the spreading of manure from other species on the same land. This could contribute to over-application of manure.

The Province of Quebec addresses this issue in its regulation *Respecting the Prevention of Water Pollution in Livestock Operations*, a regulation under *The Environment Quality Act*. Schedule A of Quebec's Regulation details

the "Application Threshold and Maximum Number of Animal Units" as they apply to manure storage facilities and the spread of manure. The footnote at the end of the schedule reads, *"To apply this Schedule, compute the total number of animals contained in all the buildings or yards of a livestock operation situated less than 150 meters from each other which belong to the same owner or which use a common manure management system, including any additional livestock expected within the scope of the application for a certificate of operation".*

Regardless of the manure source, over-application of manure can be a threat to the environment. Manitoba can benefit by the lead that the Province of Quebec has taken on this issue by including all livestock involved in an operation in calculating total animal units for operations.

Minimum acceptable storage capacity for manure storage facility constructions

According to Conservation's website, the minimum acceptable capacity for a manure storage facility was 200 days. Program staff informed us that 400 days capacity was considered optimum by Conservation. This capacity allowed flexibility to maximize the value of manure and avoid the need to "dispose" of manure during winter months when access to fields was limited and nutrient use was minimized.

Although Conservation uses the optimum capacity of 400 days as a guide in assessing applications for manure storage facility constructions, Manitoba's *Livestock Manure and Mortalities Management Regulation* does not stipulate a minimum capacity.

We found that both Quebec and Ontario include minimum storage facility capacities in their legislation. Quebec has set the minimum at 200 days storage in its *Agricultural Operations Regulation* under *The Environment Quality Act*. The Ontario Regulation 267/03 under *The Nutrient Management Act* requires new manure storage facility constructions to have a capacity for 240 days of the manure generated by the number of farm animals that the building or structure has the capacity to house.

Controls to address the effects of chemical fertilizers combined with manure application

The application of chemical fertilizers is not addressed in the Regulation. Excessive application of natural or chemical fertilizers or a combination of both can result in unacceptable nitrate levels. The Regulation only addresses the over-application of natural fertilizers.

The Province of Ontario has restrictions in place for the spread of all nutrients, including chemical fertilizers. The Ontario Regulation 267/03 states, *"A nutrient management plan for an agricultural operation must*

account for the total quantity of nutrients that it is reasonable to expect will be applied to land in the course of the operation during each year for which the plan is prepared".

Submission of contingency plans to deal with potential emergencies related to livestock manure

We did not find legislation in place for the Province of Manitoba which requires operators to document a plan to deal with potential emergencies related to livestock manure.

We found that in the Province of Ontario, legislation requires operators to prepare a "contingency plan" as part of their nutrient management strategies or plans. In order for these strategies or plans to achieve third party review or approval, the contingency plans must include provisions for:

- When more nutrients are generated than planned;
- When a manure storage facility is reaching capacity sooner than planned;
- Unanticipated releases of nutrients (spills); and
- When fields or equipment are not available when required or fields are snow covered, too wet, or otherwise unavailable.

Controls related to the application of manure on frozen or snow-covered ground

The spread of manure on frozen ground poses a higher risk to the environment because manure cannot be injected or worked into frozen soil. Manure does not readily infiltrate frozen soil and the likelihood increases for manure to run off and enter surface watercourses.

Under the heading "Prohibitions on winter spreading" in Section 14(1), the *Livestock Manure and Mortalities Management Regulation* prohibits the spreading of manure between November 10 of one year and April 10 of the following year for operations with 300 animals units or more. The Regulation exempts certain operations, depending on the date they came into existence. Operations with less than 300 animal units that were in existence prior to March 30, 2004 are allowed to spread manure year round, provided they adhere to setback requirements (i.e., the minimum distance requirements as identified in the Regulation). Subsequent to our audit, the Regulation was amended to include restrictions on winter spreading in "regularly inundated areas".

Legislation in Quebec prohibits all livestock operations from spreading manure on frozen or snow-covered ground, regardless of size or location.

We recommend that the Department consider the following potential amendments to the Regulation:

- **Preventing over-application of manure by operations with multiple species;**
- **Incorporating a minimum acceptable manure storage capacity for manure storage facility constructions. The minimum capacity should be set at a level which will avoid the need to "dispose" of manure during winter months;**
- **Incorporating controls to address the effects of chemical fertilizers combined with manure application on soil nutrient levels;**
- **Requiring the submission of contingency plans to deal with potential emergencies related to livestock manure; and**
- **Limiting the spreading of manure on frozen or snow-covered ground for all livestock operations.**

Response from Officials

Controls related to the application of manure by operations with multiple species

Government policy has been to consider animal units cumulatively for planning purposes such as the TRC process under The Planning Act but not cumulatively under the Livestock Manure and Mortalities Management Regulation for administration of manure management plans. Smaller numbers of different species of livestock typically involve different manure types and different manure management regimes. Over-application of manure is inherently addressed for operations with 300 or more animal units through the manure management planning process whereby mandatory soil sampling prior to manure application provides a measure of nitrate nitrogen and phosphorus in the soil. If additional manure is applied, the soil test will indicate the presence of additional nutrients and the operator will have to reduce subsequent applications so as to avoid exceeding regulatory limits.

Minimum acceptable storage capacity for manure storage facility constructions

The Livestock Manure and Mortalities Management Regulation specifies that the storage facility must be of sufficient capacity to store all of the manure produced until the manure can be applied as fertilizer [section 4(a)] and prohibits winter application by all operations except those operations with fewer than 300 animal units that were in operation prior to March 30, 2004 [section 14(2)]. Achievement of the objectives of this recommendation have recently been further enhanced by the development of better and more accurate guidelines for design criteria that are based on greater experience with the specific needs of different types of operations (i.e., more precise estimates of manure volume generation) and better performance by operators.

Controls to address the effects of chemical fertilizers combined with manure application

Direct regulation of commercial inorganic fertilizers is beyond the scope of a livestock manure regulation. Direct regulation of nutrients from both synthetic fertilizer in combination with livestock manure is being proposed by Water Stewardship through the proposed Nutrient Management Regulation under The Water Protection Act.

Submission of contingency plans to deal with potential emergencies related to livestock manure

The objectves of this recommendation have largely been addressed through a regulatory amendment (MR 52/2004) which requires that the environment be protected in the event of a structural failure of the manure storage facility. Additionally, the department has developed better and more accurate guidelines for design criteria that are based on greater experience with the specific needs of different types of operations, thereby significantly reducing the possibility of exceeding storage capacity. However, the department will evaluate and consider this recommendation to determine if further amendment would be helpful.

Controls related to the application of manure on frozen or snow-covered ground

The regulation was amended by MR 219/2006 which will prohibit deposition of manure even by small operations during the period November 10 to April 10 within the Red River Valley Special Management Area and other regularly inundated areas as of 2013. Winter deposition in other areas by operations with fewer than 300 animal units poses less of an environmental risk and government policy has been to avoid posing onerous restrictions on these smaller family farm units. Note that any operations that expanded beyond 300 animal units or came into existence after March 30, 2004 are prohibited from winter spreading of manure (MR 52/2004).

4.0 Processes in Place to Ensure Compliance With Legislation

Objective and Criteria	Conclusions
Our objective was: To determine whether Conservation had adequate processes in place to ensure operators of livestock operations (operators) comply with the key provisions of the *Livestock Manure and Mortalities Management Regulation*.	Conservation had a number of processes in place to address the provisions of the *Livestock Manure and Mortalities Management Regulation*. However, we found several processes requiring attention: • issuing permits for construction, modification and expansion of manure storage facilities; • monitoring of construction of manure storage facilities; • post-construction monitoring; • identification, assessment and approval of non-permitted manure storage facilities; • monitoring of manure application to land; and • utilization of the Department's information system.

Objective and Criteria	Conclusions
The audit criteria established for this objective were:	
Section 4.1 Conservation should have adequate processes in place for issuing permits to construct, modify, or expand manure storage facilities.	**Need to strengthen permitting processes** Conservation generally reviewed applications for permits to construct, modify or expand manure storage facilities. There were specific aspects of its permitting processes which were either not performed or were not adequate. • Permit issued with no permit application received (**Section 4.1.1**); • Inconsistent sign-off on permit application review (**Section 4.1.2**); • Permits were issued without verification of applications for required licenses (**Section 4.1.3**); • Site inspections were not conducted before permits were issued (**Section 4.1.4**); • Consultation with municipalities was limited (**Section 4.1.5**); • Municipal conditions were not incorporated in permits (**Section 4.1.6**); and • Client acceptance of permit conditions was not required (**Section 4.1.7**).
Section 4.2 There should be adequate processes in place for monitoring the construction, modification and expansion of manure storage facilities.	**Need to strengthen construction monitoring processes** Conservation was conducting inspections of manure storage facilities during construction, modification and expansions. There were specific aspects of its monitoring processes which were either not performed or were not adequate. • Written inspection results were not provided to the operator or representative (**Section 4.2.1**); • Inappropriate timing of final inspections (**Section 4.2.2**); • Inadequate assessment of soil test results (**Section 4.2.3**); and • Inadequate certification by professional engineers (**Section 4.2.4**).

Objective and Criteria	Conclusions
Section 4.3 There should be adequate processes in place for the monitoring of livestock operations after manure storage facilities have been constructed.	**Need to strengthen post-construction monitoring processes** Conservation was conducting inspections of livestock operations with permitted manure storage facilities. There were specific aspects of its monitoring processes which were either not performed or were not adequate. • Periodic inspections were not risk-based (**Section 4.3.1**); • Periodic inspections were narrow in scope (**Section 4.3.2**); • Insufficient follow-up on issues identified during inspections (**Section 4.3.3**); and • Conservation did not require operator acknowledgement of periodic inspection reports (**Section 4.3.4**).
Section 4.4 There should be a strategy in place to identify, assess and approve manure storage facilities that were constructed before permits were required.	**Strategy to identify, assess and approve non-permitted manure storage facilities needed** There was no strategy in place to identify non-permitted manure storage facilities (**Section 4.4.1**) and no strategy to assess and approve non-permitted manure storage facilities (**Section 4.4.2**).
Section 4.5 There should be adequate processes in place to monitor the application of manure to land.	**Need to strengthen processes for monitoring of manure application** Conservation had implemented an internal audit function to assess plans for the application of manure to land (manure management plans). There were specific aspects of its monitoring processes which were either not performed or were not adequate. • Inadequate assessment of manure management plans (**Section 4.5.1**); • Manure management plans submitted at the request of municipalities were not reviewed by Conservation (**Section 4.5.2**); • No follow-up on manure management plans not submitted for registration (**Section 4.5.3**); • No follow-up to confirm manure spread (**Section 4.5.4**);

Objective and Criteria	Conclusions
	• Internal audit of manure management plans was narrow in scope (**Section 4.5.5**); • Inadequate communication of internal audit results of manure management plans to operators (**Section 4.5.6**); and • Inadequate follow-up of manure issues identified (**Section 4.5.7**).
Section 4.6 Information systems should be effectively used to track all aspects of the environmental livestock program.	**Need to maximize utilization of the Department's information system** An information system was in place which was capable of tracking all aspects of the environmental livestock program. The system was not being utilized effectively as a tracking mechanism. • Environmental management system (EMS) under-utilized (**Section 4.6.1**); and • Data entry issues not resolved (**Section 4.6.2**).

4.1 Need to Strengthen Permitting Processes

Audit Criterion

Conservation should have adequate processes in place for issuing permits to construct, modify, or expand manure storage facilities.

Adequate processes would include:

- Compliance with the Regulation requirement that all permits applications be made on the approved application form;
- An assessment of the site specifications (proposed location), the design specifications developed to address the site's geological conditions and of the proposed storage capacity. The review process should be sufficiently documented and signed-off when complete;
- Verification of applications for all required licenses;
- Site inspections prior to the issuing of permits;
- Consultation with municipalities; and
- Applicant acceptance of conditions included in permits.

These processes are important to ensure compliance with the Regulation and to ensure that the interests of all stakeholders are considered.

We found that, Conservation reviewed applications for permits to construct, modify or expand manure storage facilities. There were specific aspects of its permitting processes that were either not performed or were not adequate:

- Permit issued with no permit application received (**Section 4.1.1**);
- Inconsistent sign-off on permit application review (**Section 4.1.2**);
- Permits were issued without verification that other required licenses were in place (**Section 4.1.3**);
- Site inspections were not conducted before permits were issued (**Section 4.1.4**);
- Consultation with municipalities was limited (**Section 4.1.5**);
- Municipal conditions were not incorporated in permits (**Section 4.1.6**); and
- Client acceptance of permit conditions was not required (**Section 4.1.7**).

4.1.1 Permit Issued With No Permit Application Received

Section 6(2) of the Livestock Manure and Mortalities Management Regulation states, *"An application for a permit shall be made by an operator to the director, on a form approved by the director, and be accompanied by the information required on the application form and any additional information that the director requires".*

No permits should be issued without the submission of documents required by the Regulation. By insisting on completed applications and reviewing these applications according to Conservation's protocol, there is less risk that errors or omissions will occur.

Conservation used a standard application form for manure storage facility constructions, modifications and expansions. Although we found that for 25 of our 26 test files, permit applications had been prepared and submitted on the form approved by Conservation, we found that one permit had been issued without an application for a permit. The permit was for the construction of a third cell, thus expanding an existing manure storage facility. The two original cells were constructed under a permit that was issued in 1999. Although the original permit authorized the construction of a three-cell facility, the permit expired before the third cell was built. The third cell was constructed in 2001.

In our review of the file for the second permit, we found that the third cell was described in a letter from the engineering firm but that no actual application for a permit was submitted to Conservation. The proposed third cell was reduced in size from the original 1999 proposal. The engineer explained in the letter that the proposed size would accommodate 402 days of manure storage for this hog operation. However, when we reviewed the engineer's calculation for storage requirements, we found that he had used the wrong manure production rate from the Farm Practices Guidelines for Hog Producers in Manitoba for that particular operation. As a result, the calculated capacity was not correct. The correct total capacity for the three-cell storage facility was approximately 254 days, not 402 days as the engineer had suggested. In addition to this change, the proposed third cell was to be built 70 feet away from the site proposed in the original application.

Since the operator did not have an active permit, a new application for modification of an existing storage facility should have been submitted to ensure a complete review of the proposed facility. Conservation staff may have concluded that a new application was not required and therefore accepted the letter from the engineer as a request for a permit. However, according to the Regulation, the construction, modification or expansion of all manure storage facilities requires that the operator apply for a permit on an approved form.

We recommend that no permits be issued without proper documentation and review as required by the Regulation.

Response from Officials

The department shall review procedures and operational guidelines and revise them appropriately to address this concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

4.1.2 Inconsistent Sign-Off on Permit Application Review

We expected Conservation's processes for the issuing of permits to include a complete review of applications and evidence that Conservation was satisfied that a permit should be issued.

Conservation's standard application form for manure storage facility constructions, modifications and expansions included a space for "Reviewed by". Authorizing signatures would ensure that steps in the permitting process were not omitted. The reviewer's initials or signature would serve as an indication that the plan submitted complied with the Regulation and that a permit could be issued.

We found that Conservation had reviewed permit applications and assessed the site specifications, the design specifications and the storage capacities. However, documented evidence of review was often lacking. For example, when Water Rights licenses were required as indicated by applicants, we found no notations in the files to indicate that further action was required. We discuss the issue of Water Rights licenses further in **Section 4.1.3**.

With regard to Conservation's sign-off upon completion of the review, ten of the 26 permit applications (38%) that we examined had not been signed or initialed.

We recommend that the review of all permit applications be sufficiently documented.

We recommend that the application be signed off upon completion of the review to signify that all requirements of the application review process have been met.

Response from Officials

The department shall review procedures and operational guidelines and revise them appropriately to address this concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

The department shall amend the permit application format and shall amend procedures so as to implement this recommendation.

4.1.3 Permits Issued Without Verification of Applications for Other Required Licenses

In our examination of the processing of permit applications, we expected to find that Conservation obtained confirmation that other pertinent licenses and permits had been applied for before permits to construct manure storage facilities were issued.

The Department of Water Stewardship (Water Stewardship) is responsible for issuing various permits and licenses related to water. Conservation should confirm with Water Stewardship that pertinent licenses and permits related to water have been applied for. This is an appropriate point at which to prevent operations from proceeding where there is a lack of adherence to permitting requirements.

The Department of Intergovernmental Affairs (Intergovernmental Affairs) has a leadership role with respect to the municipalities of Manitoba. As described on its website, Intergovernmental Affairs carries out this role *"by functioning as an advocate of community needs and a catalyst and coordinator of action"*.[9] With this relationship in mind, we discussed the matter of verifying that pertinent licenses and permits were in place with representatives from Intergovernmental Affairs and confirmed that it was their expectation that Conservation ensured that appropriate licenses were obtained before permits were issued. Based on our survey of rural municipalities, the municipalities were also under this impression.

The permit application requires that the applicant indicate water requirements for the operation and whether or not a Water Rights license is required. If a license is required, the license number is requested. In addition, Water Resource permit numbers are requested for operations located within the Red River Valley Designated Flood Area.

Of the 26 files we reviewed, 17 of the applications (65%) indicated that a Water Rights license was required but had not been obtained at the time of application. We found no evidence that Conservation followed up to ensure that application was made for these licenses. We confirmed with Water Stewardship that 9 of the 17 licenses (53%) were never obtained, even after the manure storage facilities were built.

We recommend that Conservation ensure that application has been made for pertinent licenses and permits related to water by communicating with the Department of Water Stewardship.

9 http://www.gov.mb.ca/ia/aboutus/mandate.html

Response from Officials

The department shall review procedures and operational guidelines and revise them appropriately to address this concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

4.1.4 Site Inspections Not Conducted Before Permits Were Issued

We expected to find that Conservation conducted an inspection of each site proposed in permit applications before issuing permits. A site inspection prior to the issuance of a permit would assist Conservation staff in gaining a better understanding of the geological conditions. Conservation would be in a better position to identify environmentally sensitive areas such as wells and sinkholes which are not always visible in topographic maps and may not have been identified in the application. All of this would contribute to ensuring that the proposed site meets the requirements of the Regulation before construction begins.

We found that site inspections prior to the issuance of permits were not being done. Conservation had a protocol in place to conduct pre-construction inspections. However, these inspections were conducted after the permits were issued. Even with this policy in place, we found that for 13 of the 26 (50%) permits we reviewed, the first inspections actually took place after construction had begun.

Once a permit has been issued, approving what is proposed in an application, it is much more difficult for Conservation to influence where the facility is actually built, particularly if construction has commenced before they actually visit the site.

For three of the 26 test files, the actual geographic location of the manure storage facilities did not agree with the locations shown on site plans submitted with the applications.

We recommend that all proposed sites for manure storage facilities be inspected prior to issuing a permit.

Response from Officials

The department has amended procedures to ensure that a departmental engineer or environment officer inspects the site prior to drafting a permit for the director's consideration.

4.1.5 Consultation With Municipalities Limited

Conservation should communicate and consult with rural municipalities on issues of common concern related to livestock operations. Adequate communication would ensure that the needs of municipalities were considered when making decisions related to manure storage facilities. Areas in which we expected to find evidence of communication were:

- Municipal Conditional Use Hearings;
- Rural Municipality Approval;
- Technical Review Reports; and
- Design Plan Changes.

We found that consultation and communication with rural municipalities needed to be strengthened in all of these areas as described below:

Municipal Conditional Use Hearings
Municipalities approve or disapprove the establishment or expansion of a livestock operation at public meetings known as Conditional Use Hearings. Conservation should attend these meetings to provide expertise on environmental issues or concerns.

Conservation advised us that they attend some Conditional Use Hearings, but not all.

Seventy-five percent of the municipalities that we surveyed indicated that it is important for representatives of Conservation to attend Conditional Use Hearings for proposed livestock operations.

One municipality reported to us in the response to our survey that, as of June 2, 2005, no representation from Conservation had been available for any of their Conditional Use Hearings despite the fact that their Planning Board had sent a letter requesting representation prior to the two most recent hearings and the Minister of Conservation replied that someone would be there.

Rural Municipality Approval
As applications for manure storage facility permits are received, the respective municipalities should be consulted to ensure they are aware of proposed manure storage facility constructions and have issued municipal approval.

We reviewed permit applications for 26 manure storage facilities. Of these applications, 21 of the files had no evidence of municipal approval and no indication that the rural municipality had been contacted. Four of the permit files contained a Notice of Conditional Use Hearing, but we found

no evidence that Conservation attended or followed up on the outcome of those hearings.

When we discussed this matter with Intergovernmental Affairs, we found that their expectation was that Conservation ensured that there was local municipal approval before permits to construct manure storage facilities were issued.

Conservation maintained that they must issue a permit if the application meets the requirements of the Regulation, regardless of whether or not the municipality has issued its approval. Despite this, we see value in two-way communication on matters of mutual concern related to livestock operations.

Technical Review Reports

Conservation should ensure that it receives and reviews Technical Review Reports when required. One of the purposes of a Technical Review is to assist with the exchange of information between the proponent, municipal and provincial governments, and the general public.

In one of our test files we found that a permit had been issued to construct a concrete storage facility for a 758 animal unit operation. This was done without the benefit of a Technical Review. Conservation staff indicated that, since the operation already existed but was just changing to a concrete manure storage facility, they would not fall under the Technical Review requirement. However, this operation had not been subjected to a Technical Review when it first came into existence.

Regardless of the fact that the operation had been in existence for many years, a Technical Review would have been beneficial in assessing the impact of constructing a concrete storage facility on all stakeholders, including the rural municipality.

By not obtaining a Technical Review in this case, Conservation compromised its own policy as set out in instructions to applicants. The instructions for obtaining a "Permit for the Construction/Modification/Expansion of Manure Storage Facilities" state, *"If the proposed operation is 400 Animal Units or larger...a Technical Review will be required"*.

Design Plan Changes

When rural municipalities approve livestock operations and issue Development Permits or Conditional Use Orders, they take the size of the proposed operation into consideration, as well as the design and location of the proposed manure storage facility. When design plans change significantly, either during the permitting process or during construction, Conservation should ensure that the respective municipalities are aware of the changes.

Before permits for the construction of manure storage facilities are issued, Conservation analyzes the site specifications and the proposed design, verifying that the facility will provide sufficient storage capacity. According to Conservation's website, the minimum acceptable capacity for a manure storage facility is 200 days (the volume of manure that would be produced in 200 days). However, program staff informed us that 400 days capacity is considered optimum. Conservation also ensures that an adequate land base is available for spreading the manure produced by the operation.

Despite these preliminary assessments, we found no evidence of contact with rural municipalities when design plans or site plans differed from what was originally presented to the Municipality or to Conservation.

In one case, a manure storage facility was built with two and one half times the proposed capacity that the permit was issued for. The depth approved in the permit was 12 feet and the final constructed depth was 20 feet. This change in depth, combined with increases in length and width, resulted in an increase in the planned storage capacity from approximately 132,000 cubic feet to approximately 334,000 cubic feet. There was no evidence that Conservation informed the rural municipality of the change, nor was the permit modified.

In another case, design plans changed twice during the construction process, after the permit was issued. The original proposal was for a storage facility that would accommodate 484 days of manure but the final construction only had a capacity for 203 days of manure, yet there was no indication in the file that this was a concern to Conservation. It was interesting to note that this operation later requested permission to spread manure in the winter because the manure storage facility was full.

We recommend that Conservation provide representation at all municipal Conditional Use Hearings for proposed livestock operations that involve manure storage facilities.

We recommend that documented municipal approval be obtained for all permit applications before permits are issued. Approval should be in writing, included as a permanent record in the paper file, and noted as being received in the central information management system.

We recommend that adherence to established policies related to Technical Reviews be ensured. If Conservation questions the necessity of a Technical Review, it should seek written approval from the rural municipality involved to have the requirement waived.

We recommend that significant amendments to design plans for manure storage facilities and the subsequent construction be communicated to the respective rural municipality.

Response from Officials

The department has established and staffed the position of Technical Review Officer for this purpose.

The department has assigned to the Technical Review Officer the responsibility of requesting the documentation from the respective municipalities following completion of the Technical Review Committee report and associated Conditional Use Hearing. The need for documentation in the central information system (i.e., EMS) shall be communicated to the newly staffed position of EMS Coordinator in order to determine the necessary revisions to software and procedures manuals that may be required.

The Planning Act does not allow a waiver of the Technical Review process for livestock operations with 300 or more animal units.

The department shall review procedures and operational guidelines and revise them appropriately to address this concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

4.1.6 Municipal Conditions Not Incorporated in Permits

When rural municipalities issue Conditional Use Orders, they often include restrictions or conditions of approval. We expected to find that Conservation would include these conditions in the permit issued. By doing so, they would be able to reinforce the Municipality's position and assist the Municipality in ensuring that its requirements were met.

In our survey of rural municipalities, 61 of 73 (84%) of those that responded stated that it was important for all of the applicable conditions imposed by Conditional Use Orders or Development Permits be included in manure storage facility permits issued by Conservation.

We found that Conservation focused on ensuring that the *Livestock Manure and Mortalities Management Regulation* was followed and considered the

requirements of municipalities and adherence to those requirements as a function only of the Municipalities. We were advised by Conservation staff that they sometimes disagreed with the conditions recorded in Conditional Use Orders by Municipalities because they felt that those conditions would not serve the purpose for which they were intended. Despite these differences, we see value in communication and cooperation between the rural municipalities and Conservation on areas of mutual concern related to the livestock program.

We found one case where the municipality required that the manure storage facility be covered or tarped and that use of a previously existing manure storage facility be discontinued once construction was complete. Conservation had this information, including a copy of signed agreement acknowledging the operator's acceptance of these conditions. However, no mention of the specific requirements of the municipality was made in the permit. Correspondence in the file from the municipality showed that, one year after the construction of the facility, the old facility was still in use and the new facility was not covered.

We recommend that there be a more cooperative and coordinated approach in dealing with manure storage facility constructions, taking into consideration the conditions imposed by Municipalities on operations and incorporating those conditions in permits where possible. If Conservation considers the conditions of a municipality to be ineffective or inappropriate, discussions should be initiated with the Municipality to ensure that reasonable conditions are included in Conditional Use Orders.

Response from Officials

The department will strive to improve communications and cooperation with municipalities. However, The Planning Act clearly delineates the responsibilities of municipalities and it may be inappropriate to implement certain aspects of this recommendation.

4.1.7 Client Acceptance of Permit Conditions Not Required

It is often the practice in industry and in government to obtain written acceptance by a proponent for documented conditions in a license or permit. For example, when the Department of Water Stewardship issues a Water Rights License, the proponent's signature is required to signify acceptance. We expected to find that permits issued for the construction of manure storage facilities would be signed by the applicant to indicate acceptance of the conditions of the permit.

Written acceptance of the permits as issued, including the conditions outlined within the document, would provide assurance that the applicants understand what is required of them to meet the conditions of the permit and of the *Livestock Manure and Mortalities Management Regulation*. This could reduce the number of infractions related to manure storage facility constructions.

Conservation did not have a policy in place to document acceptance of the permit conditions.

We recommend that applicants be required to formalize their acceptance of conditions outlined in permits for manure storage facilities by signing the permit.

Response from Officials

The department shall amend the permit format and shall review procedures and operational guidelines and revise them appropriately so as to implement this recommendation.

4.2 Need to Strengthen Construction Monitoring Processes

Audit Criterion

There should be adequate processes in place for monitoring the construction, modification and expansion of manure storage facilities.

Adequate processes for monitoring of construction would include:

- Conducting of inspections throughout the construction process. Copies of inspection reports should be provided to operators and the reports should be acknowledged by the operator or representative;
- An assessment of test results upon completion; and
- Final inspection upon completion and upon receipt of all required documents and reports.

This is important to ensure compliance with the Regulation and to ensure that the interests of all stakeholders are considered.

We found that Conservation was conducting inspections of manure storage facilities during construction, modification and expansions. There were specific aspects of its monitoring processes which were either not performed or were not adequate:

- Written inspection results were not provided to operator or representative (**Section 4.2.1**);
- Inappropriate timing of final inspections (**Section 4.2.2**);
- Inadequate assessment of soil test results (**Section 4.2.3**); and
- Inadequate certification by professional engineers (**Section 4.2.4**).

4.2.1 Written Inspection Results Not Provided to the Operator or Representative

After a permit is issued, Conservation's policy is to conduct a minimum of three inspections of manure storage facility constructions, modifications or expansions: one inspection before construction begins; at least one inspection during construction; and a final inspection upon completion. These inspections are intended to ensure compliance with permit and Regulation requirements, and to address problems encountered during these phases of construction.

We expected to find that operators or appropriate representatives were provided with a signed copy of inspection results when issues of concern were noted and that the signature of the operator or representative would be required to indicate acceptance of the results. By providing this documentation and having them sign off on the inspection results, Conservation can ensure that the operator understands what is required in order to obtain final approval before the facility can be put into operation.

We found that issues or concerns that came to light during these inspections were conveyed verbally. No documentation was left with the operator. This approach reduced the effectiveness of Conservation's efforts to ensure compliance with permit and Regulation requirements.

We recommend that interim and final inspection results be provided in documented form to the operator or an appropriate representative, and that this documentation be signed by the operator or representative, as well as by the inspector.

Response from Officials

The department shall review procedures and operational guidelines and revise them appropriately to address this

concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

4.2.2 Inappropriate Timing of Final Inspections

We expected to find that all manure storage facility constructions had a final inspection upon completion, after final certification by the Professional Engineer was received. Along with a visual site inspection, this final inspection should include a thorough review of the file for completeness. For example, files could include: the certification letter of the Professional Engineer; soil density test results; and revised "as built" design plans.

By performing a final inspection, Conservation has an opportunity to review the Professional Engineer's certification and other reports. In the event that there are concerns in the letter of certification or in any accompanying reports or test results, a final inspection would verify that issues identified at this stage are resolved before approval to operate is granted. If Conservation does not review and verify the key elements contained in these reports, there is no assurance that the facility was built according to the plans approved by Conservation.

Once the final inspection has been performed, the operator should be provided with a letter advising of Conservation's approval to put the manure storage facility in use.

We noted that a final inspection had not been performed for 11 of 26 (42%) of the files we tested. Of the final inspections that were documented, 13 of 15 (87%) took place before certification by the Professional Engineer was received. In one case, the final inspection date was six months before the engineer's certification was received. In another case the inspection was four months prior to the receipt of certification. In both of these examples, we found unresolved issues at the time the certification from the Professional Engineer was received. We highlight these issues further in **Section 4.2.4.**

Prior to the amendment of the Regulation in March of 2004, Conservation was not required to issue documented approval of constructed manure storage facilities. This process is now required by Legislation. Section 6(7) of the Regulation states that *"no person shall set into operation a manure storage facility for which a permit is required under this section until.....the director notifies the operator in writing that the certificate [professional engineer's certificate] is satisfactory"*.

The issuance of documented approval would formalize Conservation's completion of their role in manure storage facility construction and would provide an added opportunity to reinforce the ongoing requirements of the operators with regard to their operation. Where applicable, this would include the requirement to submit monitoring well samples, drinking water samples, and manure management plans.

We were informed by program officials that the practice of issuing documented approval was implemented when the amended Regulation came into effect on March 30, 2004. To verify this, we looked at the total population of manure storage facilities with permits and identified 13 files for which certification from the professional engineer had been received after the March 2004 Regulation amendment. Of the 13 files, we found that 11 contained a letter from Conservation to the operator advising them that the certificate from the professional engineer was satisfactory and that they were now authorized to put the facility into use. However, there were two files that did not contain authorizing letters.

We recommend that final inspections of all manure storage facilities be conducted after construction is finished and upon receipt of the final certification by the Professional Engineer and all required reports. The final inspection should include both a visual site inspection and a thorough review of the permit file.

Response from Officials

The department shall review procedures and operational guidelines and revise them appropriately to address this concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

4.2.3 Inadequate Assessment of Soil Test Results

When permits are issued, depending on the type of construction, they may include a requirement that soil density test results be submitted to Conservation. Test results must meet the minimum standard for density prescribed by the Regulation. It was our expectation that Conservation would ensure that this requirement was met before any facility was placed into operation.

Soil density test results provide assurance that the facility is built according to soil density specifications included in the *Livestock Manure and Mortalities Management Regulation* and ultimately that the facility is constructed with a view to protection of groundwater. Unacceptable and non-existent test results increase the risk that the environment is not protected due to increased risk of seepage.

In our 26 test files we found inconsistencies in dealing with this requirement. We found one case where results were not submitted as required with no indication of follow-up. We also found one case where the results were submitted after the facility was put in use. In addition, we found four cases where the results did not

meet the minimum density requirements of the Regulation and yet no follow-up was done.

We recommend that Conservation ensure soil density test results are received when required, and that the results of these tests be taken into consideration when assessing compliance with the Regulation.

Response from Officials

The department shall review procedures and operational guidelines and revise them appropriately to address this concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

4.2.4 Inadequate Certification by Professional Engineers

We expected to find that final, unconditional certification would be required from the Professional Engineer before allowing the start up of the operation.

Conservation's process for receiving and reviewing certification from Professional Engineers did not meet our expectations. In our testing, we found the following:

"Conditional" Certification

One problem we noted was that "conditional" certification had been submitted to and accepted by Conservation. A common reason for "conditional" certification was that monitoring wells had not yet been installed. The files we tested did not indicate that Conservation refused certification in these cases. We were advised by Livestock Program management that Conservation no longer accepts conditional certification for manure storage facilities if monitoring wells are required as a condition of the permit but have not been installed.

Inconclusive Certification

In our testing we found two cases where certification from the Professional Engineer indicated the facility "to the best of our knowledge" was constructed in accordance with the approved plans and the Regulation. In the first case, Conservation questioned the appropriateness of the wording in an inter-departmental fax. The fax indicated that the concern was relayed to the engineer's staff to pass on to the engineer. We found no follow-up of this issue in the file. In a second case involving a different operation that occurred three years later, the same engineer used the same wording - "to the best of our knowledge". For this case, we found no evidence of objection on the part of Conservation to certification of this nature.

No Certification

For 2 of the 26 files tested, no certification was found. One of these facilities had been built over two years prior to our audit. The other was built more than three years prior to our audit.

Other Issues

From our 26 sample files, we found the following deficiencies related to certification:

- One Professional Engineer's certification was not sealed with his official seal;
- Two letters of certification were received after the permit had expired;
- Two letters of certification were received without the required soil density test results required by the permit; and
- Three letters of certification were received after the facilities were put into use.

We recommend that, where conditional certification has been provided, Conservation should flag the file for follow-up until unconditional certification is received. Unconditional certification should be obtained prior to issuing approval for use of the manure storage facility.

Response from Officials

The department is in the process of amending procedures to ensure that appropriate follow-up occurs on conditional certifications.

4.3 Need to Strengthen Post-Construction Monitoring Processes

Audit Criterion

There should be adequate processes in place for the monitoring of livestock operations after manure storage facilities have been constructed.

Once manure storage facilities have been built and approved for operation, they must be monitored to ensure they are adequately maintained. If these manure storage facilities are allowed to deteriorate, there is a risk of contamination of groundwater and/or surface water.

Adequate processes for post-construction monitoring would include:

- Conducting risk-based inspections periodically;
- Monitoring of compliance with the entire Regulation through inspections;
- Adequate follow-up on issues identified during inspections; and
- Providing copies of inspection reports to operators and obtaining their acknowledgement of the reports.

We found that Conservation was conducting inspections of livestock operations with permitted manure storage facilities. There were specific aspects of its monitoring processes which were either not performed or were not adequate:

- Periodic inspections were not risk-based (**Section 4.3.1**);
- Periodic inspections were narrow in scope (**Section 4.3.2**);
- Insufficient follow-up on issues identified during inspections (**Section 4.3.3**); and
- Conservation did not require operator acknowledgement of periodic inspection reports (**Section 4.3.4**).

4.3.1 Periodic Inspections Not Risk-Based

One method of monitoring is through periodic inspections. Without an appropriate, risk-based strategy for conducting inspections, Conservation cannot ensure it is utilizing its resources effectively and that the purpose of the Regulation is best achieved.

A well-defined approach to identifying higher risk operations would ensure that priorities are set for conducting post-construction inspections. Examples of risk factors to consider are:

- Problems encountered during previous inspections;
- History of public complaints;
- New manure storage facility;
- Age and type of facility;
- Type of manure (liquid vs. semi-solid vs. solid);
- Time lapsed since previous inspection;
- Proximity to surface water; and
- Proximity to drinking water.

In addition to identifying manure storage facilities to inspect using these risk factors, Conservation's inspection strategy should include the selection of other facilities at random.

Until the year 2004, annual inspections were performed on all permitted manure storage facilities. Following the discovery in 2004 of a leaking above-ground concrete manure storage facility, Conservation decided to concentrate on the inspection of facilities of this type. Although not all permitted manure storage facilities were inspected in 2004 by Conservation, all above-ground concrete manure storage facilities were inspected. All manure storage facilities in areas covered by the Brandon office were inspected.

Conservation's attempt to implement a more risk-based strategy in its inspection of manure storage facilities in the eastern part of the province, focusing their attention on higher risk manure storage facilities, was a positive step. We agree with Conservation that it may not be necessary to conduct inspections on all facilities annually. However their strategy only addressed one risk - the risk of structural failure associated with above-ground concrete storage facilities.

We reviewed the inspection history for 26 manure storage facilities. Our examination of the frequency of inspections confirmed that Conservation's inspections in 2004 did not reflect an appropriate risk-based strategy. A summary

of our assessment of the inspections in our sample using some of the risk factors we identified previously in this section appears in **Figure 14**.

Figure 14

Summary of Sample of Inspections	
Inspection Assessment	Number of Facilities
Inspection warranted and conducted	5
Inspection not required and not conducted	6
Inspection warranted and not conducted	9
Inspection not warranted and conducted	6

Source: Office of the Auditor General

To illustrate what we mean by an inspection that was warranted and not conducted (9 facilities as shown in **Figure 14**), we found four new operations with facilities that were built in 2003 that were not inspected in 2004. We would have expected to see Conservation conduct an inspection the following year, after the facility was put into use. As for the other five facilities, we found problems encountered in previous years with no evidence of follow-up. A risk-based strategy would have identified these operations for inspection in the following year. Six inspections in our sample of 26 were conducted but not warranted. Those six were operations where no problems had been encountered in the two or three previous years. In a risk-based strategy, deferral of inspection would have been appropriate.

We recommend that an appropriate risk-based strategy be implemented provincially for conducting inspections of manure storage facilities.

Response from Officials

The department is in the process of developing a risk-based strategy that will be consistent with this recommendation.

4.3.2 Periodic Inspections Narrow in Scope

We anticipated finding an all-inclusive approach for inspections, whereby Conservation would incorporate compliance with all applicable sections of the Regulation in their protocol for inspections as well as give consideration to municipal conditions. This type of approach is indicative of a proactive approach to the protection of the environment and at the same time could help to minimize public concerns.

Several key areas should be included in the inspection process:

- Visual Inspection of a Manure Storage Facility;
- Assessment of the Management of Mortalities;
- Verification of the Status of Monitoring Well Sample Results;
- Verification of the Status of Livestock Drinking Water Sample Results;
- Verification of the Status of Manure Management Plan Submissions; and
- Confirmation that Rural Municipal Requirements are Being Met.

Some of the areas described above were included in Conservation's process for inspecting manure storage facilities. We found that improvement was needed to ensure the protection of the environment. Our findings are summarized below:

Visual Inspection of a Manure Storage Facility

Manure storage facilities should be well maintained to protect against groundwater and surface water contamination. For example, the inspection of an earthen facility should include an examination of the perimeter of the facility to ensure that the structural integrity has not been compromised by rutting or cracks. A concrete or steel manure storage facility should be examined for signs of structural weakness which could result in leakage.

Conservation used a standard inspection form when conducting visual inspections. Conservation's examination of manure storage facilities was sufficiently comprehensive to identify problems with the structures.

Assessment of the Management of Mortalities

During livestock production, some animals die or need to be destroyed. These dead animals are referred to in the Regulation as mortalities. All mortalities must be properly stored and then disposed of safely in an environmentally sound manner:

Secure storage

- Prevents access by birds and animals;
- Helps to prevent the possible spread of infectious diseases; and
- Prevents contamination of groundwater and surface waters.

Proper disposal methods as described in the Regulation with specific restrictions

- Rendering;
- Composting;
- Burial; and
- Incineration.

The inspection should include an examination of the operation's mortalities management, including storage and disposal practices.

Conservation had a process to address mortalities management. In the inspection reports we reviewed, the inspectors recorded the type of mortalities management used for the operations such as rendering, or composting. Any related issues found were appropriately documented and addressed.

Verification of the Status of Monitoring Well Sample Results
Prior to the on-farm visit, the inspector should confirm that the results of monitoring well samples were satisfactory and met the requirements of the Regulation. When results were not satisfactory, the inspector should consider obtaining samples from the monitoring wells while at the site.

The inspection form used by Environment Officers included a place to record the date that monitoring wells sample results were last received. However, we noted that some Environment Officers were using old inspection forms which did not require this information, and thus were not verifying if operations were complying with the requirement.

Verification of the Status of Livestock Drinking Water Sample Results
The inspection should also include verification that operators are submitting livestock drinking water samples when required. The same processes outlined above for monitoring well samples should be applied to livestock drinking water samples.

The tracking of the submission of livestock drinking water samples was a function of the Livestock Program's Head Office. Responsibility for monitoring compliance for this requirement was not delegated to the inspectors.

Verify the Status of Manure Management Plan Submissions
For operations that are required to submit manure management plans, the inspection should include verification of these submissions to ensure they are compliant with legislation.

In addition to checking for the submission of manure management plans, inspectors should also check for the submission of the operator's "Confirmation Sheet" to indicate where manure has been spread. The submission of this form is further noted in **Section 4.5.4**.

Conservation did not check for missing manure management plans as part of the inspection process. Many of the operations we reviewed were up-to-date with the submission of plans. However, of the operators that were required to submit plans annually, 6 of 24 operators (25%) were not doing so.

As further discussed under **Section 4.5.3**, when we compared Conservation's database of permits to its manure management plan database, we estimated that as many as 300 operations that were required by the Regulation to submit manure management plans may not have been doing so. This information was available to all Environment Officers but was not considered in the process of conducting inspections.

Confirmation that Rural Municipal Requirements are Being Met
Conservation should be aware of any restrictions or conditions imposed, not only through the manure storage facility permit and the Regulation, but also by municipalities. Conservation should be considering these conditions during their inspections, reflecting an all-inclusive and cooperative approach.

Earlier in **Section 4.1.5** we reported that Conservation did not confirm municipal approval for the construction of manure storage facilities. In our examination of Conservation's subsequent inspections of manure storage facilities, we found the same lack of consideration of municipal requirements.

Similar to what we found when we examined the processing of permit applications, for 22 of 26 (85%) of the inspections we reviewed, we did not find a Conditional Use Order or a Development Permit in the file to signify municipal approval. For the four files which did contain documented municipal approval, we found no evidence that the conditions of the municipalities were considered during the inspection process. Eighty-eight percent of the municipalities that responded to our survey thought it was important for Conservation to inform them if conditions outlined in Conditional Use Orders were not being met. Ninety percent of them felt it was important for Conservation to inform them if operations had increased in size (animal units).

Other
Other items that should also be included in Conservation's inspection process and should be incorporated in the form used at the time of inspection are:

- Client profile update (e.g., operator name, contact information, current animal units);
- Follow-up on outstanding issues (e.g., Offence Notices; Director's Orders; Environment Officer Orders; Warnings; unresolved complaints and issues);
- Adherence to manure application restrictions; and

- Visual inspection of:
    - other manure storage facilities on the premises (both operational and inactive);
    - confined livestock area(s) on the premises; and
    - field storage(s) on the premises.

These items were not included in the inspection form used by Conservation when conducting inspections and were not formally included in Conservation's protocol for inspections.

We recommend that, where it is practical to do so, the inspection process be expanded to monitor compliance with all aspects of the Regulation and with municipal conditions and that non-compliance with municipal conditions be reported to the respective rural municipality.

Response from Officials

The department shall review the inspection process and expand it where practical.

4.3.3 Insufficient Follow-Up on Issues Identified During Inspections

We expected that all issues identified during inspections would be followed-up until resolved. When this is not done, the effectiveness of the program is undermined.

In our examination of post-construction inspections, for the 26 files we reviewed we found:

- 8 that did not require any follow-up because no problems were found;
- 12 where problems were found and follow-up was done; and
- 6 where problems were found during inspection with no evidence of follow-up.

We recommend that a process be implemented to ensure that all issues identified during periodic inspections are followed up until resolved.

Response from Officials

The department shall review procedures and operational guidelines and revise them appropriately to address this

concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

4.3.4 Operator Acknowledgement of Periodic Inspection Reports Not Required

We expected to find that Conservation provided operators with a signed copy of inspection results and that the signature of the operator or representative would be required to indicate acceptance of the results. Similarly noted in **Section 4.2.1** on construction inspections, by providing this documentation and having them sign off on inspection results, Conservation can be sure that the operator understands what requires action on their part, if anything.

No documentation of periodic inspections was provided to the operator, nor did Conservation require operator acknowledgement of periodic inspection reports. Again, this approach reduced the effectiveness of Conservation's efforts to ensure compliance with permit and Regulation requirements.

We recommend that operators be provided with a written copy of inspection results, and that this documentation be signed by the operator as well as by the inspector.

Response from Officials

The department shall review procedures and operational guidelines (including identification of any equipment or materials that may be needed) and revise them appropriately to address this concern and shall ensure that staff are fully aware of and committed to these procedures and operational guidelines.

4.4 Strategy to Identify, Assess and Approve Non-Permitted Manure Storage Facilities Needed

Audit Criterion

There should be a strategy in place to identify, assess and approve manure storage facilities that were constructed before permits were required.

We consider the identification, assessment and approval of storage facilities that were built prior to 1994 to be a high priority in a risk-based strategy because a high percentage of them may have been constructed without the benefit of an engineer, a contractor, and input by Conservation.

We found that there was no strategy in place to identify non-permitted manure storage facilities (**Section 4.4.1**) and no strategy to assess and approve non-permitted manure storage facilities (**Section 4.4.2**).

The Regulation was amended in 2004 with the addition of Section 16.3 to address manure storage facilities that do not have permits. Section 16.3(2) of the Regulation stipulates that all of these facilities must be registered with the director [of Conservation] by November 10, 2010 in order to continue to be used. According to Section 16.3(12), *"a manure storage facility that has been constructed, modified or expanded under the authority of a permit under this regulation or the Livestock Waste Regulation, Manitoba Regulation 81/94, is deemed to have been registered under this section".*

The term "register" is not defined in the Regulation. We interpret it to signify the approval or acceptance by Conservation. To be approved, these manure storage facilities must be assessed to determine if they are environmentally sound. If repair, modification or replacement is needed to meet the requirements of the Regulation, a manure storage facility permit must be obtained.

According to the Regulation, the process for registration is:

- Operator must submit an application for registration;
- Department must inspect the facility;
- Operator may be required by Conservation to make repairs or modifications to the facility to ensure that the environment is protected; and
- Once all requirements were met, Conservation would approve the facility for registration.

4.4.1 No Strategy to Identify Non-Permitted Manure Storage Facilities

Manure storage facilities built prior to the requirement to obtain a permit (1994) may pose the highest risk to the environment. To reduce this risk and to facilitate compliance with the regulatory requirement for operators to submit an application to register a manure storage facility, Conservation should have had a strategy in place to identify these storage facilities.

There are several sources that Conservation could use to assist in identifying these operations:

- Databases Within Conservation;
- Other Departments;
- Industry Organizations; and
- Rural Municipalities.

We found that Conservation did not have a strategy in place to identify non-permitted manure storage facilities. Without a strategy, Conservation failed to utilize the resources available to identify these facilities:

Databases Within Conservation
Conservation should compare all data stored for livestock operations to identify operations with non-permitted sites including data related to complaints stored in its central information management system.

The database which stored complaint and investigation data was not used to identify non-permitted sites. As an example, in our testing of enforcement actions we found an Offence Notice and a Director's Order had been issued to an operation for manure not contained properly in its manure storage facility. According to data found in the central information management system, this site was revisited as recently as November, 2004. However, when we examined the permits database and the table used for non-permitted registration applications, we could not find this operation nor its manure storage facility listed in either database.

A similar example was found in our testing of the response to complaints. When one complaint was investigated, the Environment Officer noted that the operation had an earthen manure storage facility. When we checked the table of permits and the one used for non-permitted registration applications, again we could not find the operation listed in either database.

We found there was a lack of commonality in inputting data for operations in the permits database and in the manure management plan database. As a result, comparison of the two databases to identify non-permitted manure storage facilities was not practical.

Other Departments

Conservation could capitalize on opportunities to identify non-permitted manure storage facilities through the producer contacts of other Departments. For example, in the fall of 2004, the Department of Finance announced that owners of farmland could apply for a refund of a portion of the education tax included in their 2004 tax assessments. Over 27,000 rebates were processed by the Department of Finance for the 2004 tax year. It is possible that the Department of Finance could have assisted Conservation in gathering information about livestock numbers, livestock types, and manure storage facilities by requesting additional information on the tax refund application forms.

When we discussed with Conservation staff the possibility of obtaining information on non-permitted sites from other government departments, particularly the Department of Agriculture, Food and Rural Initiatives (Agriculture), we were informed that, for the most part, there was reluctance on the part of Agriculture field staff to share information of this nature with Conservation because they did not want to jeopardize relationships with producers. We also found that Conservation had not considered the possibility of requesting information through the Department of Finance.

Industry Organizations

We recognize that it may not be possible for Conservation to obtain member or producer details from industry organizations because of privacy issues, but Conservation should work with these organizations whenever possible to assist in the identification of all non-permitted manure storage facilities.

Conservation had not contacted industry organizations for assistance in identifying livestock operations. Privacy issues were cited as the reason. Conservation officials advised that these organizations would not make such information available to them.

Rural Municipalities

We expected to find that Conservation had consulted with municipalities to identify non-permitted manure storage facilities. We found that some municipalities had very detailed information on livestock operations within their jurisdictions. Both Intergovernmental Affairs and representatives from municipalities indicated to us that the municipalities had information that they would share with Conservation.

A representative from one of the municipalities with a large number of livestock operations indicated that the municipality had never been asked for information. When we compared Conservation's record of manure

storage facilities in this municipality with the municipality's database, we found 46 operations with manure storage facilities that were not accounted for in any of Conservation's databases.

In our survey of rural municipalities, we asked if Conservation had requested their assistance in identifying non-permitted manure storage facilities. Of those that responded to our survey, 52 of 73 (71%) said they had not been contacted for information and 16 (22%) were unsure. Only two municipalities reported that they had been asked for information.

Operators with non-permitted facilities were required to apply for registration of the facilities by June 10, 2004. As of December 2004 Conservation had received applications for registration for approximately 200 non-permitted facilities. Only 124 of these applications were received by the deadline imposed by the Regulation. Although Conservation had taken action just prior to the time of our audit to ensure that operations affected by this Section of the Regulation were made aware of the requirements, only 25% of the estimated 800 operations had responded by June 2005.

We recommend that Conservation establish a process to identify operations with non-permitted manure storage facilities.

Response from Officials

The department is evaluating ways to improve the identification of operations with non-permitted manure storage facilities.

4.4.2 No Strategy to Assess and Approve Non-Permitted Manure Storage Facilities

When the Regulation was amended, Conservation should have been prepared to deal with its additional responsibilities. We expected Conservation would have a strategy in place to assess and approve the storage facilities that were built prior to 1994 when permits were not required, keeping in mind the November 10, 2010 deadline imposed by the Regulation.

In 2004, Conservation estimated there could be as many as 1,500 manure storage facilities built without the involvement of the province. Conservation subsequently reduced its estimate to around 800. As of June 2005, less than 300 of these manure storage facilities had been identified. With the amendment of the Regulation in 2004, Conservation became responsible for approving 800 or more manure storage facilities as well as the subsequent monitoring of these

facilities. This was in addition to monitoring approximately 700 permitted manure storage facilities.

We found that Conservation was not prepared for this increased responsibility, both in terms of staffing and information technology capabilities. The increased workload was not reflected in the staff numbers assigned to the Livestock Program. With no staffing increases in the two years preceding our audit, Conservation was not in a position to respond to these added responsibilities. Conservation was unprepared to process applications to register non-permitted manure storage facilities, having no formal policy in place for their approval. More than one year after the Regulation came into effect Conservation was still developing policy to outline the approval process.

Our testing involved the 212 applications for registration of non-permitted manure storage facilities on file with Conservation at the time of our audit. The application form requested that operators indicate the engineer and the contractor involved in the design and construction of those manure storage facilities. **Figure 15** summarizes the 212 applications, showing the breakdown of manure storage facilities that were designed by engineers and those for which no engineer was named. **Figure 16** summarizes the manure storage facilities that were constructed by a contractor, by the owner, and those for which no contractor was identified.

Figure 15

Manure Storage Facility Designers for Non-Permitted Storages		
Manure Storage Facilities Designed By	Number of Manure Storage Facilities	Percentage
Engineer	40	19
None identified	172	81
Total	212	100

Source: Office of the Auditor General

Figure 16

Manure Storage Facility Builders for Non-Permitted Storages		
Manure Storage Facilities Constructed By	Number of Manure Storage Facilities	Percentage
Contractor	115	54
Owner	16	8
None identified	81	38
Total	212	100

Source: Office of the Auditor General

As shown in the tables above (**Figures 15 and 16**), 81% of the non-permitted manure storage facilities may not have been designed by an engineer and 46% may not have been constructed by a contractor. As such, these facilities may pose a higher risk to the environment and should be a high priority for Conservation to address.

At the time of audit, none of the 212 facilities had undergone an inspection by Conservation, and consequently none had been approved for registration.

We recommend that a strategy and action plan be developed and implemented to address amendments to the Regulation related to the assessment and approval of non-permitted manure storage facilities. This strategy should take into consideration the deadline imposed by the Regulation for the registration of all manure storage facilities.

We recommend that resources in the Department of Conservation be assessed for its adequacy.

Response from Officials

The department has requested and received additional resources for the administration of this aspect of the regulation.

The department routinely assesses the adequacy of resources through the annual estimates process. It should be noted that additional resources have been assigned to the department's Livestock Program subsequent to the Audit period.

4.5 Need to Strengthen Processes for Monitoring of Manure Application

Audit Criterion

There should be adequate processes in place to monitor the application of manure to land. Conservation should operate proactively with a strategy to encourage compliance with the Regulation for the handling of manure management plans.

Adequate monitoring processes would include:

- Assessment of all manure management plans received;
- Identification of operations that are required to submit manure management plans but fail to do so;
- Follow-up to confirm the volume and location of manure spread by operations;
- Monitoring compliance with the entire Regulation when conducting audits of manure management;
- Communication of results of manure management audits to operators; and
- Follow-up of issues identified during manure management audits.

Adequate monitoring is important in order to ensure compliance with the Regulation and the protection of the environment.

We found that Conservation had implemented an internal audit function to assess manure management plans. However, Conservation's handling of manure management issues reflected a reactive approach rather than a proactive approach. Essentially, Conservation waited for the manure to be spread before significant action was taken. It would be difficult to encourage compliance with the Regulation after the damage had been done. By putting little emphasis on the assessment of plans and concentrating on the auditing of manure management after manure had been spread, Conservation was missing the opportunity to take action before a problem occurred.

There were specific aspects of its monitoring processes which were either not performed or were not adequate:

- Inadequate assessment of manure management plans (**Section 4.5.1**);
- Manure management plans submitted at the request of municipalities not reviewed by Conservation (**Section 4.5.2**);

- No follow-up on manure management plans not submitted for registration (**Section 4.5.3**);
- No follow-up to confirm manure spread (**Section 4.5.4**);
- Internal audit of manure management plans was narrow in scope (**Section 4.5.5**);
- Inadequate communication of internal audit results of manure management plans to operators (**Section 4.5.6**); and
- Inadequate follow-up of manure issues identified (**Section 4.5.7**).

Section 12 of the Regulation describes the "Allowable application to land" for manure, taking into consideration the texture of the soil, the volume of manure to be spread, the rate of application, and the crop being fertilized. Factoring in all of these components, the Regulation sets limits for the concentration of residual nitrate nitrogen resulting from the spread of manure.

Section 13 of the Regulation addresses the submission of manure management plans. These plans outline the intentions of the operator for the coming year with respect to manure application. Plans must be filed annually with Conservation for "registration" by the Department. All livestock operations with 300 animal units or more are required to submit a plan prior to spreading manure. Before the Regulation was amended in March 2004, the threshold was 400 animal units or more.

Manure management plans must be prepared by one of the following:

- the operator;
- an agrologist certified by the Manitoba Institute of Agrologists;
- a Manitoba crop advisor certified under the international certified crop adviser program of the American Society of Agronomy; or
- a member of another professional organization exempted from registration with the Manitoba Institute of Agrologists under *The Agrologists Act*.

Agrologists, crop advisors and members of other professional organizations who prepare manure management plans must successfully complete a manure management planning course acceptable to Conservation or have training or experience that Conservation considers to be equivalent.

The Regulation does not define "registration" of their manure management plan. Based on information obtained from Conservation, particularly Conservation's Protocol for Administration of Manure Management Plans (April 1999), we interpret "registration" to mean approval of the plan and authorization to spread manure.

4.5.1 Inadequate Assessment of Manure Management Plans

Assessment of plans for the application of manure to land (manure management plans) should be a priority of Conservation in its efforts to protect surface and groundwater. By properly assessing these plans, Conservation has the opportunity to take a proactive approach in protecting the environment.

We expected that Conservation would assess manure management plans received to ensure that the environment, specifically groundwater and surface water, is adequately protected. A thorough assessment would include:

- Confirmation that all information required has been submitted;
- Thorough analysis of the plan;
- Verification that land included in a manure management plan is not duplicated in another plan; and
- Acceptance and registration of the plan.

Confirmation that all information required has been submitted

In order to properly assess manure management plans, soil samples, the rate of manure application, the volume of manure to be spread, the proposed crop, and the results of manure analysis are required. A plan cannot be properly assessed by Conservation when information is missing or incorrect.

We found:

- Manure management plans with missing information and no follow-up to obtain that information; and
- Soil sample results for fields that did not match legal descriptions in the manure management plan.

Thorough analysis of the plan

The Regulation describes acceptable levels of residual nitrogen in soil. Estimation of the residual nitrogen levels resulting from proposed manure management plans is dependant on a thorough analysis of the results of manure analysis, soil sample results and the proposed crop.

The perception of operators is that plans are being reviewed and approved, providing them with assurance that their plan is environmentally sound. Representatives from Intergovernmental Affairs told us that they also understood that manure management plans were being reviewed and approved.

According to the results of our survey of municipalities, over 80% (60 of 73 that completed the survey) informed us that the assessment and approval of all manure management plans before manure spreading occurs was important.

We found:

- Input errors in the manure management plan database, distorting the subsequent estimate of residual nitrate nitrogen;
- In some cases, there was no analysis of data, or in cases where an analysis was performed there were conflicting results with no explanations (i.e., a spreadsheet analysis of data which differed from Conservation's database analysis);
- Analysis of data after spreading had already occurred. In one case when the data was analyzed after spreading the analysis indicated that the proposed application would result in unacceptable nitrate levels;

Verification that land included in a manure management plan is not duplicated in another plan

Livestock producers often spread manure on land that they do not own, either through land leases or other agreements. In order to prevent the over-application of manure as a result of duplication of land included in more than one manure management plan for the same crop year, Conservation should track and compare land descriptions in all plans submitted.

We found that Conservation does not check for duplicate spreading (manure to be spread on the same land by more than one operator for the same crop year).

Acceptance and registration of the plan

After the assessment, if the plan is environmentally sound, Conservation should indicate its acceptance of the plan, thus "registering" it. Acceptance and registration should occur before manure is spread.

Conservation's policy was to issue a "Conditional Receipt". We found that these numbered "Conditional Receipts" varied in content, depending on what, if any, information was outstanding. We found conflicting statements in these Conditional Receipts, including the following examples:

Example 1:

> *"This plan cannot be registered and filed until all information has been compiled and received by Manitoba Conservation. The manure applicator must be able to produce the receipt number on demand.....The proponent is warned that failure to address the above deficiencies to the satisfaction of this department or a representative of this department may result in enforcement action."* In this example the soil test samples were missing, application details were incomplete, and the manure application rates were missing.

We were unsure of the intended message in this Conditional Receipt. Initially it appeared to indicate that the document could not be registered without the receipt of additional information. However, the next statement appeared to indicate that the document could serve as proof of registration of the plan and that proposed application of manure was acceptable.

Example 2:

"No deficiencies noted".

This Conditional Receipt implied that the manure management plan had been assessed by Conservation and found to be acceptable, with no deficiencies. However, the information submitted by the operator for the manure management plan was incomplete. No soil sample results and no results of manure analysis were included with the plan. Without this information, it was impossible to project residual nitrogen levels, thus impossible to compare the proposed plan to the acceptable levels outlined in the Regulation.

We recommend that Conservation assess all manure management plans to ensure that the environment is protected.

We recommend that Conservation clearly communicate acceptance of manure management plans once they have been assessed as satisfactory and in harmony with the intent of the Regulation. Conservation should follow-up on incomplete or unacceptable plans until they can be approved. Conservation should make it clear to operators that they cannot spread manure until manure management plans have been approved.

Response from Officials

The department has established and staffed the position of Manure Management Planning Coordinator to fully address this matter.

These responsibilities are some of the functions of the position of Manure Management Planning Coordinator that has been established and staffed.

4.5.2 Manure Management Plans Submitted at the Request of Municipalities Not Reviewed by Conservation

Conservation should take advantage of all opportunities to protect the environment and should thus be reviewing all manure management plans that they receive. All information received should be tracked in its information system.

Some municipalities stipulate that operations must file manure management plans as a condition of operation within the municipality. Although these plans are requested by the municipality, they are sometimes submitted to Conservation. If the requirement to submit was not based in Regulation, Conservation did not assess these plans and informed operators that they were not required to submit them to the department. Conservation missed the opportunity to be proactive in the protection of the environment.

We recommend that Conservation review all manure management plans submitted by operators, whether they are required by the Regulation to submit a plan or not. The data for these operations should also be stored in Conservation's central information management system.

Response from Officials

The department shall assign to the Manure Management Planning Coordinator the responsibility of reviewing and recording the MMP documentation from operations that submit MMPs even though they may not legally be required to do so. The need for documentation in the central information system (i.e., EMS) shall be communicated to the newly staffed position of EMS Coordinator in order to determine the necessary revisions to software and procedural manuals required.

4.5.3 No Follow-up on Manure Management Plans Not Submitted for Registration

We expected that Conservation would identify operations that have not been submitting manure management plans.

Prior to the 2004 amendment of the Regulation, all operations with 400 animal units or more were required to submit manure management plans. The amendment reduced the animal unit threshold from 400 to 300 for the submission of manure management plans. We estimated that approximately 100 more operations were required to submit plans as a result of this change. This estimate was based on the number of operations recorded in Conservation's permits

database with animal unit numbers between 300 and 400 and is likely to be conservative.

Conservation should have been prepared to deal with the increased workload related to manure management plans.

Ensuring the receipt of all manure management plans required by the Regulation was not part of Conservation's procedures in the monitoring of manure application.

We compared Conservation's permits database to its manure management plan database and estimate that as many as 300 operations that were required by the Regulation to submit manure management plans may not have been doing so.

Conservation had other ways to identify operations that should be submitting manure management plans. For example, in our testing of a sample of complaints, we found one which was initiated by a municipality. A complaint was logged that an operation with over 400 animal units, the threshold at which a manure management plan was required at that time, did not file a manure management plan. This complaint was reported in 2003 and, upon investigation, Conservation found that the operation had only 359 animal units. However, one year later, after the threshold for the filing of manure management plans was decreased to 300, this operation did not submit a plan. Conservation did not identify this operation as being in violation of the amended Regulation.

We recommend that Conservation use all available information to reduce the risk that operations are not in compliance with the requirement to submit manure management plans.

We recommend that Conservation develop a strategy to deal with changes in Legislation before they are enacted. For example, changes could include those related to the submission of manure management plans as discussed in this section as well as changes with respect to the registration of manure storage facilities as discussed in Section 4.4.

Response from Officials

The department continues to explore ways and means that will achieve consistency with this recommendation.

Departmental strategy has been to identify and submit requests for necessary resources to administer regulatory amendments concurrently with the proposed amendments. Additionally, the department routinely assesses the

adequacy of resources through the annual estimates process.

4.5.4 No Follow-up to Confirm Manure Spread

It has been the practice of Conservation to send a blank "Confirmation Sheet" to the operator with the Conditional Receipt. The operator is advised to submit details of manure application once manure has been spread, using the form to identify the location of manure application. This requirement is also mentioned on the manure management plan form. Conservation can use this information in its assessment of future manure management plans, tracking the application of manure over time.

In our sample of 28 manure management plans up to and including the 2004 crop year, we found only one file with a completed "Confirmation Sheet". However, no data related to the confirmation of spreading was logged in the central information management system for this file.

The information included on confirmation sheets has limited use if it is not input into the program's information management system. As a result, it is unlikely that it would be useful in tracking manure application over time.

We recommend that Conservation follow-up on manure application and the submission of confirmation of spreading by operators.

We recommend that all information received, including confirmation of spreading, be input in Conservation's central information system to ensure accurate data is available.

Response from Officials

These responsibilities are some of the functions of the position of Manure Management Planning Coordinator that has been established and staffed.

The need for documentation in the central information system (i.e., EMS) shall be communicated to the newly staffed position of EMS Coordinator in order to determine the necessary revisions to software and procedural manuals that may be required.

4.5.5 Internal Audit of Manure Management Plans Narrow in Scope

In keeping with our expectation that Conservation should be managing the program with an all-inclusive approach, we also expected to find that, as part of the audit process, Conservation, through consultation with the Department of Water Stewardship, would monitor water from nearby water sources to measure the impact of the application of manure on water quality. Ultimately, if runoff from fields spread with manure is potentially hazardous to water quality, its components would show up in water sources.

In carrying out its mandate, Conservation is responsible for the administration of the entire Regulation. An operation subjected to an audit by Conservation should be examined for compliance with all aspects of the Regulation. This is consistent with our expectation for periodic inspections as discussed in **Section 4.3.2**. Conditions imposed by municipalities regarding manure application should be reviewed and respected when conducting these audits.

Conservation had been conducting "audits" of manure management plans for several years. During this process, a number of plans were selected for follow up after manure had been spread to determine if the concentration of nitrate nitrogen in the soil was within the acceptable levels outlined in the Regulation.

Since Conservation began auditing manure management plans in 2000, a total of 117 plans had been audited as of June 2005. Almost half of these audits were conducted on plans for the 2003 crop year. It was Conservation's intention at that time to audit at least 10% of the plans submitted annually. This 10% target was accomplished for the 2003 crop year, however, only 1% of the 2004 plans were audited.

We examined the files for approximately 12 of the 117 (10%) audits performed by Conservation up to and including the 2004 crop year. Conservation's audit of manure application was very limited in its scope and was largely focused on ensuring that potential enforcements for high nitrate nitrogen levels could lead to convictions under Section 12 (Allowable Application to Land) of the Regulation. Documentation found in files only related to the sampling of soil in some of the fields included in the manure management plans.

We found no evidence that other matters addressed by the Livestock Regulation were considered during the audit visits to these operations. For example, we found no documented evidence that the condition of the manure storage facility on the site was visually inspected or that the operation's management of mortalities was assessed. No monitoring well samples or drinking water samples were collected.

Also, we found no evidence that Conservation considered water quality testing in its assessment of the effects of manure application. It was not part of

Conservation's protocol for the audit process, nor was it part of other protocols in place for the administration of the Regulation.

As per **Section 4.1.3**, some operations are restricted by the municipality through a Conditional Use Order. Often the conditions include restrictions on the spread of manure. For example, the municipality may state that manure cannot be spread on certain parcels of land. In our survey of the municipalities, 61 of 73 (84%) of those that responded agreed that a review of these conditions by Conservation was important. However, Conservation officials advised that this was not their responsibility. Municipal conditions related to manure management were not considered when conducting audits.

We recommend that, where it is practical to do so, Conservation expand its audit process to monitor other sections of the Regulation, including compliance with manure storage facility maintenance and mortalities management requirements.

We recommend that Conservation interact with the Department of Water Stewardship in its manure management audit process to ensure that the effect of manure application on nearby water sources is monitored.

Response from Officials

The department shall review procedures to determine if any additional efficiencies may be gained and how these might best be implemented.

The intent of this recommendation has been addressed by a recent revision of permit issuance procedures whereby Water Stewardship is provided an opportunity to review and comment during processing of applications for permits to construct manure storage facilities. Supporting documentation, including proposed manure management spread lands, is provided to assist Water Stewardship in its review.

4.5.6 Inadequate Communication of Internal Audit Results of Manure Management Plans to Operators

The results of Conservation's findings should always be communicated in writing to the operations it has audited, as well as the implications of those findings. The operators could use this information in the future management of manure.

Even when enforcement action is not required, providing a report to the operator can serve a number of purposes. For example, a report indicating low nitrate nitrogen levels could influence the operator's subsequent manure management plans, knowing the fields in question could safely accommodate more manure; knowledge of high levels, even though not in contravention of the Regulation, could also influence the operator's subsequent manure management decisions and prevent levels from escalating.

The communication to the operator should clearly identify the action, if any, to be taken by Conservation. If enforcement action is required based on the Regulation, enforcement action should be taken.

Until 2003, Conservation only conveyed the results of its findings in writing if enforcement action was taken. Even in cases where the results of soil sampling showed extremely high nitrate nitrogen levels but did not exceed the limits of the Regulation, these results were not communicated to the operator.

We were pleased to find that Conservation's process changed for the 2003 audits when it started notifying all operators of audit results. However, our review of Conservation's 2003 audits of manure management revealed a serious breakdown in communication of results:

Our testing of 10% of Conservation's audit files included five files from 2003. Of the five files, one had acceptable nutrient levels and the other four did not, yet they received basically the same letter.

All five files that we tested contained a copy of a form letter sent to the operator with the same message. Each letter:

- Identified their soil sample results as "preliminary";
- Detailed the nutrient levels in the fields sampled;
- Stated the acceptable levels for all types of crops and soil conditions (according to the Regulation); and
- Closed with the following statement, *"If any of the above fields show levels approaching or exceeding the regulated soil nitrate nitrogen limits, we encourage you to contact us to inquire about whether this situation will affect any subsequent Manure Management Plans from your operation. Enforcement action may result if the amount of nitrate nitrogen in your fields exceeds these levels".*

We have the following concerns with this letter:

- With the use of the word "preliminary" the operator may expect to receive "final" results at a later date;

- The operator is left to determine whether the results were satisfactory or not; and
- Whether or not enforcement action will be taken is ambiguous.

Of the four files with unacceptable levels, only two were followed-up with enforcement action.

We recommend that Conservation communicate the results of all audits of manure application to the operations it has audited. Conservation should clearly indicate whether the operations were found to be in compliance with the Regulation or not. Any operations identified as having nitrate levels in excess of what the Regulation allows should result in appropriate enforcement action.

Response from Officials

The department is revising procedures and implementing appropriate mechanisms to improve communications with operators whose manure management plans have been audited and to improve follow-up on enforcement actions where warranted.

4.5.7 Inadequate Follow-Up of Manure Issues Identified

Once problems have been identified during Conservation's audit process, it is essential that these issues be followed-up and resolved. These operations should be flagged for future audit. Priority should be given to assessing plans from operations which have been known to have unacceptable soil samples to ensure the same problems are not repeated and potentially compounded. Without adequate follow-up, Conservation is putting the environment at risk.

For all of the manure application audits that we tested, we found insufficient follow-up in subsequent years of manure management problems identified. We illustrate this lack of follow-up with the following examples:

Example 1:

Soil samples for one audit revealed high nitrate nitrogen levels and a warning was issued to the operator. We found no evidence that the plan submitted the following year by this operator was assessed by Conservation.

Example 2:

An Environment Officer indicated in his notes that a warning was in order for nitrate nitrogen levels in excess of what the Regulation allows. We found that no warning was issued, no enforcement action of any kind was taken, and there was no record of follow-up in this instance.

Example 3:

An audit was performed by Conservation on an operation for the 2002 crop year and soil sample results revealed higher than acceptable nitrate nitrogen levels. Despite the fact that this operation had a long history of problems associated with manure issues, Conservation did not follow-up on manure management plans for the operation in subsequent years. No plans were submitted by the operation for 2003 and 2004.

This lack of follow-up is a clear indication of weakness in Conservation's strategy. If Conservation operated with a risk-based strategy, the three operations mentioned above would clearly have been identified as higher risk and priority would have been given to pursuing these issues.

We recommend that Conservation implement a risk-based strategy for the monitoring of manure application to land by ensuring that all problems identified in manure application audits are followed-up.

Response from Officials

These responsibilities are some of the functions of the position of Manure Management Planning Coordinator that has been established and staffed.

4.6 Need to Maximize Use of Department's Information System

Audit Criterion

Information systems should be effectively used to track all aspects of the environmental livestock program.

Information tracked should include:

- Permit data;
- Inspection data;
- Manure management plan data;
- Public inquiries and complaints; and
- Enforcement actions.

In 1999, the Province of Manitoba purchased an information management system known as the Environmental Management System (EMS). Conservation began using the system to track the Environmental Livestock Program in 2001.

We found that the information system was capable of tracking all aspects of the environmental livestock program. Improvements are required to use it effectively, as a tracking mechanism. Specifically, EMS was under-utilized (**Section 4.6.1**). We also identified some unresolved data entry issues (**Section 4.6.2**).

4.6.1 Environmental Management System (EMS) Under-Utilized

We expected to find that all data for the Livestock Program was stored in this central information management system for tracking purposes, accessible by all regional offices as well as by the Headquarters Operations office. This data should include information for:

- Manure storage facility permits;
- Inspections during the construction phase of manure storage facilities;
- Periodic inspections and monitoring of manure storage facilities (post-construction);
- Manure management plans;
- Public inquiries and complaints; and
- Enforcement actions.

The following are our findings for each of the program segments outlined above:

Manure storage facility permits
The database should include information on operations with manure storage facilities under construction. This would include pending applications as well as facilities for which permits have been issued.

Permit applications were processed in two locations for the province. Applications for the eastern part of the province were processed in Conservation's Steinbach office, while its Brandon office looked after applications in the western part of the province.

We found that the two offices were using EMS for permits, but were inputting only basic information in the system to identify the operations and permits which had been issued. Data was only input in EMS for permits after they had been issued, not when applications were still in the pending stage. The status of applications through the permit approval and construction process was not tracked.

Conservation also used a separate database for permits to store information on permitted facilities. We found this database to be inadequate as a tracking mechanism for various reasons:

- Use of the database was not consistent in all areas of the province;
- The database did not track the status of permits during the application approval process; and
- The database was not comprehensive enough to include all pertinent data following the issuance of permits (i.e., during construction).

This limited database did not fully serve the needs of Conservation. Although the initial assessment of applications for manure storage facility constructions may have required the use of other software to analyze design specifications and other pertinent details, EMS should have been used for tracking purposes during the permitting and construction processes.

Inspections during construction phase of manure storage facilities
Tracking of progress through the construction phase is vital in ensuring that facilities are constructed as proposed and therefore in harmony with the Regulation. Inspections conducted by Conservation throughout construction should be accurately documented in EMS, readily accessible to all Department staff.

Issues identified during the construction phase should be flagged for follow-up in this information management system.

In most cases, we found no details recorded in EMS for inspections, despite seeing notations in corresponding manual documents that required follow-up.

In one case, we found that construction had begun without notifying Conservation, an act in violation of the Regulation and of the conditions noted in the permit. This should have resulted in an enforcement action against the operator but no action was taken. The record in EMS showed the client as being in compliance.

Periodic inspections and monitoring of manure storage facilities (post-construction)

All data for Conservation's periodic inspections of manure storage facilities should be included in the database. Data associated with requirements dictated by the original manure storage facility permits (e.g., submission of annual monitoring well sample results, submission of livestock drinking water sample results) should also be included. By storing this type of data in EMS, all program staff would be aware of any outstanding issues or requirements related to a particular operation when visiting the site for any reason.

The results were not properly recorded in EMS for 8 of 26 (31%) of the inspections we tested. In one case where an inspection was not recorded in EMS, many problems were noted in the "hard copy" file. The Environment Officer suggested in the manual report that a Director's Order should be issued, yet we found no evidence of enforcement action and no evidence of follow-up.

If this information had been input in EMS and flagged for follow-up, the issue may not have gone unresolved.

We found that Conservation was not using EMS to track the submission of monitoring well samples. In the eastern part of the province Conservation's permits database was used to identify whether results were required for each operation and to record the date results were last received. In the western part of the province, an electronic spreadsheet was used to record this information.

As well, the submission of livestock drinking water sample results was not tracked in EMS. These results were tracked in another electronic spreadsheet by Head Office and were not readily accessible to the regional offices.

Manure management plans

The database should store details related to manure management plans including:

- Date of receipt of manure management plans;
- Confirmation of assessment of plans;
- Tracking of requests for additional information;
- Approval status of plans;
- Notification of approval;
- Date of receipt of confirmation of spreading; and
- All correspondence.

We found that Conservation was not using its official tracking information system, EMS, to monitor the submission of manure management plans and subsequent follow-up. Conservation used a separate database specifically for manure management plans.

Although the assessment of manure management plans may have required a separate computer program to assist with calculations, all pertinent data should be input in EMS first.

Tracking of operations in EMS did not include any of the details mentioned above.

Public inquiries and complaints

The database should include relevant information on public inquiries and complaints including the date of the receipt of the complaint, the nature of the complaint, the response date and the outcome.

We reviewed the files for 62 of the 624 (10%) of complaints logged in Conservation's database at the time of our audit and noted that Conservation was responding to complaints in a timely and appropriate manner. However, Conservation did not record sufficient details of complaints and investigations in EMS.

We found various levels of detail in EMS:

- *No detail* – When the complaint was "closed" in EMS, there were no details of Conservation's investigation, nor of the outcome;
- *Inadequate detail* – Some details were found in EMS, but not enough to fully comprehend the problem, the action taken, and/or the outcome; and
- *Sufficient detail* - Enough detail to provide the reader with a complete picture of what the complaint entailed, what action was taken, and, when the complaint was 'closed' in EMS, what the final outcome was.

All of the complaints we examined in the western part of the province were properly documented with sufficient detail in EMS. This was not the case in the eastern regions. **Figure 17** summarizes our findings:

Figure 17

Results of Our Testing of Documentation of Complaints in EMS				
	No Detail	Inadequate Detail	Sufficient Detail	Total
Eastern areas	16	7	19	43
Western areas	-	-	19	19
Total	16	7	38	62

Source: Office of the Auditor General

Also, when we looked at the dates that complaints had been "closed" in EMS, it was evident that findings were not always input in a timely manner, as the events occurred. When we looked at dates in our sample for one full year of complaints, we found that, in one region, 5 of 11 (45%) of the complaints were "closed" or "resolved" in the month of December. We believe that the majority of the issues were actually resolved in a timely manner throughout the year, but that the data was not input in EMS until the end of the year.

Enforcement actions

The database should include relevant details of enforcement actions, including outcomes.

It was the policy of Conservation to enter enforcement actions in EMS. For the most part, this was done on a go-forward basis when Conservation began using EMS for the Environmental Livestock Program in early 2005.

We recommend that Conservation track all pertinent data related to the Regulation in its official tracking system, EMS.

Response from Officials

The need for documentation in the central information system (i.e., EMS) shall be communicated to the newly staffed position of EMS Coordinator in order to determine the necessary revisions to software and procedural manuals that may be required.

4.6.2 Data Entry Issues Not Resolved

In our examination of the use of EMS for the Livestock program, we found the following limitations that hamper Conservation's ability to ensure that the requirements of the Regulation are being met:

Follow-up on enforcements must be input separate from previous documentation

When we examined the tracking of enforcement actions in EMS, we identified a restriction in the program which inhibits proper tracking. Once an enforcement action was input, staff could not add comments to detail subsequent discussions or findings. To illustrate, when an Environment Officer issued a Warning and input the data in EMS, it was linked to the original call or "incident" as it was referred to in EMS. However, when the officer followed up on the Warning, details of the follow-up could not be linked to the original "incident" when input in the system. Another "incident" had to be entered in EMS which was not tied in any way to the original "incident" or the Warning that was input.

Without the ability to link all related information, tracking in EMS is complicated and unreliable. Also, statistical information is distorted when multiple "incidents" are recorded for the same problem.

Animal unit data not included in EMS

Given the emphasis in the Regulation on the number of animal units included in an operation, inclusion of this information in Conservation's central information management system is key to adequately monitoring compliance with the Regulation.

We found that, at the time of our audit, the input of this information as a separate field to be used for tracking operations was not possible in EMS because a data field was not assigned to enter this information.

Tracking and use of this information could assist the department in following up situations such as the complaint described in **Section 4.5.3**.

Inconsistent identification of livestock operations

We found the identification of livestock operations in EMS to be inconsistent.

Additionally, we found that operations that constructed additional manure storage facilities or that expanded a manure storage facility were set up in EMS as a different operation. This made tracking of the various aspects of the Environmental Livestock Program difficult if not impossible. For example, an operation with two manure storage facilities may still only be required to submit one manure management plan. With operations

identified in two different ways, tracking of compliance with the requirement to submit manure management plans is complicated.

We recommend that Conservation modify the EMS program to properly track the follow-up of enforcement actions.

We recommend that Conservation modify the EMS program to incorporate animal unit numbers for operations.

We recommend that Conservation develop and use a consistent method to identify all operations.

Response from Officials

The need for modification of the central information system (i.e., EMS) shall be communicated to the newly staffed position of EMS Coordinator in order to determine the necessary revisions to software and procedural manuals that may be required.

The department is currently implementing a new system of identification that shows considerable promise of meeting the intent of this recommendation. The challenges are significant as the ownership, name and type of many operations are in a state of flux. Some quarter sections of land contain more than 1 livestock operation. Additionally, the operations themselves may expand, decline in size or change focus in response to market conditions.

5.0 Increased Use of Information to Protect Surface and Groundwater Needed

Objective and Criterion	Conclusions
Our objective was: To determine whether Conservation used information available to further its efforts in protecting surface and groundwater from contamination.	Significant data was available from various elements of the Environmental Livestock Program. Conservation did not use this information to the extent they should have to further efforts in protecting surface and groundwater from contamination.

Audit Criterion

Conservation should use information available from the Livestock Program in assessing and making decisions.

Appropriate decision making depends on sufficient, accurate, and timely information, as well as on a complete and thorough analysis of that information focusing on the purpose of the Livestock Program, that being the protection of surface and groundwater from contamination.

Information gathered for the Livestock Program should be used in assessing and making decisions regarding:

- The manner in which Conservation delivers its various initiatives; and
- The allocation of resources.

We found that a significant amount of information was available from various elements of the Environmental Livestock Program, including: permit application review and issue; manure storage facility construction inspection; manure management plan review; and enforcement activities. The information was in oral, written and electronic formats. Information was accumulated in hard copy files, in Conservation's central EMS, as well as in other databases maintained by program staff throughout the Province.

We found that Conservation had analyzed some of the available information in order to provide the members of the Legislative Assembly and the public with information on the activities of the program in its Annual Reports. However, the information was not analyzed with a view to furthering its efforts in protecting surface and groundwater from contamination. The analysis did not address the manner in which Conservation delivered its various initiatives and the allocation of resources.

Although much information was available, Conservation had not conducted a thorough analysis of the program's data. Conservation did not consolidate information gathered under various aspects of the program to monitor operations for compliance with all aspects of the Regulation.

We recommend that Conservation conduct a comprehensive analysis of the livestock program's data to aid in the development of a strategic direction for the program.

Response from Officials

This recommendation includes some of the tasks assigned by the Minister to the Clean Environment Commission for their investigation into the sustainability of the hog production industry in Manitoba.

6.0 Limited Consultation with Other Departments and Municipalities

Objective and Criterion	Conclusions
Our objective was: To determine whether Conservation was sufficiently consulting with the Departments of Agriculture, Food and Rural Initiatives, Health, Intergovernmental Affairs, and Water Stewardship as well as municipalities on common issues related to water quality.	Conservation had limited consultation with other government departments and municipalities on common issues related to water quality.

Audit Criterion

Conservation should access information available from other departments and municipalities to fulfill the program's mandate.

Consultation with other departments and municipalities is important to ensure that Conservation is aware of all operations and issues that affect its ability to fulfill its mandate.

Through our interviews and surveys, we found that Conservation had limited consultation with other government departments and municipalities on common issues related to water quality and were therefore unable to utilize information obtained in this manner in fulfilling the program's mandate. Although issues surrounding privacy and the sharing of information between local government and provincial officials may need to be resolved, there are many advantages in cooperating and communicating with other departments and municipalities.

Many opportunities may have been missed which could have enhanced the efficiency of the livestock program.

Although most of the Regulation affects operations with 300 or more animal units, other components of the Regulation apply to all operations, regardless of size. Program staff advised that enforcement of these other components was difficult because it was hard to identify all operations.

Conservation considered small beef operations to be the biggest challenge in enforcing the Regulation. Identification of these operations is difficult because they generally do not build manure storage facilities and therefore have had little or no previous interaction with Conservation. Only one manure storage facility for a beef operation was included in Conservation's database of permitted manure storage facilities.

When we surveyed the rural municipalities, they reported a combined total of 11 manure storage facilities for beef operations in the province. Since approximately only 50% of the municipalities provided specific data on the number of livestock operations in their areas, and many were only able to report estimates to us, it is possible that there are even more manure storage facilities for beef operations not yet identified by Conservation.

One municipality in the Interlake Region estimated that it had over 140 beef operations, 100 of which have over 300 animal units each. However, Conservation had no data for any livestock operations in this municipality in EMS.

Also, as discussing previously in **Section 4.4.1**, it is possible that information could be obtained through the Departments of Finance and Agriculture, Food and Rural Initiatives which could help Conservation in fulfilling its mandate.

We recommend that Conservation consult with other departments and municipalities to identify issues of common interest in sustaining the agricultural economy while at the same time protecting the environment.

Response from Officials

This recommendation includes some of the tasks assigned by the Minister to the Clean Environment Commission for their investigation into the sustainability of the hog production industry in Manitoba.

7.0 Recommendations

Legislation

- That the Department consider the following potential amendments to the Regulation:
  - Preventing over-application of manure by operations with multiple species;
  - Incorporating a minimum acceptable manure storage capacity for manure storage facility constructions. The minimum capacity should be set at a level which will avoid the need to "dispose" of manure during winter months;
  - Incorporating controls to address the effects of chemical fertilizers combined with manure application on soil nutrient levels;
  - Requiring the submission of contingency plans to deal with potential emergencies related to livestock manure; and
  - Limiting the spreading of manure on frozen or snow-covered ground for all livestock operations.
  (Section 3.0)

Permit Applications for Manure Storage Facility Construction, Modification and Expansion

- That no permits be issued without proper documentation and review as required by the Regulation. **(Section 4.1.1)**
- That the review of all permit applications be sufficiently documented **(Section 4.1.2)**
- That the application be signed off upon completion of the review to signify that all requirements of the application review process have been met. **(Section 4.1.2)**
- That Conservation ensure that application has been made for pertinent licenses and permits related to water by communicating with the Department of Water Stewardship. **(Section 4.1.3)**
- That all proposed sites for manure storage facilities be inspected prior to issuing a permit. **(Section 4.1.4)**
- That Conservation provide representation at all municipal Conditional Use Hearings for proposed livestock operations that involve manure storage facilities. **(Section 4.1.5)**
- That documented municipal approval be obtained for all permit applications before permits are issued. Approval should be in writing,

included as a permanent record in the paper file, and noted as being received in the central information management system. **(Section 4.1.5)**

- That adherence to established policies related to Technical Reviews be ensured. If Conservation questions the necessity of a Technical Review, it should seek written approval from the rural municipality involved to have the requirement waived. **(Section 4.1.5)**
- That significant amendments to design plans for manure storage facilities and the subsequent construction be communicated to the respective rural municipality. **(Section 4.1.5)**
- That there be a more cooperative and coordinated approach in dealing with manure storage facility constructions, taking into consideration the conditions imposed by Municipalities on operations and incorporating those conditions in permits where possible. If Conservation considers the conditions of a municipality to be ineffective or inappropriate, discussions should be initiated with the Municipality to ensure that reasonable conditions are included in Conditional Use Orders. **(Section 4.1.6)**
- That applicants be required to formalize their acceptance of conditions outlined in permits for manure storage facilities by signing the permit. **(Section 4.1.7)**

Construction of Manure Storage Facilities

- That interim and final inspection results be provided in documented form to the operator or an appropriate representative, and that this documentation be signed by the operator or representative, as well as by the inspector. **(Section 4.2.1)**
- That final inspections of all manure storage facilities be conducted after construction is finished and upon receipt of the final certification by the Professional Engineer and all required reports. The final inspection should include both a visual site inspection and a thorough review of the permit file. **(Section 4.2.2)**
- That Conservation ensure soil density test results are received when required, and that the results of these tests be taken into consideration when assessing compliance with the Regulation. **(Section 4.2.3)**
- That, where conditional certification has been provided, Conservation should flag the file for follow-up until unconditional certification is received. Unconditional certification should be obtained prior to issuing approval for use of the manure storage facility. **(Section 4.2.4)**

Post-Construction Monitoring

- That an appropriate risk-based strategy be implemented provincially for conducting inspections of manure storage facilities. (**Section 4.3.1**)
- That the inspection process, where it is practical to do so, be expanded to monitor compliance with all aspects of the Regulation and with municipal conditions and that non-compliance with municipal conditions be reported to the respective rural municipality. (**Section 4.3.2**)
- That a process be implemented to ensure that all issues identified during periodic inspections are followed up until resolved. (**Section 4.3.3**)
- That operators be provided with a written copy of inspection results and that this documentation be signed by the operator as well as by the inspector. (**Section 4.3.4**)

Registration of All Manure Storage Facilities

- That Conservation establish a process to identify operations with non-permitted manure storage facilities. (**Section 4.4.1**)
- That a strategy and action plan be developed and implemented to address amendments to the Regulation related to the assessment and approval of non-permitted manure storage facilities. This strategy should take into consideration the deadline imposed by the Regulation for the registration of all manure storage facilities. (**Section 4.4.2**)
- That resources in the Department of Conservation be assessed for its adequacy. (**Section 4.4.2**)

Monitoring of Manure Application

- That Conservation assess all manure management plans to ensure that the environment is protected. (**Section 4.5.1**)
- That Conservation clearly communicate acceptance of manure management plans once they have been assessed as satisfactory and in harmony with the intent of the Regulation. Conservation should follow-up on incomplete or unacceptable plans until they can be approved. Conservation should make it clear to operators that they cannot spread manure until manure management plans have been approved. (**Section 4.5.1**)
- That Conservation review all manure management plans submitted by operators, whether they are required by the Regulation to submit a plan or not. The data for these operations should also be stored in Conservation's central information management system. (**Section 4.5.2**)

- That Conservation use all available information to reduce the risk that operations are not in compliance with the requirement to submit manure management plans. **(Section 4.5.3)**
- That Conservation develop a strategy to deal with changes in Legislation before they are enacted. For example, changes could include those related to the submission of manure management plans as discussed in this section as well as changes with respect to the registration of manure storage facilities as discussed in Section 4.4. **(Section 4.5.3)**
- That Conservation follow-up on manure application and the submission of confirmation of spreading by operators. **(Section 4.5.4)**
- That all information received, including confirmation of spreading, be input in Conservation's central information system to ensure accurate data is available. **(Section 4.5.4)**
- That Conservation, where it is practical to do so, expand its audit process to monitor other sections of the Regulation, including compliance with manure storage facility maintenance and mortalities management requirements. **(Section 4.5.5)**
- That Conservation interact with the Department of Water Stewardship in its manure management audit process to ensure that the effect of manure application on nearby water sources is monitored. **(Section 4.5.5)**
- That Conservation communicate the results of all audits of manure application to the operations it has audited. Conservation should clearly indicate whether the operations were found to be in compliance with the Regulation or not. Any operations identified as having nitrate levels in excess of what the Regulation allows should result in appropriate enforcement action. **(Section 4.5.6)**
- That Conservation implement a risk-based strategy for the monitoring of manure application to land by ensuring that all problems identified in manure application audits are followed-up. **(Section 4.5.7)**

Information Systems

- That Conservation track all pertinent data related to the Regulation in its official tracking system, EMS. **(Section 4.6.1)**
- That Conservation modify the EMS program to properly track the follow-up of enforcement actions. **(Section 4.6.2)**
- That Conservation modify the EMS program to incorporate animal unit numbers for operations. **(Section 4.6.2)**

- That Conservation develop and use a consistent method to identify all operations. (**Section 4.6.2**)

Use of Information

- That Conservation conduct a comprehensive analysis of the livestock program's data to aid in the development of a strategic direction for the program. (**Section 5.0**)

Coordination of Effort

- That Conservation consult with other departments and municipalities to identify issues of common interest in sustaining the agricultural economy while at the same time protecting the environment. (**Section 6.0**)

Appendices

Appendix A Glossary of Terms

Algae	Mainly aquatic photosynthetic organisms that differ from plants in not having true leaves, roots, or stems and includes the seaweeds.
Animal unit	The number of animals of a particular category of livestock that will excrete 73 kg of total nitrogen in a 12 month period.
Aquifer	A water bearing formation that is capable of transmitting water in sufficient quantities to serve as a source of water supply.
Bedrock	The solid rock that lies beneath soil, loose sediments, or other unconsolidated material.
Bovine Spongiform Encephalopathy (BSE)	A fatal disease of cattle affecting the nervous system, resembling or identical with scrapie of sheep and goats, and probably caused by a prion transmitted by infected tissue in food -- abbreviation BSE; also called mad cow disease.
Certification	A sealed, certified statement from a professional engineer that the work of any contractor or other person performing work for which a manure storage facility permit is required conforms to the siting and construction requirements as set out in the permit and in the Regulation. The statement also certifies that the completed construction, modification or expansion of the manure storage facility conforms to the siting and construction requirements.
Composting	A designed and managed system to facilitate the process of aerobic decomposition of organic matter by biological action.
Collection basin	A structure intended to collect runoff water contaminated with manure in an agricultural operation which is constructed primarily from soil by excavating or forming dikes.

Glossary of Terms

Appendix A (cont'd)

Concrete tank	A type of liquid-tight manure storage structure. Located on a concrete foundation, it consists of concrete panels bound together with cable or bolts and sealed between panels.
Conditional certification	Certification of a manure storage facility with exceptions or conditions.
Conditional receipt	A document issued to operators by Conservation upon receipt of manure management plans.
Conditional use	The use of land or buildings which may be permitted in any particular zoning district as provided for in a zoning by-law.
Conditional Use Hearing	A public hearing held by a municipality or a planning district to determine conditional use.
Conditional Use Order	A document detailing conditional use. The document may include conditions imposed by the Planning District or municipality.
Confined livestock area	An outdoor, non-grazing area where livestock are confined by fences or other structures, and includes feedlot, paddock, corral, exercise yard, holding area and hoop structure.
Confirmation sheet	A form indicating the land on which manure was spread.
Contamination	The introduction of any substance, such as sewage, petroleum products, or agricultural fertilizers (both natural and chemical), that will render a water source supply unfit for its intended use.
Crop year	The year in which nutrients will be taken up. For example, a fall application in 2005 (after August 15) on a field used for a cereal will be used as a fertilizer in the 2006 growing season.

Appendix A (cont'd) Glossary of Terms

Crow Benefit	A federal freight subsidy to offset export grain transportation costs.
Development permit	A permit issued under a zoning by-law, authorizing development, and may include a building permit.
Director's Order	An enforcement action issued by a Director of Conservation detailing required action.
Earthen manure storage facility	A manure storage structure built primarily from soil, constructed by excavating or forming dikes.
Environment Officer	Employee of Conservation responsible for carrying out field inspections, monitoring projects and enforcing Regulations and Orders in addition to administering and delivering the Environmental Livestock Program.
Environment Officer Order	A document issued by an Environment Officer detailing an offence and the required action.
Environmental Livestock Program	The administration of the Livestock Manure and Mortalities Management Regulation by a team of Environment Officers and Environmental Engineers.
Environmental Management System	An information management system known as Environmental Management System (EMS) used by Conservation to track various programs including the Environmental Livestock Program.
Groundwater	All water below the surface of the ground. This includes water found in the unsaturated zone above the water table and water in the saturated zone beneath the water table.
Incineration	The burning of mortalities in a specially designed container.

Glossary of Terms

Karst terrain	Terrain with enlarged fractures and caverns resulting from the movement of water through fractures in limestone, dissolving the rock.
Lagoon	A waste treatment facility which is designed to "digest" municipal sewage.
Liquid manure	Manure that contains less than 5% solid matter.
Livestock	Animals or poultry not kept exclusively as pets, excluding bees.
Livestock Stewardship Panel	A panel of three members appointed by the Government of Manitoba in 2000 with a mandate to seek the views of Manitobans on the expansion of the livestock industry in Manitoba and to present these to government in a report along with recommendations.
Manure	Livestock feces and urine, and water contaminated by either of them, and may include wasted feed, livestock bedding, soil, milkhouse waste, hair, feathers and other debris associated with an agricultural operation.
Manure analysis	Actual or estimated total nitrogen content in the manure.
Manure application rate	The rate at which manure will be applied to fields (e.g., number of gallons per acre or number of tons per acre).
Manure management plan	A plan that provides for the storage and handling of the manure produced in an agricultural operation and the land application, treatment or other acceptable use or disposal of the manure (as defined in the Regulation). The Regulation excludes field storage sites, vehicles or other mobile equipment used to transport or dispose of manure, gutters or concrete storage facilities used to store liquid or semi-solid manure for less than 30 days,

Appendix A (cont'd) Glossary of Terms

	collection basins, and composting sites for manure and mortalities.
Manure storage facility	A structure, earthen storage facility, molehill, tank or other facility for storing manure or where it is stored, and includes any permanent equipment or structures in or by which manure is moved to or from the storage facility (as defined in the Regulation).
Molehill	A manure storage facility in which manure is mechanically forced through a pipe and becomes mounded.
Monitoring well	An opening made by digging or drilling into the ground to detect and monitor seepage from a manure storage facility.
Mortalities	Dead livestock, or parts of dead livestock, that are not marketable for human consumption.
Non-permitted manure storage facility	A manure storage facility built without a permit issued by Conservation.
Notice of Conditional Use Hearing	A notice published on two occasions at least six days apart in a newspaper or other publication with general circulation in the area of a proposed development plan, during the period beginning 40 days before the hearing and ending seven days before the hearing. Where there is no newspaper or publication available, the notice is posted in each municipal office and at least two other public places in the area affected by the development plan at least 14 days before the hearing.
Offence notice	An enforcement action issued under the authority of the Offence Notices Regulation with a set fine.
Operator	A person who carries on an agricultural operation.

Glossary of Terms

Permit	A permit to construct, modify or expand a manure storage facility issued by Conservation pursuant to Section 6 of the Livestock Manure and Mortalities Management Regulation.
Permitted manure storage facility	A manure storage facility constructed, modified, or expanded under the authority of a permit issued by Conservation.
Planning Board	The board of a planning district established under The Planning Act to make decisions regarding land use.
Red River Valley Designated Flood Area	All land identified on Plan No. 11-1-1679 filed at the head office of the Water Branch of Conservation.
Rendering	A high temperature process whereby materials such as deadstock are sterilized and converted to useful products such as some plastics and meat or bone meal.
Residual nitrate nitrogen	The amount of nitrate nitrogen that remains in soil after the production of a crop.
Ruminants	Herbivorous even-toed hoofed mammals (such as cattle, sheep, oxen, deer, and camels) that chew the cud and have complex 3 or 4 chambered stomachs.
Runoff	Runoff of manure from farm fields to bodies of water caused by events such as snow melts, heavy rains or floods.
Seepage	Seepage of the contents of a manure storage facility through cracks or spaces.
Semi-solid manure	Manure that contains 5% to 25% solid matter.
Sinkhole	A surface depression found in karst terrains that drains directly into an underlying bedrock aquifer

Appendix A (cont'd) Glossary of Terms

	or the unsaturated portion of the geological unit forming a bedrock aquifer.
Solid manure	Manure that contains more than 25% solid matter and does not flow when piled.
Steel tank	A type of liquid-tight, above-ground manure storage structure. Located on a concrete foundation, it consists of steel panels bolted together and coated inside and outside to provide corrosion protection.
Surface water	Any body of flowing or standing water, whether naturally or artificially created, including, but not limited to, a lake, river, creek, spring, drainage ditch, roadside ditch, reservoir, swamp, wetland and marsh, including ice on any of them, but not including a dugout or reservoir on the property of an agricultural operation.
Synthetic liner	A geomembrane liner installed in an earthen manure storage facility to reduce or eliminate seepage.
Technical Review Report	A provision of *The Planning Act* whereby municipalities obtain a review of livestock operation proposals to assess their potential impact on stakeholders.
Terrestrial	Living on or in or growing from land.
Warning	An enforcement action issued by an Environment Officer detailing an offence and the required action.
Waterborne disease	A disease transmitted through or propagated by contaminated water.
Water Resource Permit	A permit issued under the Authority of *The Water Resources Administration Act* authorizing the building, erection, construction, or bringing a building, structure or erection on or within a designated flood area, or for the addition to or

Glossary of Terms

	reconstruction of any building, structure or erection within a designated flood area.
Water Rights Licence	A license issued under the authority of The Water Rights Act authorizing the use or diversion of water for any purpose, the construction, establishment, operation or maintenance of works for any purpose, or the control of water and the construction, establishment, operation or maintenance of water control works.

Appendix B Calculation of Animal Units by Species

Calculation of Animal Units By Species
Animal Unit (AU)[1]

	AUs Produced by One Livestock	Number of Livestock Equivalent to 300 AUs	Number of Livestock Equivalent to 400 AUs
Dairy			
Milking cows (including associated livestock)	2.0000	150	200
Beef			
Beef cows[2] (including associated livestock)	1.2500	240	320
Backgrounder[3]	0.5000	600	800
Summer pasture/replacement heifers[4]	0.6250	480	640
Feedlot cattle	0.7690	390	520
Hogs			
Sows, farrow to finish	1.2500	240	320
Sows, farrow to weanling	0.3130	958	1,278
Sows, farrow to nursery	0.2500	1,200	1,600
Weanlings	0.0330	9,091	12,121
Grower/finishers	0.1430	2,098	2,797
Boars (artificial insemination operations)	0.2000	1,500	2,000
Chickens			
Broilers	0.0050	60,000	80,000
Roasters	0.0100	30,000	40,000
Layers	0.0083	36,145	48,193
Pullets	0.0033	90,909	121,212
Broiler breeder pullets	0.0033	90,909	121,212
Broiler breeder hens	0.0100	30,000	40,000
Turkeys			
Broilers	0.0100	30,000	40,000
Heavy toms	0.0200	15,000	20,000
Heavy hens	0.0100	30,000	40,000
Horses (PMU)			
Mares, including associated livestock	1.3330	225	300
Sheep			
Ewes, including associated livestock	0.2000	1,500	2,000
Feeder lambs	0.0630	4,762	6,349

(1) One animal unit is defined as the number of livestock required to excrete 73 kg. (160 lbs.) of nitrogen in a 12 month period.
(2) Calves and replacement heifers included in cow numbers, e.g., number of livestock for 100 cow calf pairs with 30 replacement heifers is equal to 100.
(3) Cattle on finishing rations intended for slaughter.
(4) Weaned calves.

Based on Department of Conservation Animal Unit Worksheet.