

Submission by the
Southern Chiefs' Organization
to the Clean Environment Commission
on the
Hog Production Industry Review



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Southern Chiefs' Organization

Aboriginal people have inherent rights and treaty rights. These rights include the right to clean water, as well as the right to protect our waters according to our own laws, teachings and traditions. Water is sacred to Aboriginal people; the source from which all life flows. Our traditions teach about a sacred right to live with water, and a sacred responsibility to protect water.

The mandate of the Southern Chiefs' Organization is to "protect, preserve, promote and enhance First Nations' peoples' inherent rights, languages, customs and traditions through the application and implementation of the spirit and intent of the treaty-making process". With regard to the environment, the Chiefs of southern First Nations:

- Passed a resolution on environmental research and stewardship (September 2004);
- Accepted the *Environmental Strategy for Southern First Nations* (February 2005);
- Created the *First Nations Water Protection Council* (March 2005).

Through the *First Nations Water Protection Council*, the Southern Chiefs' Organization has begun an Indigenous Water Inventory for Source Water Protection within the traditional territories of the 36 southern First Nations of Manitoba. Despite Aboriginal rights to water continually being diminished, we will continue to defend our inherent right to water and to live up to our responsibility of protecting water within our traditional territories.

Submission by the Southern Chiefs' Organization to the Clean Environment Commission on the Hog Production Industry Review

This submission is in response to the Clean Environment Commission's (CEC) request for public comments on the investigation into the environmental sustainability of hog production in Manitoba. The submission by the Southern Chiefs' Organization fully supports the moratorium on hog production in Manitoba and further recommends that all proposals that are currently in progress for new hog operations be included in the moratorium. The Southern Chiefs' Organization would also support a permanent moratorium on intensive hog production in Manitoba, as well as the eventual decommissioning of all intensive hog operations in the province.

The Terms of Reference for this investigation were provided by the Minister of Conservation, Stan Struthers, and are as follows:

- 1) The CEC, as part of its investigation, will review the current environmental protection measures now in place relating to hog production in Manitoba in order to determine their effectiveness for the purpose of managing hog production in an environmentally sustainable manner.
- 2) The CEC must include a public component to gain advice and feedback from Manitobans. This public component should be conducted by means of public meetings in the various regions of Manitoba to ensure broad participation from the general public and affected stakeholders.
- 3) The CEC investigation should include a review of the contents of the report prepared by Manitoba Conservation entitled "An Examination of the Environmental Sustainability of the Hog Industry in Manitoba."
- 4) The CEC will, as part of this investigation, take into account the efforts underway in other jurisdictions to manage hog production in a sustainable manner.
- 5) As part of its investigation, and based on public feedback, the commission will consider various options and make recommendations in a report to the Minister on any improvements that may be necessary to provide for the environmental sustainability of hog production in Manitoba.

Despite numerous references to "environmental sustainability", no definition of this term was ever provided, including in the report by Manitoba Conservation. Defining environmental sustainability is necessary, since in the context used for these hearings - environmental sustainability of hog production - it is meaningless and an oxymoron. The Aboriginal view of the world is represented by the circle, which never ends and is thus self-sustaining or "sustainable" (Kempton, 2005). The environment is rooted in the existence of humans and vice versa - they are inseparable. Giving to the land is more important than taking from the land. This is in extreme contrast to western views, whereby the environment is dominated, fragmented and exploited by humans (Kempton, 2005). The hog industry in Manitoba is the epitome of this view; represented by the line, which inevitably has an end. That 'end' is the capacity of soils to absorb nutrients and contaminants from manure; the ability to breathe clean air; the contamination of surface and ground water sources with pathogens, nutrients and other contaminants. Given the absence of a definition for the term "environmental sustainability", we are left to our own interpretation. "Environmental sustainability of hog production" is thus "environmental thresholds that once

exceeded (i.e. contaminated) would no longer support the economic viability of the hog industry".

The hog industry in Manitoba

In the last 15 years, Manitoba has experienced an unprecedented expansion of the hog industry. It now ranks as Canada's third largest pig-producing province after Quebec and Ontario (Statistics Canada, 2007). In 2005, Manitoba was responsible for about 23% of national production and about 5% of total North American production (Salvano et al, 2006). This equates to over eight million hogs produced in Manitoba in 2005 (Manitoba Conservation, 2006).

As is characteristic of the industrialization of farming, the number of farms in Manitoba is decreasing while the number of pigs per farm is increasing. According to the 2007 Hog Statistics (Statistics Canada, 2007), there were 1,280 hog operations in Manitoba in 2007. This was down by 30% since the year 2000 when 1,830 hog producers reported. Conversely, the average number of pigs per "farm" nearly doubled in the same time period, a mere seven years, from 1,174 to 2,312. Two rural municipalities in southern Manitoba, La Broquerie and Hanover, have experienced particularly large increases in animal density and now have, respectively, the 6th and 11th highest density of livestock in Canada (Flaten et al, 2003). The owners of these industrialized facilities (Mapleleaf, Hytek and Puratone) are not farmers, but rather corporations. Corporations do not live on farms.

As hog production facilities become larger, their potential for environmental and social impacts also increases. The CEC investigation focuses on the environment only. In Aboriginal cultures, you cannot separate humans from the environment as they are interconnected and inseparable. The Manitoba Conservation report entitled "An Examination of the Environmental Sustainability of the Hog Industry in Manitoba", demonstrates a clear bias toward the hog industry in terms of its social impact on rural Manitoba claiming it is a "means of keeping communities alive" following the loss of the CROW benefit. **A proper review of the hog production industry must include social as well as environmental impacts.**

Manure has to go somewhere

The greatest environmental threat associated with hog production is the massive amount of liquid manure produced by the millions of hogs in the province. The estimated annual production of hog manure in Manitoba is approximately 1.54 tonnes per hog (Flaten et al, 2003). Liquid manure systems are used in most hog operations, whereby feces and urine fall through slatted floors. This manure has to go somewhere, and when it is not being spread on fields, it is stored in lagoons. Contamination from lagoons can occur in a number of ways. For example, losses of nitrogen from the lagoon surface to the atmosphere, losses through seepage from the bottom and walls, losses caused by heavy rains or floods breaching the lagoon. Liquid manure systems also have higher levels of odours than solid manure systems, and a greater potential to contaminate surface water or groundwater because the manure is liquid (Fleming et al, 2001).

The spatial distribution of manure in this province is another environmental concern. Statistics Canada published the Geographical Profile of Manure Production in Canada (Statistics Canada, 1996). As far back as 1996, there were five major clusters or 'hotspots' in Canada where manure production was concentrated at the highest level of over 2,000 kg of manure per hectare of total land. One of these hotspots was in southern Manitoba around Steinbach. In the same study, some of the major substances found in manure such as nitrogen, phosphorus, total coliform and fecal coliform bacteria were also estimated. Interestingly, the maps for all of these parameters look strikingly similar for Manitoba (Fig. 1), with the hotspot of highest concentration again located in southern Manitoba near Steinbach (Statistics Canada, 1996). This region is within the Red River Valley Special Management Area. These are lands, designated by the Manitoba Phosphorus Expert Committee in 2006, that require special management because they are subject to regular inundation by overflow (from a water body such as the Red River) or by precipitation or snowmelt. In these areas, there is a high level of risk for the transfer of manure directly into water from adjacent land. Furthermore, the prolonged contact between water and the soil surface increases the potential for the transfer of phosphorus to overlying floodwaters (Manitoba Phosphorus Expert Committee, 2006).

Over the last 10 years, Statistics Canada estimates that manure nutrient production by pigs in Manitoba has risen by 65% (Flaten et al, 2003) and much of this increase has occurred in the area near Steinbach in the rural municipalities of Hanover and La Broquerie (where the aforementioned hotspot already existed in 1996). Indeed, the annual residual values of soil phosphorus have been estimated to be 23 and 29 kg/ha for Hanover and La Broquerie, respectively (Nicolas et al, 2002). According to the Manitoba Phosphorus Expert Committee (2006), as soil test phosphorus increases to very high levels such as these, losses of soluble and particulate phosphorus can also increase.

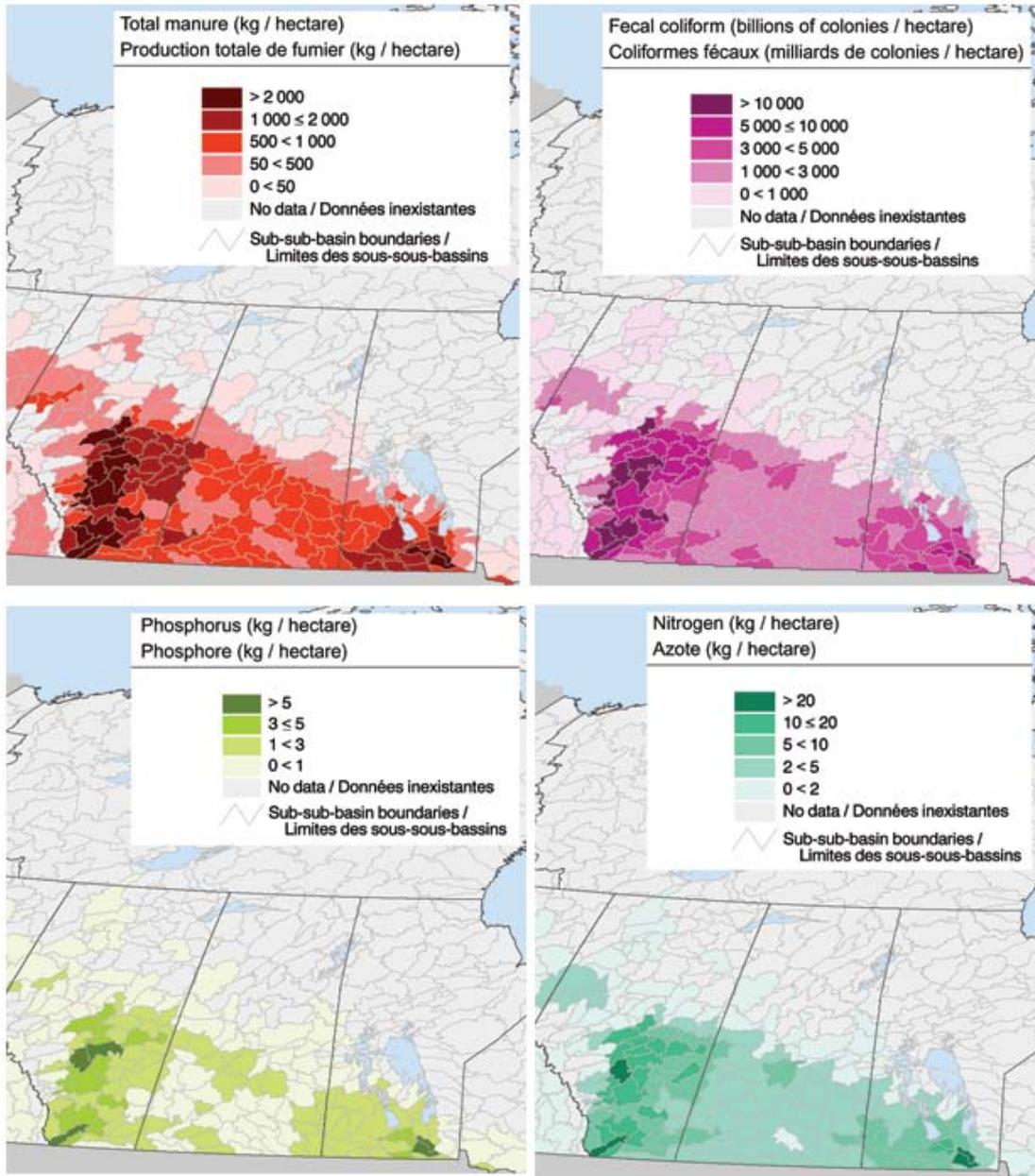


Figure 1. 1996 Spatial trends in manure, fecal coliform bacteria, nitrogen and phosphorus in western Canada. Modified from Statistics Canada, 1996.

Another disturbing observation is that the majority of the manure storage facilities in Manitoba are located within the Red River Valley Special Management Area (Fig. 2). In addition to the Red River Valley, other natural floodplains throughout the province, such as low lying areas of the Souris and Assiniboine river valleys, are also considered to be Special Management Areas (Manitoba Phosphorus Expert Committee, 2006). According to Manitoba Conservation, "appropriate location of manure storage facilities is essential to protect ground and surface water" (Manitoba Conservation, 2006). Why then are the majority of the manure storage facilities in the Red River Valley, an area that is subject to regular flooding?

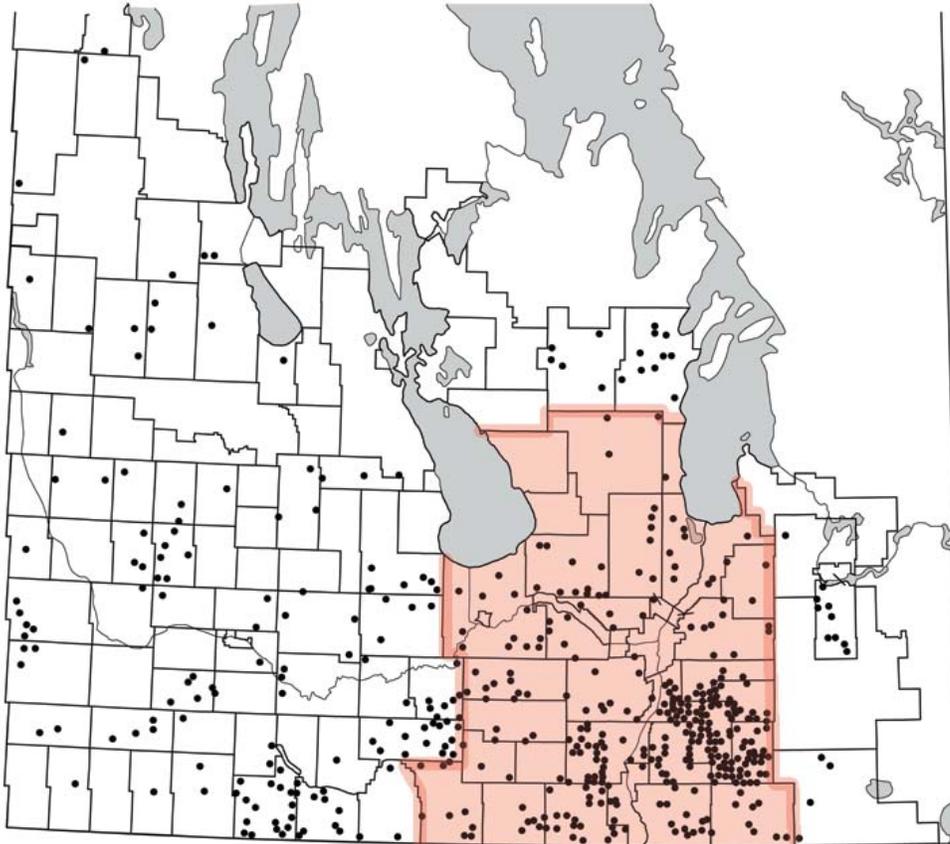


Figure 2. Location of permitted manure storage facilities (April 2006) and the Red River Valley Special Management Area (in pink). From Manitoba Conservation, 2006, and Manitoba Phosphorus Expert Committee, 2006.

Clearly, the proper management of such enormous quantities of hog manure is critical to protecting the environment, which includes human health. However, even the government itself admits that it has failed to keep pace, "Before 2000, the substantial growth in the livestock sector and the changing face of agriculture in rural Manitoba did not result in corresponding change in the regulatory framework for the industry, apart from the adoption of the *Livestock Manure and Mortalities Management Regulation* in 1998" (Manitoba Conservation, 2006). It is now 2007 and two sets of regulations have only just been proposed to control the application of nutrients onto land. The first regulation is intended to control the application of manure phosphorus through amendments to Manitoba Conservation's *Livestock Manure and Mortalities*

Management Regulation. The second set of regulations is intended to prevent the over-application of nutrients, notably nitrogen and phosphorus, from all nutrient sources (fertilizer, sewage sludge, manure) on land, through the establishment of Water Quality Management Zones for Nutrients under Manitoba Water Stewardship's *Water Protection Act* (Salvano et al, 2006).

It is evident that the hog industry has developed and operated unsustainably for over 15 years. A hotspot of high concentrations of manure, nutrients and bacteria in southern Manitoba existed over ten years ago. This hotspot is located in an area designated at risk for regular inundation. The majority of the manure storage facilities in the province are also located in this high risk area. No regulations for phosphorus exist and are only just being proposed. **It is critical that the government recognize that it has not kept pace with the expansion of the hog industry. The new proposed legislation for phosphorus reductions, although meritorious, is extremely late and inadequate considering the current size of the hog industry and the compromised state of water in Manitoba.**

Water quality in Manitoba

In 2005, the Auditor General conducted an audit of well water quality in Manitoba (Auditor General's Report, 2005). As described in the report, the province conducted groundwater sampling between September 1999 and September 2000 to better understand rural water quality in the agricultural regions of Manitoba. Wells were tested for nitrate, total coliform and *E. coli* bacteria. Test results showed that 42% of tested wells exceeded the Canadian Guidelines for total coliform bacteria, 16% exceeded the Canadian Guideline for nitrate-nitrogen, and 3% exceeded the Canadian Guideline for *E. coli*. Since May 2001, the Province has offered the Bacteriological Water Testing Subsidy Program and results have consistently shown coliform and *E. coli* bacteria above the levels considered safe under Health Canada's *Guidelines for Canadian Drinking Water Quality*. **The conclusion of the Auditor General's audit was that "the Province's risk management efforts regarding private wells indicate that there is much work to be done to ensure that groundwater is adequately protected for the benefit of future generations."**

Approximately 25% of the population of Manitoba (Auditor General's Report, 2005) and 21% of First Nation communities (Manitoba Conservation, 1995) rely on groundwater for drinking water. Most of the rural population depends on groundwater from privately owned well systems, which they are responsible for (Auditor General's Report, 2005). As of March 31, 2005, there were 40 boil water advisories in place in communities throughout Manitoba and five in First Nations communities (Health Canada, 2005). Swan Lake First Nation relies on an aquifer for its drinking water. This community is currently faced with the possible construction of four hog barns housing a total of 8,000 feeder hogs (20,000 pigs annually) (Ross, 2003). The lagoon is slated to be constructed near the aquifer recharge area thus increasing the risk of contaminating the aquifer upon which the Swan Lake First Nation relies.

Lake Winnipeg supports the largest walleye fishery in North America contributing over \$25 million to the provincial economy annually. Over 80% of the fishers on the lake are First Nation and Métis and depend on the lake for their livelihood. In the last 15 years,

Lake Winnipeg has experienced larger and more frequent algal blooms, especially in the north basin, but more recently in the south basin as well. These blooms clog fishers' nets making them visible to fish, and they also cause abrasions on fishers' hands. Algal blooms block water filters at fishing stations and water treatment facilities, and cause taste and odour problems in drinking water. **The water quality in Lake Winnipeg has become so compromised that it now ranks as the most eutrophic lake of the ten Great Lakes of the world** (Salki, pers. comm.).

The eutrophication of Lake Winnipeg is being driven primarily by excess phosphorus entering the lake. Very little phosphorus is needed for algal growth relative to other essential nutrients, like nitrogen and carbon. Consequently, when phosphorus is present in excess, nitrogen in the lake becomes limiting to algae. This scenario promotes the growth of cyanobacteria or "blue-greens" which have the unique ability to use or "fix" atmospheric nitrogen (a gas) for growth. Two species of blue-greens now predominate the algal community in Lake Winnipeg and both produce toxins that are poisonous to humans and other animals.



Satellite image of Lake Winnipeg in 2006 showing extensive algal blooms in the north and south basins.

The entire southern portion of Manitoba drains into Lake Winnipeg, including the rural municipalities of Hanover and La Broquerie, the hotspots of manure, nutrients and bacteria. From an agricultural perspective, the low concentrations of phosphorus that promote eutrophication are not significant since crop requirements are considerably higher. But from an environmental perspective, they are catastrophic. The eventual and inevitable loss of the commercial fishery on Lake Winnipeg due to changes in the fish community in response to eutrophication will result in important social and economic consequences for the Aboriginal communities that depend on the lake. **Manitoba's water is already severely compromised yet the province is only just proposing legislation on phosphorus.** Continued expansion of the hog industry will put further stresses on aquatic ecosystems, far beyond their capacity to recover.

Contribution of the hog industry to eutrophication of aquatic systems

Manitoba Water Stewardship has estimated the average nitrogen and phosphorus loads to Lake Winnipeg from a variety of sources. Agriculture represents 6% (5,103 tonnes) and 15% (1,210 tonnes) of the annual nitrogen and phosphorus loads, respectively

(Lake Winnipeg Stewardship Board Report, 2006). However, as Flaten et al (2003) point out, the amounts of phosphorous originating from agricultural activities is difficult to determine due to a number of knowledge gaps in the areas of hydrology and nutrient loading in Manitoba. For example, over 85% of the total annual runoff from agricultural watersheds is snowmelt runoff. Runoff is also the main transport vector of non-point source phosphorus (Flaten et al, 2003). More runoff means more phosphorous loading (in the dissolved form) with the main pulse occurring in the spring when snow melts and smaller ones during important precipitation events. Unfortunately, most of Manitoba's water quality data is based on a pre-determined schedule rather than on an event-based schedule. The flow data is continuously monitored. Consequently, the most important events concerning nutrient loading are not being consistently monitored and accounted for (Flaten et al, 2003). For this reason, the provincial estimate of 15% for phosphorus derived from Manitoba agriculture is likely a gross underestimate of nutrient loading to Lake Winnipeg.

And what about pathogens?

Human and animal waste in water poses the greatest immediate danger to public health (Auditor General's Report, 2005). The consequences of consuming tainted water can range from mild discomfort to serious illness and death (Auditor General's Report, 2005). The consequences of a full waterborne disease outbreak encompass economic losses, loss of public confidence, litigation and of course, the severe human health toll (MacBride, 2000).

Surface water is more likely than groundwater to contain pathogenic organisms because of the possibility of direct contamination with manure (CDC, 1997) by surface runoff from fields, in water moving laterally in the near surface layer of the soil, and from soil surface to tile drains (Fleming et al, 2003). Groundwater can become contaminated by direct transport through soil, through poorly maintained wells, and through cracks, sink holes and caverns. Once an aquifer becomes contaminated, restoration is extremely slow (Fleming et al, 2003) as most groundwater originates from rain or snow melt that soaks into the ground (Auditor General's Report, 2005).

Chryptosporidium and *Giardia* are two common protozoa that cause gastrointestinal illness in humans and animals. *Chryptosporidium* form oocysts and *Giardia* form cysts, which allow them to resist chlorination and to survive for months in cold water (Olson and Guselle, 2000). The most famous waterborne *Chryptosporidium* outbreak occurred in Milwaukee, Wisconsin in 1993 affecting 403,000 people (CDC, 1997). The water supply in the town of Dauphin, Manitoba was affected by *Chryptosporidium* and *Giardia* and both organisms have also been detected in Shoal Lake, the water supply for Winnipeg (MacBride, 2000). What about all of the other water sources that aren't tested, such as private wells? Or the water systems that treat with chlorination only?

Salmonella spp have been known for many years to cause serious infections in humans and are usually transmitted to humans by eating foods contaminated with animal feces. However, water may be contaminated directly by manure or through runoff following heavy rainfall (Olson, 2000). *Salmonella* spp can survive in water for months and are relatively resistant to killing by drying and freezing (Olson, 2000). More recently, pathogens such as *E. coli* O157:H7 and *Campylobacter* are becoming

increasingly important (Olson, 2000). Cattle and hog manure are a potential source of waterborne infections of *Campylobacter* through direct contamination and agricultural runoff. *E. coli* O157:H7 in manure may contaminate water and soil (Olson, 2000).

Livestock Stewardship Panel Recommendation #17 states that "Strong research and development emphasis should be placed on the monitoring of pathogens and the mechanism by which they are transferred from animals to humans." The government's action statement states that "Through existing research and development programs, government will ensure that appropriate and timely research is undertaken" (Manitoba Conservation, 2006). In other words, no additional funding is being provided to examine the threat of waterborne microbial contaminants to Manitoba's waters.

"Timely research" should have been 15 years ago, not sometime in the future. Considering the size of the hog industry in Manitoba and the vast amount of manure produced, this complacency is unacceptable. **Pathogen monitoring must be enhanced and should include organisms other than just coliforms and *E. coli*. In addition, nutrient management strategies, such as manure injection, must also ensure the protection of water supplies from pathogens.**

Who really pays?

In 2005, pigs represented around \$900 million in farm gate receipts in Manitoba (Salvano et al, 2006). The estimated annual cost to the hog industry for compliance to the proposed phosphorus regulations (under a maximum threshold regulation of 1x phosphorus removal rate) is \$27.9 million (Salvano et al, 2006). Not surprisingly, these costs are not distributed evenly with the hotspot in southern Manitoba affected to the greatest extent. The rural municipality of Hanover faces the greatest cost of \$6.7 million followed by La Broquerie (\$2.9 million), De Salaberry (\$1.9 million), Morris (\$1.6 million) and Ste Anne (\$1.2 million)(Salvano et al, 2006).

What about the many other costs imposed on provincial taxpayers to support the "innovative programs to ensure the environmental sustainability of the livestock industry" through the *Livestock Stewardship Initiative* (2000) (Manitoba Conservation, 2006)? They include:

- 16 positions to administer Manitoba Conservation's Environmental Livestock program
- \$2.6 million for monitoring, enforcement and inspection of manure storage facilities
- funding for improved aquifer management and water quality monitoring
- 12 drinking water monitors
- over \$100 million to upgrade drinking water and wastewater treatment facilities
- double the number of soil survey teams

Manitobans will also bear the cost of the clean-up of contaminated surface and ground water, waterborne illness related healthcare costs, and of course, litigation costs associated with contaminated water. **A review of the hog industry must include the associated economic burden imposed on Manitobans such as the costs of monitoring, enforcement and incentive programs. The costs related to remediation of contaminated water supplies, healthcare and litigation must also be included in the review.**

Summary

The Southern Chiefs' Organization fully supports the moratorium on hog production in Manitoba and further recommends that all proposals that are currently in progress for new hog operations be included in the moratorium. The Southern Chiefs' Organization would also support a permanent moratorium on intensive hog production in Manitoba, as well as the eventual decommissioning of all intensive hog operations in the province.

Aboriginal people have inherent rights and treaty rights to a quality and quantity of water. Our traditions teach about a sacred right to live with water and a sacred responsibility to protect water, including from the ecologically detrimental consequences of intensive hog production. The term "environmental sustainability" used so freely in the context of hog production can have only one meaning, and that is "environmental thresholds that once exceeded would no longer support the economic viability of the hog industry". The thresholds for nutrients in aquatic ecosystems have been exceeded, as the eutrophication of Lake Winnipeg attests. The new proposed legislation for phosphorus reductions is extremely late and inadequate. Furthermore, the provincial estimate of 15% for phosphorus derived from Manitoba agriculture is likely a gross underestimate of loading to Lake Winnipeg. **It is critical that the government recognize and admit that it has not kept pace with the expansion of the hog industry.** Manitoba's water is already severely compromised and continued expansion of the hog industry will put further stresses on these aquatic ecosystems. It is only a matter of time before the thresholds for pathogens are also exceeded and waterborne outbreaks occur. Pathogen monitoring must be enhanced and should include organisms other than just coliforms and *E. coli*. In addition, nutrient management strategies, such as manure injection, should ensure the protection of water supplies from pathogens.

A proper review of the hog production industry must include social as well as environmental impacts. In addition, the review must include the associated economic burden imposed on Manitobans, such as the costs of monitoring, enforcement, incentive and compensation programs, as well as the costs associated with the remediation of contaminated water supplies, healthcare and litigation.

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