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Research in Support of the Manitoba Clean Environment Commission's Hog Production Industry Review

Task 2 – Policy/Process Review – Conclusions/Recommendations

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1 Introduction

This report advances discussion surrounding the *Total Nutrient Loading Framework* developed in Task 1, in support of a practical understanding of current policy and decision-making processes related to the development of new hog barn operations in Manitoba.

1.1 The CEC Review

On 8 November 2006, the Minister of Manitoba Conservation requested that the Manitoba Clean Environment Commission (CEC) to "conduct a review and produce a report on the environmental sustainability" of the hog industry in Manitoba (Manitoba Conservation 2006). Central to this review is the following item within its Terms of Reference:

1. The CEC, as a 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.

In January 2007, the CEC entered into discussions with the International Institute for Sustainable Development (IISD) to assist in fulfilling its Terms of Reference item #1. In March, IISD produced a concept paper for the CEC. This in turn resulted in the preparation of two research papers (Task 1 and Task 2).

1.2 Task 2 Project Objective

IISD's Task 2 for the CEC (Industry Development Review Process and Policy) is defined as:

> Applicable planning, agricultural, and environmental legislation will be considered within the *Total Nutrient Loading Framework* for the case of a hypothetical hog proponent (Proponent X) to draw implications.
>
> Following this analysis, recommendations will be proposed for Manitoba's current hog industry development review process. This will identify relevant and redundant planning/review procedures related to the hog industry.

1.3 Research Methods

In completing Task 2, IISD has conducted the following:

1. Advancement of a conceptual analytical framework for total nutrient loading in Manitoba;
2. A review of current Manitoba policy and legislation related to hog industry development;
3 Consideration of existing planning/review mechanisms which could be employed in support of improved decision-making related to hog barn siting; and
4. Preparation of proposed recommendations focused on strengthening Manitoba's hog industry planning/review mechanisms with the goal of reducing total nutrient loading within a watershed-based decision-making framework.

1.4 The Total Nutrient Loading Concept

In Task 1, Using the IWRM cycle and policy instruments discussed in Section 3 of the Task 1 report, an effective *Total Nutrient Loading (TNL) Framework* was developed based on the Integrated Water Resources Management (IWRM) cycle initially outlined by Jønch-Clausen (2004) and refined by Swanson (2005). In addition, a number of potential policy instruments which governments can utilized to improve decision-making and sustainability were also incorporated (IISD and TERI 2003).

The development of a TNL Framework is driven by concerns regarding the health of a watershed, usually about a particular water resource. The design and implementation of such a framework is in itself the application of an *institutional* policy instrument. It would logically take the form of a "Total Nutrient Loading Strategy" centered on the institutionalization of watershed-based planning and management founded on the concepts of IWRM.

An effective TNL Framework would indicate to decision makers and other stakeholders concerned with the health of a water body, exactly what current levels of nutrient loading exist within a particular watershed – and how these would be affected by the incremental increase of one new hog barn. If this could be achieved, the planning process would benefit from the increased knowledge related to the various nutrient sources and removals.

Meanwhile, all stakeholders concerned about the health of a particular watershed would have greater knowledge regarding the incremental impact of one new hog barn on *Total Nutrient Loads*, offering greater clarity regarding this impact and greater comfort for those who are responsible for making the decision. Ideally, this would result in sustainable water resource management through an informed implementation process.

1.4.1 IWRM's Key Monitoring Element

For the purposes of this project, the primary focus is on the fourth stage in the IWRM planning process (Figure 1-1): "Monitoring, Evaluation, and Improvement." Development of a *Total Nutrient Loading Framework* for Manitoba should logically focus on improving Lake Winnipeg water quality as an ultimate goal, as much of the water flowing in and through the province influences this iconic water body. However, in order to make progress on Lake Winnipeg, its composite watersheds must become a central focus for action. Lake Winnipeg water quality will improve if the nutrient loads associated with its various drainage components (at various scales) can be reduced.

As noted in Task 1, relative nutrient contributions from many sources must be considered, particularly the interrelated elements of *Manitoba Watershed Processes* which include "natural background/undefined" and "present-day agriculture." The importance of hydrologic connectivity – linking headwater streams to downstream water bodies – must also be incorporated, as does hydrologic scale. Also, the pivotal role of phosphorus and our current understanding of its export in particulate and dissolved from – from agricultural lands and through streambed and streambank erosion influence – must also be considered in some detail.

The ability to monitor water quality trends from individual hydrologic unit to the watershed, basin, or regional level is fundamental to understanding and/or utilizing the full potential of a *Total Nutrient Loading Framework*. In addition, this degree of monitoring would also serve to track the impacts of various IWRM initiatives, including those related to manure management.

Scientifically valid indicators of watershed health would need to be developed and monitored based on rigorous sampling protocols. Based on observed trends, progress toward nutrient loading reduction within each hydrologic unit could be observed, with determinations made as to whether this progress was due to various IWRM initiatives, or some other factors.
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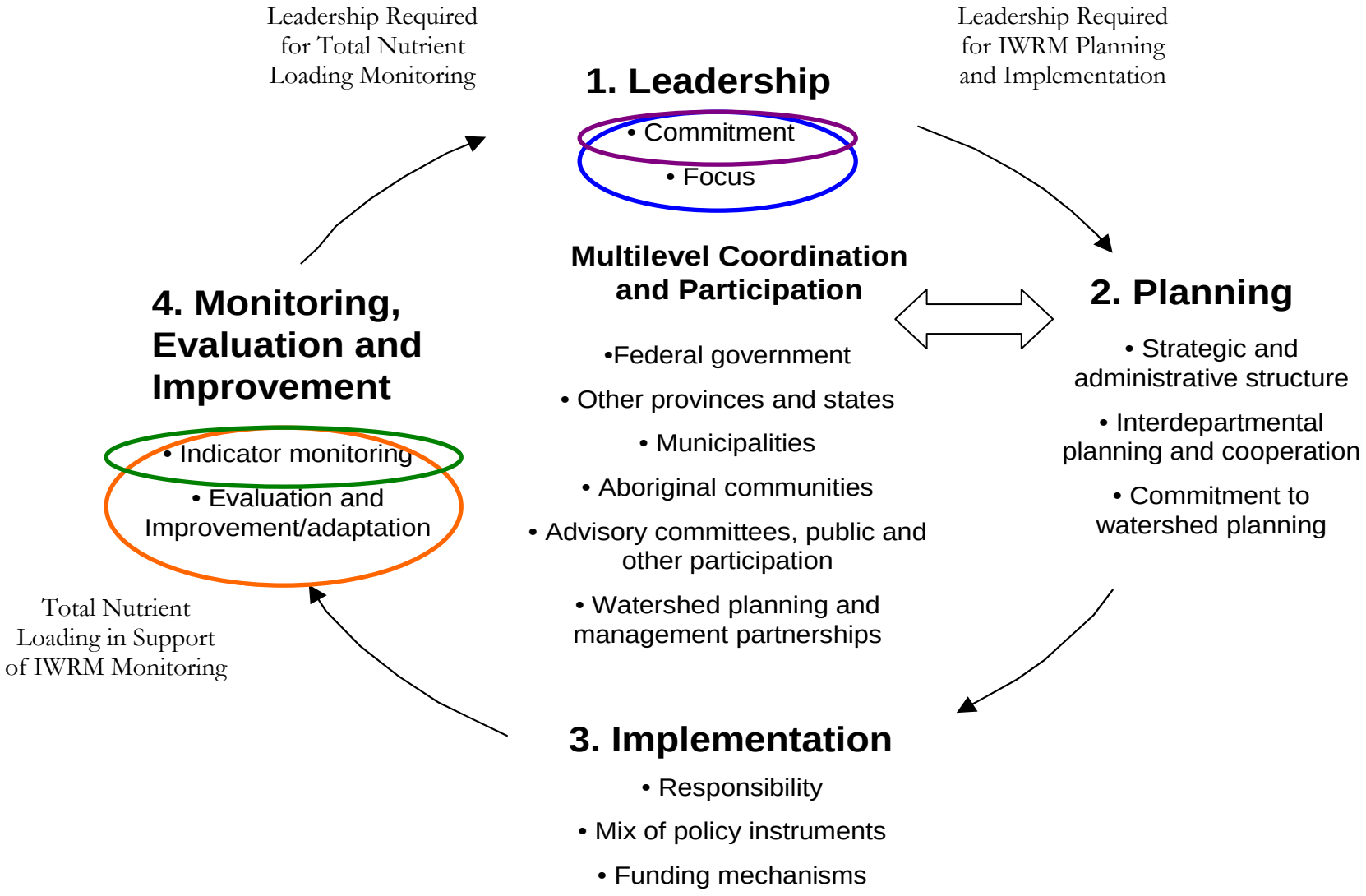

Figure 1-1: Total Nutrient Loading/Monitoring/Planning within the Context of IWRM
Source: Adapted from Swanson et al (2005)

1.4.2 The Need for Leadership and Coordination

Figure 1-1 also denotes the centrality of "Leadership" in the IWRM planning cycle. Without leadership, there can be no effective IWRM Planning and Implementation or Monitoring, Evaluation, and Improvement. As such, without leadership there can be no *Total Nutrient Loading Framework* and no improvements in Lake Winnipeg water quality.

With regard to these issues, the Province of Manitoba is the most appropriate authority to provide the leadership which is required to address the province's nutrient loading challenges. Given its authority over most aspects of natural resources management, Manitoba is responsible for most aspects of surface water management, agriculture, land use, environmental quality, and most municipal rural or urban issues related to municipalities.

Given these interrelated responsibilities, which are managed through the operations of numerous provincial government departments, effective provincial leadership would necessarily involve a high degree of interdepartmental planning, communications, and performance measurement. This is required to bring focus to the challenge of nutrient management, to harness the collective influence and full resources of government.

With the health of the province's signature water body serving as the focus for provincial action, it would logically be accepted that any provincial efforts related to IWRM or development of a *Total Nutrient Loading Framework* would, by their very interrelated and interdepartmental nature, involve the highest possible level of support, from the highest offices of government. This is required to demonstrate the full commitment of government to the nutrient management challenge.

To be truly province-wide in nature, such provincial leadership would not be entrusted to only one department – but to several – under the direction of a designated Executive (Cabinet) Committee or perhaps the Premier, as the President of Executive Council. Such an approach would necessarily involve a high level of strategic coordination.

Leadership does take this form in other provinces where water issues have become major provincial priorities, such as in Alberta and Saskatchewan. In these provinces, provincial strategies related to safe drinking water and the implementation of watershed-based solutions have received the highest levels of Executive Council support, significant funding, and designations as *Cross-Government Strategies* for which several departments are accountable. These *Cross-Government Strategies* are also governed by clear guidelines for interdepartmental planning and reporting.

1.5 Depicting a Proposed TNL Framework

The challenge for Manitoba now, is the delivery of an effective institutional framework for IWRM planning, implementation, and performance measurement. Choosing the right scale at which nutrient loads can be monitored and analyzed for effective nutrient loading reduction may differ across the province, based on such factors as soil types, topography, land use, and development intensity. IWRM is also largely a question of governance – of how individuals and groups can come together – to address mutual concerns related to the health of their watershed community.

Determining exactly when participating individuals, organizations, and communities are ready to collaborate and implement watershed-based solutions is a nascent research topic. The common drainage areas shared by communities should be *meaningful* to the people who live in them and use their resources. They should also be *manageable* so that local governance entities such as local municipalities, watershed districts, and other community stakeholders may in fact have significant influence in improving their condition. For these reasons, it seems most logical that the focus for IWRM (and TNL Loading) should be on the watershed or subwatershed level.

Figure 1-2 outlines the flow of nutrients through drainage system. This *Total Nutrient Loading Framework* demonstrates the cumulative effects of numerous individual hydrologic units, minor watersheds, and subwatersheds – supplying multiple watersheds – which in turn comprise several subbasins, larger basins, and subregions (not depicted) – which ultimately drain into a major water body. This framework also indicates how the use of various policy instruments such as regulation, direct expenditures (e.g. BMPs), and economic incentives could reduce the outflow of nutrients into the watershed and ultimately the sub-region. The focus is decidedly limited to the watershed level (and below), to reflect the reality that 3000 km^2 (watershed) or 1000 km^2 (subwatershed) represent an appropriate scale for watershed planning and management to occur. Watershed activities occurred at this scale are most *meaningful* to the residents and communities living within them, and most *manageable* in terms of the degree of cooperation and participation which may be required among individuals and groups – whether working at the individual hydrologic unit, minor watershed, or above.

The ability to assess the *Total Nutrient Loading* impact of one new hog barn development within any hydrologic unit could and should be the objective of an effective TNL Framework. An analysis of this aspect of the TNL Framework – exploring the current and a possible future decision-making process related to such a development (Proponent X), shall be the focus of our work in this report.

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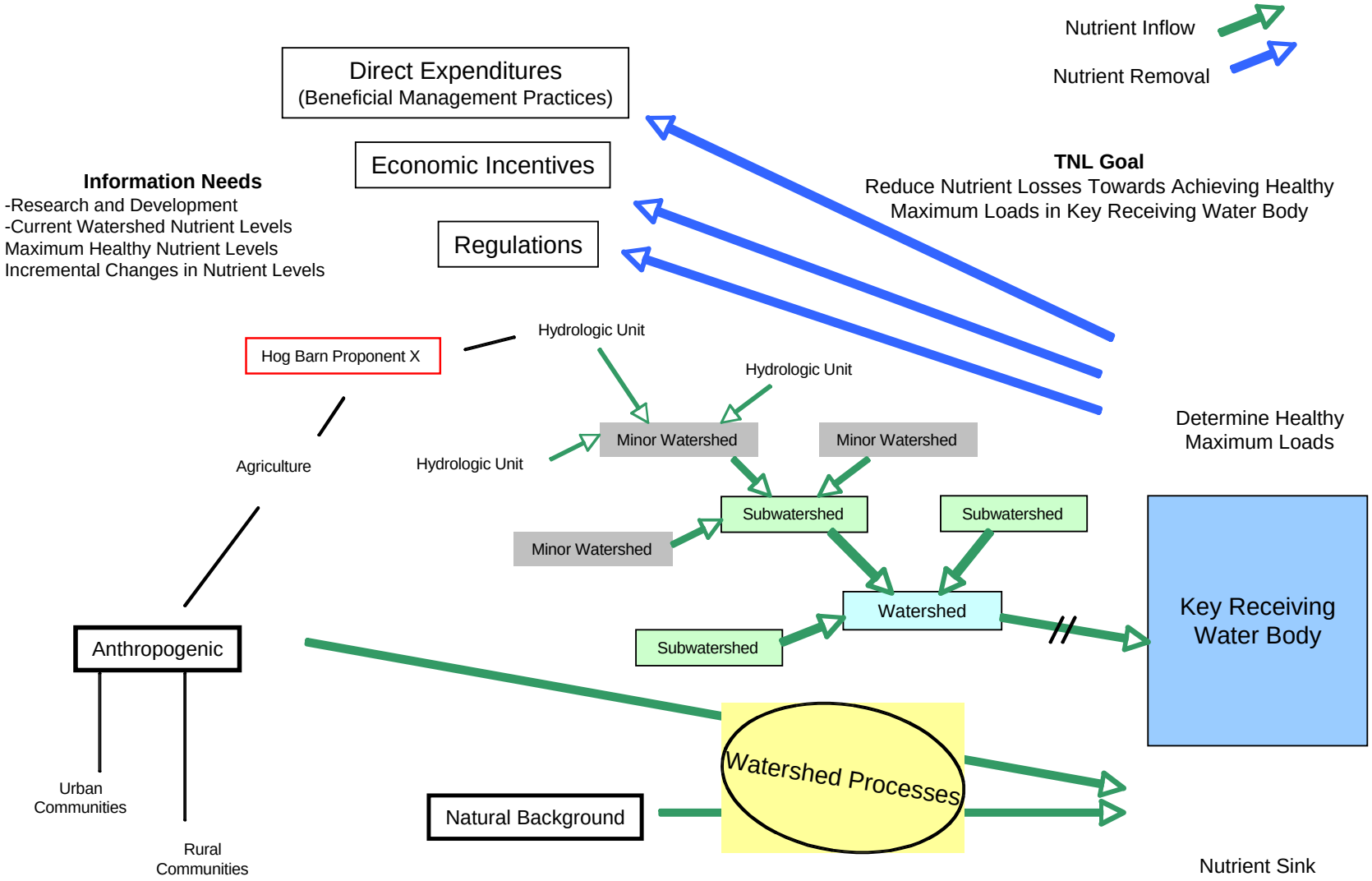
Figure 1-2: Total Nutrient Loading Framework (Watershed/Subwatershed Focus)



1.5.1 TNL Framework Components

The ultimate focus of a the TNL Framework is on understanding and addressing changes in the health of Manitoba's watersheds, at various scales (from individual hydrologic units to basins, and regional water systems). The health of a water resource is of critical importance to the overall sustainability of a region, as it influences all social, environmental and economic factors.

In reality, the development of a TNL Framework represents one component of a comprehensive IWRM strategy. Other key elements would include the management of excess water flows during periods of intense precipitation, planning for drought, managing other contaminants, and improving overall water use efficiency in agriculture, industrial, and domestic settings. However, with a present need to focus on nutrient reduction, understanding several key aspects is required. These include the following:

1.5.1.1 Research and Development

Research is fundamental component of a TNL Framework. Several questions still remain about nutrient movement from individual hydrologic units, through a watershed, and finally into a regional level water body. The research component assists in determining the maximum allowable levels of nutrients in the water, as well as monitoring nutrient levels in streams, rivers and lakes. The research activities usually lead to the development and recommendation of beneficial management practices. The results of the research influence watershed management decisions.

1.5.1.2 Current Watershed Nutrient Levels

Knowledge regarding current nutrient levels provides information necessary for the determination of which policy instruments may be most appropriate to improve downstream water quality. The various instruments used will either be: regulatory, expenditure, or economic in nature. In order to ensure that current nutrient levels (and their sources) are well understood, a significant degree of watershed monitoring will be required – from the individual hydrologic unit to the basin or regional level. It is likely that some of this required monitoring could be undertaken through the use of "representative watersheds" which have similar watershed and landscape features to others.

1.5.1.3 Maximum Healthy Nutrient Limits

An approximation of the maximum healthy nutrient limits for a watershed should be known for each contributing drainage system, as well as for downstream water bodies. Unfortunately, the maximum healthy nutrient levels are not know in most cases, so precautionary limits should be used in the interim. While exact numbers may not be known, estimates can be used to promote nutrient reduction activities.

1.5.1.4 Incremental Changes in Nutrient Levels

The final element in the design of a TNL Framework would involve the ability to track incremental changes in nutrient loads within a watershed. These may result from either natural or anthropogenic sources, and they may be either positive or negative – in terms of their influence upon *Total Nutrient Loading* of the particular hydrologic unit being assessed.

Increased nutrient loads may occur in association with increased (or more intense) precipitation, which in turn causes increases in erosion and the movement of both dissolved and particulate nutrients downstream. These loads may also increase due to wastewater discharges from municipal sewage treatment facilities or agricultural runoff – among many other natural background or anthropogenic sources. As noted in Task 1, a substantial portion of these loads are in some way related to watershed processes, and a very significant portion of these arise from within Manitoba.

Nutrient loads within a watershed may also decrease due to natural factors, such as the type and mass of particular forms of riparian vegetation. The effective application of various policy instruments can also serve to reduce watershed nutrient loads. They may decrease in association with: various types of BMPs and effective watershed management coordinated by a conservation, farming, or other organization (expenditure instrument); specific regulations designed to reduce nutrient loading (regulatory instrument), or the use of particular incentives (economic instrument).

However, the primary focus of this project is centred on understanding how the individual decisions of private agricultural landowners (primarily hog producers actually affect *Total Nutrient Loading*, and how these impacts can be reduced – through the application of various policy instruments. It is these incremental changes (and decisions) which are of the greatest interest at this time. The proposed TNL Framework will demonstrated how the impact of one additional hog barn development may theoretically be assessed in terms of its incremental impact on watershed health.

1.5.2 TNL Policy Instruments

IWRM approaches, actions, and solutions need to be explored from the perspectives of federal and provincial governments, rural municipalities, landowners, production decision-makers, and society. This is essentially the same group of stakeholders, which are ideally also responsible for IWRM planning, implementation, and performance measurement. Key decisions are made by all participants, and their various land use and water-related decisions occurring within a particular watershed can result in downstream impacts of many types.

The development of a *Total Nutrient Loading Framework* is a logical approach to understanding, acting, and measuring progress toward reduced nutrient loads from the contributing watersheds of a downstream water body, these same composite watersheds, or general environmental quality.

Using sound science as a foundation, many social, economic and environmental impacts can be evaluated and adapted to – through a variety of policy instruments available to government, including: **institutional** instruments (internal education, strategies, policies, and procedures); **regulatory** (laws, regulations, and enforcement); **direct expenditure** (broad or targeted programs, education and awareness, and research and development); and **economic** instruments (taxes, fees, and incentives). Any policy instrument is comprised of two elements – design and implementation (IISD and TERI 2003).

1.5.2.1 Institutional Instruments

These include government strategies, new or revised institutional structures, and changes to policy and procedures of governments.

1.5.2.2 Regulatory Instruments

Regulations are one of the tools used by governments of all levels to restrict activities that are concerns for an entire sector, as an example, there are restrictions on how wastewater is managed.

1.5.2.3 Expenditure Instruments

Direct program expenditures designed to achieve particular goals may include the funding of various beneficial management practices (BMPs) is to improve the condition of an area of concern. In the case of water quality, certain BMPs can reduce the flow of nutrients into a water body. BMP development and implementation should be based on encouraging individual decision makers to change their practices and remain with that particular practice after funding has expired.

1.5.2.4 Economic Instruments

These may involve incentives and/or changes to the tax system to encourage or reward individual decision-makers for changing the way they undertake certain activities.

1.5.3 TNL Hydrologic Scale Considerations

Nutrient loading throughout any drainage system can occur naturally and anthropogenically within each composite hydrological unit. The summation of these inputs determines *Total Nutrient Loading* levels for each particular watershed (at any scale). From a monitoring perspective, more data is typically better than less, and as such, measurements from each hydrological unit within the watershed hierarchy would be considered ideal. Realistically, however, this is not always possible or necessarily the most efficient method of measurement. Developing a TNL Framework requires an appropriate scale to be effective for a particular watershed system.

Selecting the appropriate scale for measurement requires an understanding of the regions hydrological classifications and the activities within each watershed and its sub-units. Table 1-1 outlines the hydrologic levels introduced in Task 1, their classification name, and the approximate area of each classification. Landscapes, climatic conditions, and anthropogenic activities tend to differ between each watershed and result in different nutrient loading potentials.

Table 1-1: Hydrologic Scales within a TNL Framework

Hydrologic Level	Classification	Approx. Area Limit
1	Region	1,000,000 km^2
2	Subregion	300,000 km^2
3	Basin	150,000 km^2
4	Subbasin	30,000 km^2
5	Watershed	3000 km^2
6	Subwatershed	1000 km^2
7	Minor Watershed	100 km^2
8	Ind. Hydrologic Unit	10 km^2

More detailed monitoring provides more information about nutrient sources, but at a watershed level this detail may not provide sufficient information to develop effective strategies for reducing nutrient loads. Total nutrient monitoring needs to be based on the value of information received and the costs associated with the measurement.

There are still un-answered questions relating to the source of nutrients that need to be further researched. Intensive monitoring and research are gradually increasing the available knowledge surrounding nutrient loading. With this research, the effectiveness of nutrient source and removal models are becoming more accurate, possibly resulting in the need for less physical monitoring within each watershed.

1.5.4 Proponent X Hog Development within the TNL Framework

The focus of this research is on the incremental increases in nutrient loading which one additional (or expanding) agricultural producer of hogs may or may not be contributing, as one component of overall nutrient loads to Manitoba's downstream drainage systems.

Figure 1-2 situates such a producer as Proponent X within the *Total Nutrient Loading Framework*. This operation can be expected to contribute a measurable portion of total nutrient loads – simply by the fact that it is developed agricultural land, an *Anthropogenic* source of nutrients from rural Manitoba.

The storage of manure as part of this operation represents a certain degree of risk which can be estimated. Meanwhile, the application of manure to its surrounding fields suggests the possibility that some proportion of the nutrients within this manure may not be taken up by growing crops, and find its way into an adjacent drainage ditch and other water bodies downstream. Proponent X is also positioned at the beginning of the nested watershed system as an "individual hydrologic unit," which along with similar agricultural operations, each contribute surface water flows to the overall system.

Surface water flows from agricultural landscapes are accentuated by: the clearing of natural vegetation as part of the agricultural development process; on-farm agricultural drainage

systems designed to enhance production; the type of crops, land management, and/or production techniques utilized on the farm; and the construction of roads, artificial drains, and culverts designed to facilitate settlement, transportation, and agricultural production in general. In most cases, these influences have been in place for decades, while others are new.

Increased surface water flow can generally be expected to result in corresponding increases in nutrient loads. While they are a direct result of agricultural development of Manitoba's Prairie landscape, these accentuated surface water flows (and nutrient loads) have been typically considered as a *Natural Background* contribution to overall loads reaching Lake Winnipeg (Lake Winnipeg Stewardship Board 2006).

In Task 1 of this research, the watershed-based linkages associated with water flowing from individual hydrologic unit to larger water bodies downstream – and the fact that all watershed processes (which anthropogenic or natural in nature) – should be considered together in attempting to address the challenge of nutrient management through a *Total Nutrient Loading Framework*.

1.5.4.1 Key Information and Policy/Process Gaps

Depicted to represent any Manitoba hog producer (or other livestock operator), when considering a decision to invest in a new development (or expand an existing one), Proponent X currently faces a decision-making process and several pieces of legislation which – it has been suggested – could be significantly improved.

Most current policy and process related to hog industry development centres on the *Technical Review Committee* (TRC) process, which occurs under the auspices of the Manitoba Planning Act. Proponent X is primarily concerned with the expedient production of the TRC report – which can facilitate a decision by the local *Planning Authority* (a planning district or rural municipality) whether to approve the proposed development as a conditional use, or not.

Many Manitoba Rural Municipalities have struggled with decisions related to the development of new hog barn and associated operations, and the fact the TRC process may not be providing the information they require to make effective decisions. Expectations for the TRC process may well be exceeding its intentions as originally designed.

Municipal ratepayers and others living within communities affected by new or expanded hog industry developments – in addition to other Manitobans beyond these communities – have expressed significant concerns related to some developments. It is clear that a improved decision-making process should be explored.

Many of these issues related to the need for better scientific and other information related to the cumulative impacts of incremental increases in the livestock sector, with a particular focus on Total Nutrient Loads within the Lake Winnipeg drainage system. This report seeks to review current policy and decision-making processes related to these issues, with a view toward considering possible improvements which could be made. These are outlined in the form of *Summary Conclusions and Recommendations* in Section 4.

2 Review of Applicable Policy and Watershed-Related Legislation

2.1 COSDI and the Sustainable Development Act

After an aborted attempt to implement a landmark sustainable development act in the mid-1990s (involving the consolidation of many related pieces of legislation), a simplified *Manitoba Sustainable Development Act* was later passed in 1998 – committing to the concept of large area planning, regular sustainability reporting, sustainable development codes of practice, financial management guidelines, and continuation of the Manitoba Round Table.

A subsequent stakeholder consultation resulted in the *Report on the Consultation on Sustainable Development Implementation (COSDI)* in 2000. The COSDI report called for Manitoba to make better environmental, land use, and resource allocation decisions – employing the concept of "large area planning," based on naturally definable areas, such as watersheds. This set the stage for a major discussion paper, based on the first six water policy themes outlined below and within *Building a Sustainable Future – Water: A Proposed Strategic Plan for Manitoba*, released in October 2001 (Manitoba Conservation 2001).

2.2 The Manitoba Water Strategy

Manitoba's Vision for its freshwater resources is stated within the Manitoba Water Strategy (Manitoba Water Stewardship 2007), which foresees:

"The best water for all life and lasting prosperity."

The strategy's Key Goals (described as Policy Areas and Objectives) are focused on:

1. Water Quality – To protect and enhance our aquatic ecosystems by ensuring that surface water and ground water quality is adequate for designated uses and ecosystem needs.
2. Conservation – To conserve and manage the lakes, rivers, and wetlands of Manitoba so as to protect the ability of the environment to sustain life and provide environmental, economic, and esthetic benefits to existing and future generations.
3. Use and Allocation – to ensure the long term sustainability of the province's surface water and ground water for the benefit of all Manitobans.
4. Water Supply – To develop and manage the province's water resources to ensure that water is available to meet priority needs and to support sustainable economic development and environmental quality.
5. Flooding – To alleviate human suffering and minimize the economic costs of damages caused by flooding.
6. Drainage – To enhance the economic viability of Manitoba's agricultural community through the provision of a comprehensively planned drainage infrastructure.

A stakeholder steering committee undertook a review of the strategic plan, providing ministerial recommendations which led to the current Manitoba Water Strategy, released in April 2003. Past activities and proposed future actions are outlined for each of the six policy themes/detailed objectives, while the implementation framework for the strategy is outlined (Manitoba Conservation 2003 20-23). The implementation elements include:

I. Development of an Integrated Water Planning and Management System

Watershed-based planning will be supported through the creation of "watershed districts" (subsequently called "watershed planning authorities") across the province, building on the existing efforts of Manitoba's conservation districts – which are primarily based on municipal boundaries, but employ sub-watershed-based local committees. Larger basin-level or aquifer districts may also occur where appropriate. Planning partners will be important at every level.

II. Review and Consolidation of Water Legislation

There are at least 20 separate provincial acts and several more legislative regulations related to water in Manitoba. The province hopes to consolidate most existing water legislation into a single act, based on extensive public consultation. Some acts will be repealed, some may be revised, and some (such as those related to federal legislation) may not change or be consolidated. Relevant water legislation includes:

- Conservation Agreements Act	- Conservation Districts Act
- Drinking Water Safety Act	- Dyking Authority Act
- Fisheries Act	- Fishermen's Assistance Act
- Floodway Authority Act (crown corporation)	- Groundwater and Water Well Act
- Manitoba Habitat Heritage Act (crown corp.)	- Lake of the Woods Control Board Act
- Manitoba Natural Resources Transfer Agreement	- Public Health Act (relating to drinking water)
- Water Commission Act (repealed)	- Water Power Act
- Water Resources Administration Act	- Water Supply Commissions Act
- Water Services Board Act (crown corporation)	- Water Rights Act
- Water Protection Act	- Water Resource Conservation and Protection Act

III. Development of Mechanisms for Financing Water Management and Planning

Locating adequate, long-term funding in support of comprehensive water management has been an ongoing challenge, although crisis-related funding is more readily available (i.e. flooding). Funding to support the maintenance of provincial waterways, and watershed restoration projects will be expected to reflect an equitable distribution of costs, in accordance with benefits received among all users.

2.2.1 The Water Protection Act

Manitoba Water Stewardship is a relatively new provincial department responsible for implementation of the Manitoba Water Strategy. Manitoba has begun to formalize its water policy direction by drafting the *Water Protection Act*. The Act supports additional legislative efforts passed under the Drinking Water Safety Act, which saw the creation of the Office of Drinking Water – with associated enforcement, inspection, and advisory powers regarding the operation of any public or private water supply system. The Act (Manitoba Statutes 2007), was designed to:

- Enshrine water quality objectives and standards in legislation;
- Commit to ongoing consultation through the Manitoba Water Council;
- Formalize a provincial commitment to watershed-based planning (through the recognition of "watershed planning authorities," ideally comprised of existing conservation districts;
- Establish "water quality management zones" requiring specific action based on the sensitivity of draining water bodies to nutrient loading (based on soil type and land use); and
- Establish a Water Stewardship Fund.

The Water Protection Act is expected to significantly advance the concept of land and water management planning – on a natural systems basis (watersheds). The legislation is attempting to address many of the systemic, institutional, cultural, and traditional barriers to effective watershed management.

The Act contains two very significant parts which outline a number of relevant items which are germane to the hog industry in Manitoba. The focus in Part 2 is on "water protection," including provisions for the adoption of water quality standards, objectives, or guidelines in s. 4(1). This will occur in conjunction with the existing provisions of the *Environment Act,* as noted in s. 4(2).

2.2.1.1 Water Quality Management Zones

Sections 5 and 6 of the *Water Protection Act* allow for the designation of "water quality management zones," regulations and prohibitions associated with any type of land use occurring within these zones, the consideration of scientific information, existing water quality standards, and scientific requirements for the provision of ministerial advice by departmental staff in response to an objection. Several key sections are noted below:

5(1) On the recommendation of the minister, the Lieutenant Governor in Council may make regulations

(a) designating any area of the province as a water quality management zone for the purpose of protecting water, aquatic ecosystems or drinking water sources;

(b) governing, regulating or prohibiting any use, activity or thing in a water quality management zone or any part of a zone.

5(2) Before recommending that a regulation be made under subsection (1), the minister may consider scientific and other information relating to

(a) the physical characteristics of land in the area, including its topography and soil types;

(b) the ability of the soil or water in the area, or water downstream of the area, to assimilate nutrients and other pollutants;

(c) water bodies or groundwater in the area, including information relating to

(i) the water quality characteristics of the water,

(ii) the susceptibility of the water to contamination or adverse changes in level or in-stream flow, and

(iii) the extent to which the water is pristine or relatively undisturbed by human activity;

(d) the area's aquatic ecosystems;

(e) whether the area contains a source, or a potential source, of drinking water;

(f) whether the area supports species that are sensitive to alterations in water quality or quantity resulting from human activity;

(g) whether the area provides habitat for endangered species; and

(h) any other matter that the minister considers relevant.

Section 5(1) clearly outlines Manitoba Water Stewardship's strong powers and responsibilities regarding the control of any land use activities which may be undertaken within a designated water quality management zone. These powers have been criticized by the agriculture industry in particular (for setting the stage to penalize farmers) and from some environmental organizations (for being too weak).

Meanwhile Section 5(2) outlines the comprehensive nature of the zone designation process. The considerations required before any water quality management zones are announced are comprehensive and scientific in nature, clearly denoting the importance of maintaining a rigorous database of watershed information by the province. However, this information is not readily available or in a useable form for watershed-by-watershed analysis. Appropriately, the regulation which would bring the use of these zones into place has yet to be registered by Manitoba Water Stewardship.

Section 5(3) refers to the need for Manitoba Water Stewardship to consider any existing and applicable water quality standards and approved watershed management plans before designating a water quality management zone. There is an extensive history associated with the development of provincial water quality standards through Manitoba Conservation and earlier versions of this department (Manitoba Conservation 2002), although no regulation formally implementing these standards has been registered by Manitoba Conservation. To date, only one watershed plan has been completed, and formally adopted by Manitoba Water Stewardship (TMCD 2004). Both of these elements demand a strong scientific foundation.

In section 6, the need to consult with a "water planning authority" is also noted. While there are other options are prescribed within the *Water Protection Act* regarding the composition of these authorities, to date only conservation districts have been designated as such, most of which are not watershed-based organizations.

The foundational importance of science is again highlighted in s. 7(5), 7(6), and 8 where a rigorous requirement exists for expert scientific and technical advice – in responding to objections and/or in reviewing the effectiveness of any water quality management zone regulation. Given the demonstrated connection between phosphorus loading and hydrologic flow, it would be most logical for Manitoba's water quality management zones to be based along watershed boundaries. There is a need for greater technical capacity and stronger watershed science throughout the province is clear, as noted below.

7(5) Within 60 days after notifying the minister of the objection, the director must give advice to the minister as to whether the proposed regulation should be varied or revised.

7(6) Before providing advice under subsection (5), if the director determines that there is an unresolved scientific or technical issue, he or she must obtain expert advice in such a manner as may be set out in the regulations.

8 The minister must, not later than five years after the date on which a regulation under section 5 comes into force, require the water council to

(a) review the effectiveness of the regulation and, in the course of that review, consult with any persons affected by the regulation that the council considers appropriate; and

(b) recommend, if it considers it advisable, that the regulation be amended or repealed.

The minister may, in addition, require the council to undertake such a review at any other time.

2.2.1.2 Watersheds and Water Planning Authorities

Equally significant is Part 3 of the Act, referring to designation of "watersheds" and "water planning authorities." Section 14 notes that:

14 The Lieutenant Governor in Council may by regulation

(a) designate a watershed for the purposes of this Act, and specify its boundaries;

(b) designate a water planning authority for a watershed, which may be

(i) the board of a conservation district,

(ii) the board of a planning district,

(iii) the council of a municipality,

(iv) any other person or entity, or

(v) a joint authority consisting of two or more entities or persons described in subclauses (i) to (iv);

(c) prescribe the date by which the authority must submit a watershed management plan for approval, terms of reference for the preparation of the plan, and any other terms or conditions that the Lieutenant Governor in Council considers necessary.

2.2.1.3 Watershed Management Plans

Sections 15 and 16 outline the requirements for the preparation of a watershed management plan, as well as its mandatory contents:

15 In preparing a watershed management plan, a water planning authority must consider the following:

(a) water quality standards, objectives and guidelines that apply to the watershed;

(b) whether a water quality management zone is included within any part of the watershed, and if so, any regulations made under section 5 respecting the zone;

(c) studies that the authority considers relevant relating to water, land use, demographics, the capacity of the environment to accommodate development, and any other matter related to present or future physical, social or economic factors;

(d) comments received through public consultation or public meetings held under section 17;

(e) prescribed water management principles;

(f) relevant provincial land use policies, development plans, and zoning by-laws;

(g) any other information that the authority considers relevant.

These sections provide strong clues as to the level of detail, public consultation, and communications which are required for a watershed management plan to be acceptable to Manitoba Water Stewardship. In addition, s. 15.f and 16(1).c denote the obvious and logical linkages between watershed planning and land use planning. Section 16(1).c is particularly important, as it refers to a challenging requirement that the development plan of a planning district or municipality must include "some or all of the provisions of the watershed management plan."

16(1) A watershed management plan must

(a) identify issues relating to the protection, conservation or restoration of water, aquatic ecosystems and drinking water sources in the watershed;

(b) contain objectives, policies and recommendations respecting some or all of the following:

(i) the protection, conservation or restoration of water, aquatic ecosystems and drinking water sources,

(ii) the prevention, control and abatement of water pollution, including wastewater and other point-source discharges, and non-point sources of pollution,

(iii) land drainage and flood control, including the maintenance of land drainage and flood control infrastructure,

(iv) activities in water quality management zones, riparian areas, wetlands, flood areas, flood plains and reservoir areas,

(v) water demand management, water use practices and priorities, the conservation of water supplies, and the reduction of water use and consumption during droughts and other periods of water shortage,

(vi) the supply, distribution, storage and retention of water, including measures to ensure persons in the watershed have access to clean potable water,

(vii) emergency preparedness to address spills, accidents and other emergencies that may affect water, an

aquatic ecosystem or a drinking water source;

(c) specify linkages between water management and land use planning so as to facilitate the adoption, in a development plan or other planning instrument, of some or all of the provisions of the watershed management plan; and

(d) identify ways in which the plan can be implemented, monitored and evaluated, recognizing the need to implement the plan with the assistance of individuals, groups, and organizations.

16(2) A watershed management plan may also

(a) contain maps to assist in its interpretation; and

(b) specify a date by which the plan must be reviewed.

The Act is lacking a strong economic incentive component, and The Act's enshrinement of plans to create a Water Stewardship Fund (s. 29) are particularly significant however, creating a direct opportunity for funding watershed management implementation and stewardship solutions, in partnership with other funding sources.

An emerging question relates to the Act's prescription for addressing the long-term challenge of integrated watershed resource management – through the creation of "local water planning authorities." While the legislation is flexible in how these entities may be created and funded, the department's direction is focused heavily on the existing conservation districts program to facilitate watershed planning and authority creation. Limited watershed planning capabilities at the conservation district level and the means by which to harmonize provincial policy goals with local community interests and priorities represent significant current and future challenges.

2.2.2 Priorities and Timeframes

Water-related issues are currently being addressed on several levels – with a strong focus on Lake Winnipeg water quality. Even prior to development of the Manitoba Water Strategy, the province's main priorities relating to water have focused on (Manitoba Water Stewardship 2007):

- Drinking water safety (act passed in August 2002, Office of Drinking Water created);
- Preventing bulk water export and inter-basin transfers both within and beyond the Hudson Bay Basin (Water Resources Conservation and Protection Act, passed in August 2000);
- Extensive legal challenges to the Devils Lake and Garrison Diversion projects in North Dakota, over concerns regarding downstream water quality and biota transfer;
- Rural community flood protection with ring dykes since the 1997 Red River Flood;
- The provision of timely and accurate flood-related water information and forecasting;
- Winnipeg Floodway expansion (creation of Floodway Authority in June 2004);
- Nutrient management, riparian incentives, and research in support of Lake Winnipeg water quality, and creation of the Lake Winnipeg Stewardship Board (October 2004).

The origins and scope of the Manitoba Water Strategy and the Water Protection Act are rooted on the concept of inter-generational equity, and their intent clearly respects the environmental, economic, and social elements of sustainable development. However, at this time, there are no stated timeframes for any initiatives associated with Manitoba's water policies, strategy directions, or legislative activity.

2.2.3 Watershed Partnerships

Historical and emerging watershed-based efforts exist at several levels. These include:

2.2.3.1 Basin-level Commissions and Advisory Boards

The Red River Basin Commission is a transboundary partnership with multi-stakeholder representation from Manitoba, North Dakota, Minnesota. The organization's main focus is on development of a comprehensive natural resources framework plan for the basin. Manitoba, Minnesota, and North Dakota all support the RRBC, along with numerous municipalities (RRBC 2005). Manitoba also supports the Partners for the Saskatchewan River Basin organization.

In recent years, Manitoba has also supported river basin management advisory boards focusing on the Assiniboine River and Lake Manitoba. The role of the Lake Winnipeg Stewardship Board is to assist the government of Manitoba in achieving the main commitments associated with its Lake Winnipeg Action Plan of reducing phosphorus and nitrogen in the lake to pre-1970 levels (Lake Winnipeg Stewardship Board 2007). Board members represent a variety of interests, including fishing, agriculture, urban land use, First Nations, federal, provincial and municipal government, and non-governmental organizations.

2.2.3.2 Local Watershed Organizations

Several Manitoba rural municipalities in the Red River Basin and Interlake area have been working together in an attempt to address longstanding drainage issues outside of the conservation district framework. Similar cooperative efforts have occurred in the past, typically following major flooding events. Today's North West Red Water Management Association is comprised of several south-central Manitoba municipalities – virtually the same membership as an earlier entity, the Lower Red River Valley Water Commission, a municipal partnership body which became active after the Red River flood of 1950.

There also a number of active watershed restoration associations operating within the City of Winnipeg, notably on the Seine River, Bunn's Creek, and through the Assiniboine Watershed Network (involving the Sturgeon, Truro, and Omand's Creek systems).

There is a long history of federal/provincial partnerships related to soil conservation and sustainable agriculture, dating to 1989, during which the Canada-Manitoba Soil Conservation Agreement was used to establish 44 local agricultural conservation organizations known as "Farming for Tomorrow" groups. Most organizations remaining today work in partnership with, or have formed a conservation district. Many others have disbanded.

One very active organization remaining today is the Deerwood Soil and Water Management Association, which operates a long-term, scientific watershed research project in south-central Manitoba at South Tobacco Creek (Deerwood 2003). Deerwood works in partnership with the federal and provincial governments, universities, local municipalities, and others. The organization is currently focused on evaluating beneficial management practices (BMPs) under Agriculture and Agri-Food Canada's *Watershed Evaluation of BMPs* (WEBs) program and expanding their scientific research, management planning, and performance measurement to the next watershed level, in partnership with two conservation districts and five municipalities, known as the *Tobacco Creek Model Watershed* (Figure 1) (TCMW 2004).

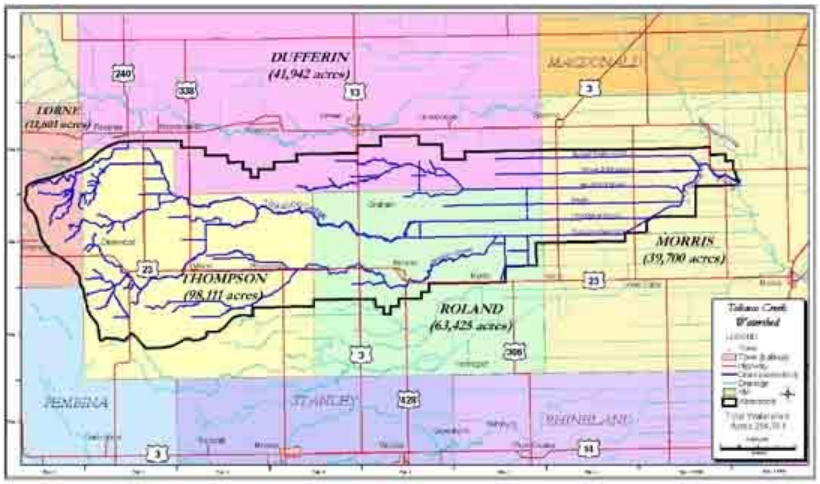


Figure 2-1: Rural Municipalities and the Tobacco Creek Model Watershed
Source: TCMW 2004

2.2.3.3 Conservation Districts

Under the Manitoba Water Strategy and the Water Protection Act, integrated watershed resource management planning is expected to occur primarily via the Manitoba Conservation Districts Program – an existing Agri-Manitoba focused network of provincial-municipal partnerships for improved soil, water, and wildlife management.

Manitoba's conservation districts are independent local boards sponsored jointly by Manitoba Water Stewardship and partner rural municipalities. Provincial funding is allocated for approved soil, water, and wildlife habitat conservation programming with private landowners – based generally on a 3 (provincial):1(municipal) funding formula.

Since 1970, 18 conservation districts have been established in Manitoba, and these bodies have a long history of providing a wide range of integrated resource management programming, which are generally perceived to be providing a valuable service to all Manitobans. One of their greatest values is a strong connection to rural communities and agricultural landowners in particular – considered vital to their future success – and in assisting to meet provincial water policy objectives outlined in the Manitoba Water Strategy (FT-Ecologistics 1998).

While the earliest conservation districts were established along watershed boundaries, the majority of those existing today are based upon municipal boundaries. A 1998 conservation districts mandate study commissioned by the province noted the need for stronger efforts in support of watershed management and performance measurement (FT-Ecologistics 1998).

Today, their efforts are being increasingly targeted on a watershed basis. Municipal and other conservation district partners are also being encouraged to consider about science-based watershed indicators – to evaluate if programming toward real improvements in watershed health are effective. These future indicators would also support the provincial priority of completing source water protection plans, as outlined in the Water Protection Act.

It is recognized that building local watershed planning capacity throughout the conservation districts network will take time. There are also resource and staffing challenges at the provincial level in providing professional technical and facilitation support. A coordinated data collection and analysis system to establish baseline planning conditions and monitor watershed management progress has also been identified as a critical requirement. Watershed planning initiatives are now underway in several conservation districts, notably in the Pembina Valley, Turtle Mountain, and West Souris River Conservation Districts.

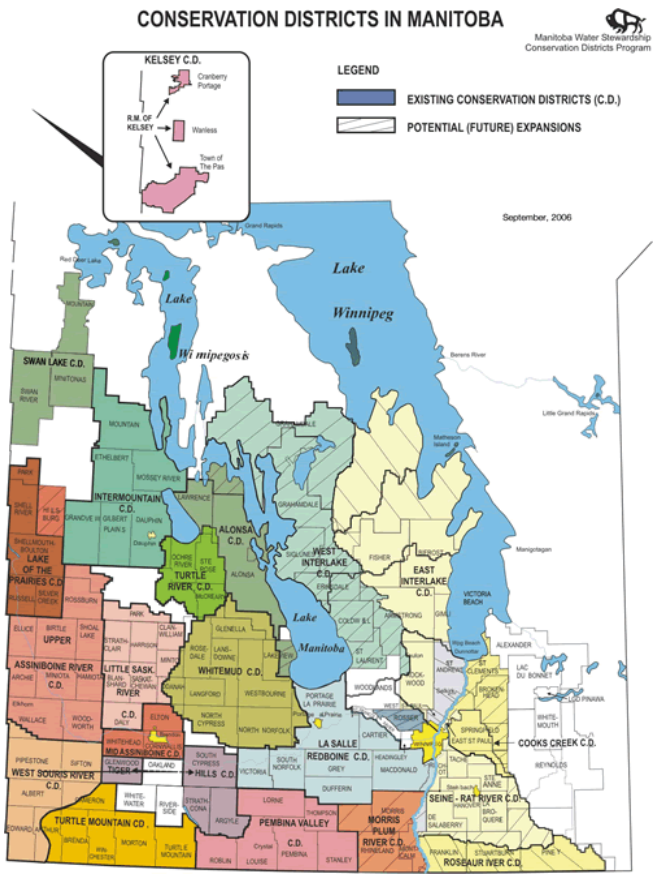


Figure 2-2: Manitoba Conservation Districts, 2007
Source: Manitoba Water Stewardship 2007

2.3 The Environment Act

This section outlines the evolution and current application of the *Environment Act* as it relates to the livestock industry.

2.3.1 Evolution of Early Legislation

in 1871, provincial legislation known as the Sanitary Act was passed with regard to controlling manure deposition along Manitoba's rivers and streams. After several name changes and revisions, this legislation eventually became known as the Pollution of Streams Act in 1891, establishing a 50' buffer zone from the high water mark of any stream, within which any "filthy and impure matter," namely manure, was not be deposited (Vaisey 1979 20).

In 1905, a new legislative focus brought attention to more visible forms of pollution, such as sawmill waste, forbidding obstructions from being placed with in stream channels, and setting out limitations related to stream navigation. This legislation was consolidated with the 1891 act renamed the Rivers and Streams Act in 1913 (Vaisey 1979 20).

In 1935, the Pollution of Waters Prevention Act was passed by the province. It separated, expanded, and highlighted the various water pollution aspects formerly under the original Rivers and Streams Act. Meanwhile, new elements of the Rivers and Streams legislation were added, including conditions under which stream channel alternations could occur, new navigation rules, and provisions to guard against excess sedimentation and bank erosion. Under the Pollution of Waters Prevention Act, the extent of a streambank was increased and redefined as any area within 132' of the normal high water mark. Interestingly, the definition of "filthy and impure" polluting materials was also significantly expanded to include chemicals, poisons, garbage, decomposing materials, and drugs (Vaisey 1979 21).

In addition, one recommendation of the Land Drainage Arrangement (Finlayson) Commission in 1936 focused on the permanent protection of a 75' riparian buffer strips along drains subject to the Land Drainage Act – in order to minimize soil erosion and the introduction of agricultural contaminants into provincial water bodies. Finlayson felt this would also result in impressive water quality results, directly supporting the Pollution of Waters Prevention Act passed the previous year (Vaisey 1979 22).

2.3.1.1 Birth of the Clean Environment Commission

A key element of the 1935 Pollution of Waters Prevention Act involved establishment of a Provincial Sanitary Control Commission, appointed by the Lieutenant Governor. This three person (minimum) commission had an impressive degree of power and authority associated with the protection of Manitoba's water quality. The Commission had general supervisory and investigative powers to explore and address water pollution problems, including the ability to order the halting of deleterious discharges and/or issue licences to permit controlled pollution discharges (Vaisey 1979 23). This act remained in place until 1968, and clearly set the tone for future legislation.

The Pollution of Waters Prevention Act also contained provisions for local municipalities wishing to organize themselves into "sewage districts," a legislative element which remained in place until 1972. These municipalities could work alone or as a group to form and operate a district, with the purpose of improving sewage management, water quality, and community health. Each district could also make local regulations to prohibit, regulate, or control sewage discharges within the district, subject to approval by the Commission. Also in 1935, due to several years of Prairie drought (loss of the Red River's assimilative capacity), combined with Winnipeg's population, new legislation (the Greater Winnipeg Sanitary District Act) saw responsibility for sewage treatment in Manitoba's capital city become the responsibility of the City itself (Vaisey 1979 24).

Even though the establishment of municipal sewage districts would make their facilities eligible for federal unemployment relief funding (Booy 1975 132-1322, in Vaisey 1979 24), uptake of the sewage district program beyond Winnipeg was not strong, possibly because municipal membership in a district was not mandatory. Ultimately, the province had to assume responsibility for local municipal sewage management beyond Winnipeg, through the Manitoba Water Services Act of 1972, through which the province directly funded and supported Manitoba's remaining municipalities in managing sewage loads (Vaisey 1979 25).

2.3.2 The Clean Environment Act

In 1968, a new act came into force with a broader focus, beyond water. It involved protection measures aimed at preventing air, water, and soil pollution. The concept of encouraging municipal 'sewage districts" was removed, and the concept of licensing polluters was given greater attention. The act was no longer focused mainly on water, as there was a recognition in legislation of the complex, inter-related environmental pathways of pollution, and the need to protect the environment as a whole. The Clean Environment Act was introduced shortly after the 1963 Pesticides Control Act, which mandated the licencing of all distributors of pesticides (Vaisey 1979 25-26).

The 1968 act also saw the re-naming of the Provincial Sanitary Control Commission as the Clean Environment Commission (CEC), affording it "general supervisory powers and control over all matters related to the preservation of the natural environment, and the prevention and control of any environmental contaminants." The commission could investigate any environmental concern with public hearings and witnesses, and issue licences permitting specific discharges into particular water bodies. This could include the mandating of specific treatment requirements, or the restriction of a development altogether. However, the overriding powers of the CEC came to an end, as the act was again updated in 1972. The CEC's general responsibility for environmental quality was passed to the Minister, under whom most of its original authority was now placed. The CEC could set discharge limits and issue/revise mitigation Orders only where existing legislation did not address a pollution matter. The Clean Environment Act of 1972 also granted additional authority to the Lieutenant Governor, who, in addition to having the power to make regulations in support of the legislation, could now also, "for environmental reasons restrict or limit the number of industries, undertakings, plants or processes that might be permitted in the province, or any part thereof for such periods of time as might be deemed advisable." (Vaisey 1979 27-28).

In 1968, the City of Winnipeg was made exempt from the Clean Environment Act's authority, as it was with the 1935 Pollution of Waters Prevention Act. Control of deleterious substances within the city was left to Winnipeg's own authority. In concert with the amalgamation of Winnipeg's 12 founding municipalities in 1972, the new city corporation also maintained authority over the urban environment (Vaisey 1979 29).

2.3.3 Water Quality Objectives and the Manitoba Environment Act

In 1977, the Clean Environment Commission held public hearings to explore and review the implications associated with a proposed system of provincial water quality objectives. The resulting CEC "Report on a Proposal Concerning Water Quality Objectives and Stream Classification for the Province of Manitoba" was accepted by the Minister of Mines, Natural Resources and Environment in Jan 1979. The CEC was then asked to begin the water body classification process, according to current and potential uses. The ultimate result would see the department's Environmental Management Division become responsible for developing and implementing the various guidelines and regulations associated with the Clean Environment Act, and the classification and protection of various water uses with associated objectives (Vaisey 1979 iii, 1-2, 13, 30):

During the early 1980s, the CEC completed use classification and water quality objective assignments for the Souris, Red, and Grass-Burntwood watersheds. Several technical revisions to the program occurred during 1983-84, towards their finalization in 1988. Also during this year, a Manitoba Environment Act was proclaimed, providing legislative support for Manitoba Environment to implement the program of standards, objectives, and guidelines for water quality in the province (Manitoba Conservation 2002 72).

The 1988 Manitoba Environment Act replaced the 1968 Clean Environment Act, as well as a 1975 Environmental Assessment and Review Process. The Act was developed in response to growing public concern for the environment, combined with the desire to support economic development with clear environmental regulations. The Act maintained the role of the Clean Environment Commission as a ministerial advisory body with powers to explore potential environmental concerns, review regulations, and conduct public hearings in the review of proposed developments (Manitoba Environment and Workplace Safety and Health 1988 3, 19).

New concepts introduced in the Act related to a classification process for different levels (types) of development (ostensibly to streamline the development process); a clear environmental assessment and public review process for each of three development levels; specific roles for the administering department (including preparation of an annual "State of the Environment" report); and detailed enforcement procedures for non-compliance with the conditions of issued licences or orders (Manitoba Environment and Workplace Safety and Health 1988 9-18, 24-28).

The Act maintains and strengthens the administering department's authority to develop and implement standard and objectives for environmental quality, including water (s. 2.2c) while these may also be implemented by regulation (s. 41.1e). Manitoba's Water Quality Standards, Objectives, and Guidelines have been regularly reviewed and revised since their initial

proposal in 1976. The current protocol proposes a three tiered approach to improve flexibility in implementation as follows:

Tier 1: Water Quality Standards – to govern the management of common pollutants for which existing pollution abatement technology is available and commonly used (Manitoba Conservation 2002 2-4);

Tier 2: Water Quality Objectives – for Manitoba pollutants controlled through Manitoba Environment Act licencing in accordance with ambient water quality levels based on detailed United States Environmental Protection Agency (US EPA) calculations (Manitoba Conservation 2002 5-35); and

Tier 3: Water Quality Guidelines – a series of numerical and narrative targets to guide water quality decisions affecting a broad range of pollutants, using generalized data provided by the Canadian Council of Ministers of Environment (CCME) (Manitoba Conservation 2002 36-56).

Currently defined water uses include the following (Manitoba Conservation 2002 68-69):

- Drinking Water;
- Cool Water Aquatic Life/Wildlife;
- Cold Water Aquatic Life/Wildlife;
- Industrial and Cooling Water Supplies;
- Greenhouse Irrigation;
- Field, Park, and Garden Irrigation;
- Livestock Watering; and
- Primary Recreation.

The Act (Manitoba Government Queen's Printer 1987-88) also encompasses a number of associated regulations addressing various environmental issues. Most water quality protection provisions are contained within the Water and Wastewater Facilities Operator Regulation (MR 77/2003, 162/2005), the Onsite Wastewater Management Systems Regulation (MR 83/2003), and the Livestock Manure and Mortalities Management Regulation (MR 42/1998, 52/2004, 194/2005, 219/2006).

2.3.4 The Livestock Manure and Mortalities Regulation

MR 42/1998 (along with its recent amendments) prescribes a broad range of requirements for managing agricultural manure, including disallowing manure discharges into surface watercourses or groundwater (s. 11), requirements for approved manure management plans for operations exceeding 300 animal units (s.13), and minimum setback requirements of 3m-35m, depending on application methods and existing vegetated riparian buffer zones as noted in Schedule C (Manitoba Statutes 1998).

2.3.4.1 Manure Storage Facilities

The regulation notes that manure storage can only occur in an approved manure storage facility (s. 4-6) or as field storage (s. 7-8). Section 4 notes that:

4 An operator who stores livestock manure in a manure storage facility shall

(a) ensure that the manure storage facility, alone or in combination with other manure storage facilities located on the property of the agricultural operation, is of sufficient capacity to store all of the livestock manure produced or used in the agricultural operation until such time as the livestock manure can either be applied as fertilizer or otherwise removed from the manure storage facility;

(b) design and construct the manure storage facility, or ensure that it is designed and constructed, so as to prevent the escape of any livestock manure that may cause pollution of surface water, groundwater or soil;

(c) maintain and operate the manure storage facility in a manner that does not cause pollution of surface water, groundwater or soil; and

(d) operate and maintain the manure storage facility in a manner that sustains its structural integrity.

Two key concepts are introduced in section 4 – the need to ensure that adequate manure storage is provided based on the size of the agricultural operation in question, and the fact that an operator is responsible for the design, construction, and operation of the storage facility (and the operator's land-based and water-related operations around it) so that pollution of surface or groundwater does not occur. These are recurring themes within the regulation, as noted in section 5(5) which states:

5(5) Unless otherwise approved by the director, no person shall create a well or a drainage ditch within 100 m of a manure storage facility, measured in the same manner as the minimum 100 m setback zone provided for in clauses 1(a) and (b) of Schedule A.5(5)

2.3.4.2 Field Storage of Manure

This section makes a clear linkage between land use, hydrologic flow, and the risk of nutrient transport arising from manure storage. These linkages are continued in section 7, with references to the field storage of manure including:

7(1) No person shall store livestock manure as field storage other than solid manure.

7(2) A person who stores solid manure as field storage shall

(a) locate the livestock manure at least 100 m from any surface watercourse, sinkhole, spring or well; and

(b) store the livestock manure in a manner that does not cause pollution of surface water, groundwater or soil.

7(3) An operator shall construct dikes or other works around a field storage area that are effective to prevent the escape of livestock manure that may cause pollution of surface water, groundwater or soil, if generally accepted agricultural practices indicate their necessity. The operator shall maintain the effectiveness of the dikes or other works for so long as the field storage area is used to store livestock manure.

As noted in s. 7(6) and 7(7), after removing all manure from a field storage area by November 10 of the year following initial storage, an operator must not store any further manure in this area for at least one additional year, after a crop has been grown to deplete the area of excess nutrients.

Section 8 contains similar prohibitions as section 7 with regard to manure composting, although via s. 8(2), it is noted that smaller agricultural operations (under 300 animal units) are exempt from the water quality protection regulations included in clause 8(1).a below:

8(1) No person shall compost livestock manure on the property of an agricultural operation unless

(a) the composting site is located at least 100 m from

(i) any surface watercourse, sinkhole, spring or well, and

(ii) the operation's boundaries;

(b) the manure is composted in a manner that does not cause pollution of surface water, groundwater or soil; and

(c) the composting facilities and process are acceptable to the director.

This marks the beginning of a number of exemptions for agricultural operators below the 300 animal unit threshold, which exist – ostensibly to reduce the economic impact of meeting the *Livestock Manure and Mortalities Management Regulation*, or perhaps a recognition of the fact that the environmental impacts of these operators are likely marginal and as such can be overlooked. This logic is confusing, given that a high number of smaller operators could well result in a significant environmental impact.

2.3.4.3 Water Quality Protection

Sections 11 and 12 contain some logical and basic regulations designed to encourage the protection of downstream water quality:

11(1) No person shall handle, use or dispose of livestock manure, or store livestock manure in an agricultural operation, in such a manner that it is discharged or otherwise released into surface water, a surface watercourse or groundwater.

11(2) An operator shall ensure that livestock manure that is handled, used, disposed of or stored in an agricultural operation is not discharged or otherwise released into surface water, a surface watercourse or groundwater.

12(1) No person shall apply livestock manure to land other than as fertilizer on land on which a crop

(a) is growing; or

(b) will be planted during the next growing season.

Section 12(1.3) is also very logical, recognizing the reality that class 6 and 7 agricultural lands are generally the steepest and most erodible lands which exist. These soils are typically quite marginal, as are most "unimproved organic soils" which are not already in production. However any agricultural operation which existed prior to the registering of this regulation is exempt from this provision via s. 12(1.7), unless Manitoba Conservation believes there are water quality risks associated with these operations. There are many instances where class 6 and 7 land is cropped in Manitoba, where manure applications would thus be permitted.

2.3.4.4 Manure Management Plans

Much of the value of the *Livestock Manure and Mortalities Management Regulation* results from the requirement for the completion of *Manure Management Plans*. Detailed requirements and the professional standards required for anyone preparing these plans are outlined in section 13. These plans provide Manitoba Conservation with extensive and useful information regarding the livestock operations of many agricultural producers in the province as follows:

13(1) No person shall store, handle or dispose of livestock manure, or apply livestock manure to land, except in accordance with a manure management plan registered with the director in accordance with subsection (4).

13(4) Before applying livestock manure to land as part of the fertilization program for a growing season, an operator shall submit a manure management plan for the growing season to the director for registration. The manure management plan shall be in a form approved by the director and shall contain or be accompanied by the information the director requires.

However, the detailed requirements associated with the preparation of a *Manure Management Plan* are not applicable for agricultural operators below the 300 animal unit threshold, as noted in section 13(3):

13(2) Subsection (1) does not apply to the operator of or a person employed in an agricultural

operation that has less than 300 animal units on the day subsection (7) comes into force unless

(a) the operation is expanded after that day and the expansion results in the number of animal units in the expanded operation being 300 or more; or

(b) the director

> *(i) believes that the storage or handling of livestock manure in the operation, or that the land application of livestock manure in the agricultural operation, would likely*
>
> > *(A) cause pollution of surface water, groundwater or soil, or*
> >
> > *(B) result in the livestock manure escaping from the boundary of the agricultural operation, and*
>
> *(ii) notifies the operator in writing that subsection (1) applies to the agricultural operation for the period specified in the notice.*

While Manitoba Conservation may well have concerns regarding the manure management practices of smaller livestock operators, the reality is that the ability to investigate these concerns is limited. Once again, smaller operators are exempt from an important provision of the regulation, with one result being a lack of data on manure spreading, land use, and associated risks to downstream water quality. It would seem logical for these management details to be collected from all livestock producers – via their *Manure Management Plans*.

Despite the known and significant nutrient runoff concerns associated with winter spreading of manure, at this point only the largest livestock operations (greater than 400 animal units) are prohibited from this management activity. Section 14(3.1) notes that this regulation will begin applying to operators above 300 animal units on November 10, 2010 – and to smaller operators in 2013, as noted in s. 14(3.2.).

2.4 The Drinking Water Safety Act and the Public Health Act

The Drinking Water Safety Act was given Royal Assent in 2002, but not proclaimed until 2004. Its main focus involved the creation of the Office of Drinking Water – with associated enforcement, inspection, ordering, and advisory powers regarding the operation of any public, semi-public, or private water supply systems (Manitoba Government Queen's Printer 2002).

The Act is seen to be fairly innovative in its establishment of the Office as a central coordinating body for most aspects of drinking water safety protection. It also recognizes the fact that drinking water protection has occurred under the auspices of the Public Health Act since 1965, with three powerful regulations related to drinking water registered in 1988 (Simpson 2006 153-154). While outlining the duties of "drinking water officers," the Drinking Water Protection Act also notes that "medical officers" have ultimate authority regarding public safety decisions related to water systems (s.11).

Section 28 of the Public Health Act outlines the many areas where the minister may make regulations, including those as follows (Manitoba Government Queen's Printer 1987):

> *(p) respecting the construction, maintenance, cleansing, and disinfection, of drains, sewerage systems, sewers, sewage treatment plants, sewage disposal plants, and the location, cleansing, and disinfection of water closets, cess pools, septic tanks, privies, and other methods of disposing of sewage and waste;*
>
> *(s) respecting the construction, maintenance, and purification, of water systems, and water supplies, including the testing and analysis of water therefrom, and the inspection and approval of sources of water supply; and*
>
> *(t) preventing the pollution or fouling of wells, underground waters, and springs, and the cutting and storing of ice;*

In 1988, the Water Works, Sewerage and Sewage Disposal Regulation (MR 331/88R), the Water Supplies Regulation (MR 330/88 R), and the Protection of Water Sources Regulation (MR 326/88 R) all came into force, and remain in force currently. These three Public Health regulations form much of the legislative authority within the Drinking Water Protection Act.

MR 331/88 R addresses public safety related to public water and sewer systems generally managed by "sanitary districts" and "water districts." These districts are typically comprised of Manitoba municipalities, which are ultimately responsible for their operations (s. 10). Several sections of MR 331/88 R also make direct references to related and additional requirements of district operators under the Environment Act (s. 7.1, 9, 10, 11).

MR 330/88 relates to the responsibilities of water suppliers and public water system operators who offer potable water for domestic consumption. It also contains provisions regarding the responsibilities of private well owners to prevent groundwater contamination, both during well construction, use, and upon abandonment (s. 6).

MR 326/88 R contains several very clear prohibitions against the contamination of various type of source water bodies as noted within s. 2, where for example:

> *2.1 No person shall deposit or discharge into, or on to the bank of any river, stream, lake, creek, spring, coulee, reservoir, pond, or dugout, or on the ice thereof, any manure, excreta, filth, or refuse of any nature, or permit the fouling of contamination of ice or water on any such body of water by the congregating or watering of stock at any water hole or place.*
>
> *2.2 No person shall commit any act that will or may contaminate any underground water supply by the discharge of any sewage, surface drainage, liquid waste, or filth into any well, abandoned well, hole, or other opening, and no person shall fill or replenish any existing well, except with water from an approved source satisfactory to the medical officer of health.*

A new version of the Public Health Act has received Royal Assent (Manitoba Government Queen's Printer 2006). The minister's power to make regulations relating to water will be slightly revised as follows (s. 112.1):

(z) respecting the construction, location, maintenance, cleaning and disinfection of drains, sewerage systems, sewers, sewage treatment plants, sewage disposal plants, privies and other wastewater management systems;

(aa) respecting the construction, provision, maintenance, operation and purification of potable water systems, and potable water supplies, including the testing and analysis of water and the inspection, approval and protection of sources of water supply;

(bb) respecting the pollution of wells, groundwater, surface water and springs, and the cutting and storing of ice;

2.5 Conservation Districts and Watershed Planning

Manitoba's intensive agricultural settlement pattern, based on the township and range system, necessitated a means by which to control the flow of water and remove it from farmland, much of which is inherently wet.

The Red River Valley in particular, while extremely productive agriculturally is also very flat, with only 71m of relief over its 507km distance as it drains north toward Lake Winnipeg (Krenz 1993). Settlement and development of this region, both in Manitoba and the US states of Minnesota and North Dakota, set the stage for massive agricultural expansion of this region – through drainage.

2.5.1 The Conservation Districts Act

The conservation districts program in Manitoba was originally mandated in the *Watershed Conservation District Act* of 1959. The rationale for the *Resource Conservation Districts Act* of 1970 – and the ultimate repealing of both acts in 1976 are unclear. This may well have been associated with the turbulent nature of Manitoba's legislative assembly during this period.

Seven general elections occurred between 1958 and 1977 – representing the scope of potential political influence on the two (watershed and resource-focused acts). General elections occurred in: 1958 (June 16), 1959 (May 14), 1962 (December 14), 1966 (June 23), 1969 (June 25), 1973 (June 23), and 1977 (October 11).

The current Manitoba Conservation Districts Act was passed in 1976, and is designed to create partnerships between the provincial government and rural municipalities. The districts are to implement programs that meet both local and provincial needs – with a focus on soil conservation and water management. The districts receive funding from both provincial and municipal sources, as discussed below.

Under the 1976 Act, the provincial cabinet can create CDs through an Order in Council. This may be done following an application from a municipality or municipalities, or it may

be initiated by the provincial government. According to section 7(7) of the current Act the Order in Council establishing the District must state (Manitoba Statutes 2007b):

(a) the boundaries of the district;

(b) where applicable the boundaries of sub-districts into which the district may be divided;

(c) the name of the district which shall be substantially in the words "The - - - - Conservation District";

(d) the works to be excluded from the jurisdiction, authority or control of the board;

(e) the co-ordinator;

(f) the schedule;

(g) the effective date of the formation of the district; and

(h) such other matters relating to the district as may be appropriate

In the legislation, the coordinator is defined as: *a civil servant designated by the minister for the purpose of coordinating all services and administrative assistance to CDs.* This is normally the manager of the province's Conservation Districts Program.

The legislation defines the schedule as:*an Order in Council setting out*

(i) the upper and lower limits of the amount of money that a board may annually assess an included municipality, and

(ii) the limitations of the borrowing powers of the board;

While some of the earliest CDs were established along watershed boundaries, the majority of those existing today are based upon municipal boundaries. Internally, each CD is divided into various "sub-districts," and these are intended to be as watershed-based as possible, so that planning and program delivery tends toward implementation at the watershed level. The effectiveness of this approach is debatable.

On the one hand, municipal boundaries make CD formation easier, which is important. However, a lack of watershed focus (even when conscious planning and delivery attempts are made at the sub-district level), raises the question of CD effectiveness in their attempts to address water-related challenges in a coordinated manner.

The formation of the earliest conservation districts (Whitemud, 1972; Turtle Mountain, 1973; Turtle River, 1974; Alonsa, 1978; and Cooks Creek, 1979) represent a mix of watershed-based and municipal boundary-based corporations which have experienced the greatest range of policy instrument rules and instrument delivery mechanisms associated with Manitoba's Conservation District Policy. In doing so, these five CDs have also forged the path for successive CDs to follow and learn from.

2.5.2 Conservation Districts Commission

It is critical to recognize the central and historical role played by the Conservation Districts Commission (CDC), an interdepartmental advisory body to the Minister. The CDC has been in place since the earliest CD-related legislation established it in 1959.

The CDC provides guidance on policy and financial matters, including recommending annual provincial budget contributions for each district and the program as a whole. This opportunity for the provision of key policy recommendations is very important, as it represents the only source of documented historical reference regarding many policy decisions for the CD program.

The need and importance of this function was recognized as early as 1959, has been strengthened over time, and remains in place to this day. In its initial form, the CDC was comprised of director-level representatives from rural-related provincial departments such as Natural Resources, Agriculture, and Highways. It was initially chaired by the director of water resources.

Today, the CDC is chaired by the deputy minister of Manitoba Water Stewardship and is comprised of deputy ministers from four additional departments (responsible for agriculture, conservation, intergovernmental affairs, and transportation. It includes representatives from the Association of Manitoba Municipalities, the Manitoba Conservation Districts Association, and a public appointee. Recent legislation has also been enacted to increase this public representation.

Through the advisory role played by the Conservation Districts Commission (CDC), the government controls the financial and administrative capacity of CDs. The CDC also provides policy guidance to all CDs, through a series of *Policy Directives* approved by the minister of Manitoba Water Stewardship and coordinated by the CD program secretariat with staff support.

However, its potential to play a central and long-term planning role for the CD program appears to have been underutilized in recent years, although this may prove to be extremely valuable in the future. The CDC is one of the few existing opportunities for effective interdepartmental planning and cooperation among Manitoba government departments which have responsibilities related to sustainability and natural resources management.

2.5.3 Range of Programs

By 1990, a flexible suite of CD programs had developed – with each CD delivering several activities in common with other districts in the program, and typically one or two programs somewhat unique to their own district. All CD budgets and a detailed list of planned program activities are reviewed annually – for ministerial recommendation – by the Conservation Districts Commission.

The older, watershed-based CDs have always devoted a significant portion of their annual budgets to drain maintenance and road crossing activities, notably Whitemud and Turtle River. Due to the nature of its low-lying landscape and dominance of agriculture in the area, Cooks Creek formed largely on the basis of drainage need. Alonsa assumed a degree of drain maintenance and crossing responsibilities through several agreements with the provincial water resources branch. Turtle Mountain does not have provincial drainage responsibilities given its initial formation as a *Resource Conservation District.*

Pembina Valley and all subsequent CDs were established without responsibility or authorities associated with the provincial drainage system. Beyond the complexities of drainage and water management, the range of CD programming by 1990 included the following (not all programs offered by all CDs):

Soil and Water Conservation	Wildlife and Habitat Programs	Education Programs
Creek/Gully Stabilization	Conservation Program	Conservation In Schools
Creek Maintenance	Fisheries Enhancement	Conservation Family Award
Grassed Waterway Seeding	Habitat Acquisition	Youth speaking events
Road Allowance Seeding	Land Donations	
Rotational Grazing Mgmt.	Tree planting/Shelterbelts	
Stone Crossing Installation	Agro-Forestry	
Water Quality Testing		

With the availability of additional program funding for new district formation, several new CDs were created during the 1990s (West Souris River, 1995; Upper Assiniboine, 1996; Intermountain, 1997; Little Saskatchewan, 1999; and Kelsey, 1999). Several of these new CDs formed in concert with the termination of a major federal/provincial agreement on agricultural sustainability – which saw ongoing program and technical staffing support provided to local farming associations interesting in demonstrating sustainability options.

During the 1990s, the Manitoba Conservation Districts Association became more formalized, better funded, and more professional – towards playing an increasingly credible role in representing all CDs in a unified manner in discussions with government and other stakeholders. Major improvements in annual conference attendance, sponsorship funding, communications, and policy/initiative negations occurred, evidenced by the drafting of favourable conservation agreement legislation and the negotiation of a GIS program royalty arrangement with a private software firm and the provincial government.

None of these newer CDs were interested in assuming any significant drainage or road crossing responsibilities, opting for more of an agricultural sustainability focus – stemming largely from their origins as previous local farm associations. By 2001, a variety of new CD programs included the following: many of these initiatives were gradually adopted by all other CDs in the program and Alonsa has initiated innovative working relationships with local First Nation communities (primarily through sacred site identification/interpretation:

Soil and Water Conservation	Wildlife and Habitat Programs	Education Programs
Small Scale Water Storage	Conservation Agreements	Interpretive Sites Program
Abandoned Well Sealing	Riparian Stewardship	Adult Education Workshops
Remote Cattle Watering	Ecotourism	Holistic Pasture Management
Salinity Seed Program		Check Strip Crop Demos.

Continued strong provincial promotion and support for the CD program – combined with a lack of substantial funding alternatives for both local farm associations and municipal councils saw continued program expansion into the new millennium (Lake of the Prairies, 2001; Tiger Hills, 2001; Seine-Rat River, 2001; Mid-Assiniboine, 2002; La Salle Redboine, 2002; East Interlake, 2005; and Swan Lake, 2006.

However, some of these latest additions to the CD program (and indeed some CDs created during the late 1990s) appear to be having difficulty focusing on an ideal mix of local programs of interest to local landowners and local municipalities. Several have experienced high staff turnover and few have developed management plans to guide their operations.

Also, several of these later generation CDs were established by a relatively small group of rural municipalities (and in two cases without the participation of logical adjacent municipalities). Merger discussions are being considered in at least one case. Most of the later generation CDs have included many towns and villages among their partners – building important urban/community connections and raising valuable additional operations revenue.

2.5.4 Performance Measurement

The CD program is does not contain significant provisions for scientific monitoring and progress evaluation. Annual reporting for the overall program is largely a factual outline of activities occurring within each CD, accompanied by an audited financial statement. While CD boards report both formally (at an annual general meeting) and informally through regular contact with local stakeholders (often done through the publication of meeting minutes in local newspapers), there is no specific performance measurement framework on which to defensibly evaluate and improve the Manitoba CD program.

Budget-based financial reporting and annual program review does occur though the Conservation Districts Commission and additional pre-budget consultations with several CD program partners, while the program is subject to annual review by the provincial legislature.

However, there are gaps in linking annual CD programs to long-term management plan goals based on locally identified needs combined with provincial policy objectives. Using progress indicators to monitor annual progress would provide an important feedback

mechanism for adapting to changing conditions over time. This step could occur at both the provincial level (is the program fulfilling its goals?), and at the individual CD level (is the CD implementing its plans and fulfilling its goals?).

A suite of scientific indicators related to watershed health should also be developed – for province-wide application. Such as system would provide clear direction to guide CD management responses to observed indicator trends.

2.5.5 Interrelated Challenges of Drainage and Conservation

In several cases, the Manitoba CD program is designed to facilitate land drainage in response to local agricultural needs, and/or in place of municipal and provincial land drainage responsibilities. From a sustainable development viewpoint, drainage can be problematic – allowing rapid run off rather than a slower pace which allows for more infiltration of surface water into the ground. In more steeply sloped areas, this can result in a higher risk of flooding and infrastructure losses downstream. Increased streambank erosion and sedimentation can also result, increasing downstream drain maintenance costs.

However, agricultural drainage is a fundamental economic reality in much of the province, particularly in its relatively flat Red River Valley, as well as in many other southern areas where highly productive soils are inherently wet.

Unfortunately, substantial wetland drainage and loss has also occurred in Manitoba, and Manitoba CDs have been relatively powerless to stop it – a dichotomous and difficult challenge to reconcile when CDs may have both drainage and conservation responsibilities. In addition to associated wildlife habitat and biodiversity losses, wetland drainage reduces natural water retention/flood control capabilities and eliminates an impressive range of water quality services provided by these ecosystems.

Increased rates of drainage (while desirable from an agricultural production perspective) also tend to increase the flow of pollutants and nutrients – mainly from agricultural runoff – into downstream rivers and lakes. This is especially a problem for Lake Winnipeg, which is heavily stressed due to nutrient loads from many sources.

Much of Manitoba's landscape is inherently wet, including its productive southern agricultural soils. Consequently, water management challenges have existed in Manitoba since the province's agricultural settlement period. In response to the needs and demands of Manitoba's rapidly increasing population of rural agricultural families, provincial-municipal agricultural drainage schemes were a major focus from 1895 to 1935, during which two million acres of prime agricultural land were supported with infrastructure through the creation of "drainage districts." Subsequent additional peaks of activity occurred into the 1970s, largely with federal government support.

While increased agricultural drainage made more land viable for annual crop production, according to Ogrodnik (1984), a number of long-standing and recurring drainage-related concerns routinely influenced local politics and provincial policy. These remain relevant today and include:

1) "Foreign water" (water flowing into other areas from upstream) has regularly plagued the owners of lowland agricultural areas and the downstream rural municipalities who govern these lands;

2) Strong perceptions exist that foreign water problems occur and become worse because of upland drainage, land use changes (including clearing of forested lands), and road construction; and

3) Suggestions are regularly made that owners of upstream land (and rural municipalities pay a portion of lowland water management costs.

Predictably, these concerns are more prevalent during and following periods of relatively wet growing seasons. They are prevalent in current public policy debates, particularly following record rains received in Manitoba, and across the Canadian Prairies, during the peak growing period of 2005. Increased technological efficiency has also made new on-farm drainage easier to undertake, often at lower cost than earlier methods.

In attempting to understand and address emerging "foreign water" problems associated with increased agricultural drainage, the Province of Manitoba conducted several intense investigations, beginning in 1918. As reported by Ogrodnik (1984), these commissions of inquiry gradually assisted in defining and clarifying Manitoba's surface water management challenge – eventually leading to formulation of Manitoba's Conservation District Policy and Act in 1976. A summary of these commissions' findings and other interrelated policy trends to the present-day is provided in Chart 2-1.

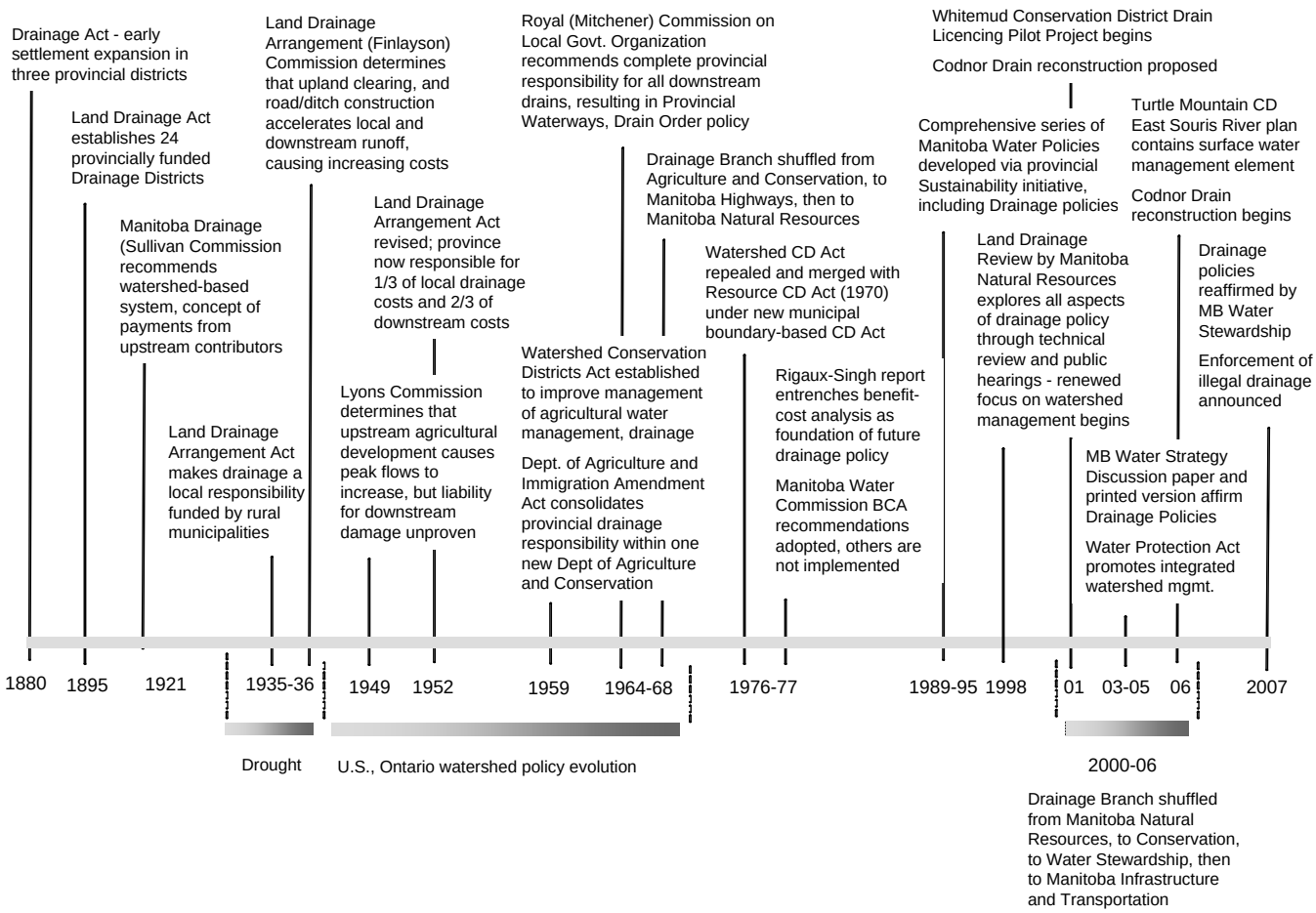


Chart 2-1: Manitoba Drainage Policy Timeline

The Manitoba Watershed Conservation Districts Act of 1959 is particularly interesting and relevant. It appears this act may have represented the vanguard of public water management policy at the time (recognizing the importance of watershed-based solutions). However, it was repealed in 1976.

In fact, Manitoba's watershed focus for resource management began to dissipate as early as 1970, with the passage of the *Resource Conservation Districts Act.* Early CDs were formed under both forms of legislation: Whitemud and Turtle River were formed under the 1959 watershed-based legislation, while Turtle Mountain was formed under the 1970 resource legislation. Both early acts were repealed and merged into the current version, in 1976.

Ontario's conservation authority legislation (which is watershed-based) was enacted in 1946, enabling the eventual formation of 36 local corporations which today spend $158 million annually on watershed management solutions through a local-provincial cost-shared partnership (Conservation Ontario 2006). Their role and budgetary importance has increased dramatically in response to the Walkerton Inquiry recommendations as key policy delivery agents for the province.

A decade earlier, the U.S. Flood Control Act was passed by Congress in 1936, signalling clear federal responsibility for water resources management (Allee 1987). Based on the apparent multi-purpose success of the Tennessee Valley Authority, federal support would be provided for watershed-based projects for which "the benefits to whomsoever they accrue are in excess of estimated costs," marking the beginning of watershed evaluation (Galloway 1987).

Allee (1987) points to the early management concepts advanced by Gilbert F. White (1957) as the first "pure doctrine" of integrated watershed planning, management, and development – citing three ideas (multi-purpose storage projects, basin-wide programming, and comprehensive regional development) and two concepts (articulated land & water programs and unified administration) which characterize an effective watershed approach.

By the early 1960s, scientists recognized "the watershed" as a sensible framework within which to address interrelated problems such as water quality and contamination. The approach of "taking the whole watershed into account" emerged as an efficient and practical means of tackling these issues with the support of science. In tracing this evolution, Heindl (1972) notes two pervasive concepts founding the discipline:

1) The watershed is a closed system which integrates the physical forces which act upon it; and

2) The knowledge and experience gained through the study of one watershed is transferable and thus, may be applied extensively elsewhere (and concentrated, small basin study is applicable to larger ones).

Manitoba's 1959 watershed-based CD legislation was drafted following earlier legislative experiences in Ontario and the United States, at the dawn of the emergence of a new scientific discipline focused on watershed planning and management solutions. Manitoba had a timely opportunity to learn from these leading policy and scientific trends – and lead with new innovations. Unfortunately, the early opportunity was lost.

2.5.6 The Current Status of IWRM in Manitoba

In 2005, the International Institute for Sustainable Development (IISD) conducted an extensive policy review of the Prairie Water Region. *Prairie Water Strategies: Innovations and Challenges in Strategic and Coordinated Action at the Provincial Level* (Swanson 2005) utilized an analytical framework based on the IWRM Management Cycle developed by the Global Water Partnership (GWP), which articulated Integrated Water Resources Management (IWRM) as:

> *"a process which promotes the co-ordinated development and management of water, land and related resources in order to maximize the resultant economic, social welfare in an equitable manner without compromising the sustainability of vital ecosystems"* (Jønch-Clausen 2004)

Watershed planning initiatives are now underway in several conservation districts, notably in the Pembina Valley, Turtle Mountain, and West Souris River Conservation Districts. IISD has been monitoring these plans as they evolve, and has conducted a detailed review of the IWRM plan prepared by the Turtle Mountain CD.

By analyzing the plans of leading watershed institutions – as the most tangible and structured evidence of provincial water policy in application, important clues regarding each province's IWRM progress can be elucidated. To study strategic and coordinated action for water resources at a provincial level, IISD has been utilizing a simplified version of the GWP IWRM cycle articulated by Jønch-Clausen (2004) as illustrated in Figure 2-3. Included are:

Leadership (e.g., commitment through a strategy, focus through articulated goals and objectives);

Planning (e.g., departmental structure, inter-departmental planning, commitment to watershed planning and management) and ***Multi-level Coordination and Participation*** (e.g., coordination within a strategy process and among jurisdictions, and engagement of key stakeholders throughout the strategy process); and

Implementation (e.g., responsibility, financing and leveraging a mix of policy instruments);

Monitoring, Evaluation and Improvement (e.g., indicator monitoring, formal and informal evaluation and improvement processes)***.***

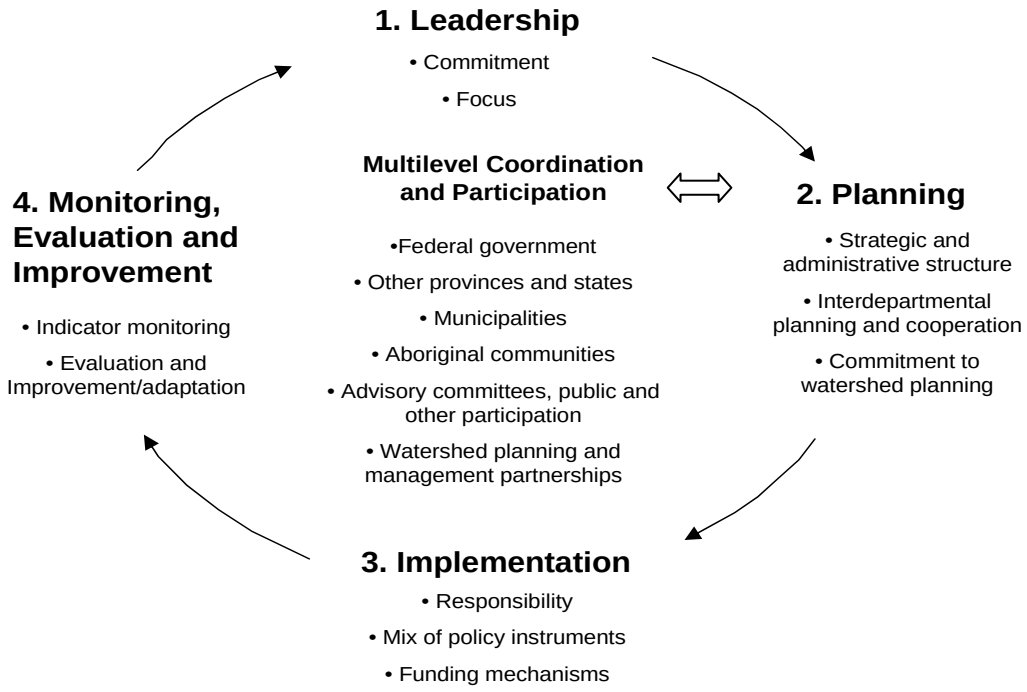


Figure 2-3: Prairie IWRM analytical framework
Source: Swanson 2005

2.5.6.1 IWRM in Manitoba: East Souris River Watershed

The Turtle Mountain Conservation District (TMCD 2006) began initial plans toward its Integrated Watershed Plan in 2002. The TMCD Board invited a variety of local stakeholders to participate in the process, and this group evolved into a Watershed Planning Advisory Team (WPAT). The *East Souris River (ESR) Integrated Watershed Plan* was finalized and adopted by Manitoba Water Stewardship as the province's first official IWRM plan in 2006.

Use of the Watershed Planning Advisory Team (WPAT) model, involving the provision of technical support from several provincial departments and other agencies – in addition to a coordinating group from the conservation district – appears to now be the standard format for IWRM planning in Manitoba. Based on a detailed analysis of the ESR plan, a draft overview of IWRM progress in Manitoba is provided in Table 2-1.

2.5.6.2 Conclusions

The ongoing debate over agricultural drainage at all levels (on-farm, locally, and regarding provincial drains), is indicative of serious problems with the decision-making framework for surface water management. While the CD program itself was originally intended to directly address Manitoba's drainage challenge, it has effectively become another forum for discussion, demonstration, and awareness in the search for coordinated, watershed-based landscape and community solutions related to agriculture and natural resources.

Manitoba's CDs are caught in the drainage struggle between farmers, rural municipalities, and the province. In responding to the surface water management dilemma, some CDs are attempting to find workable approaches to managing surface water – by outlining clear plans and relative responsibilities for all drainage stakeholders. However, with a lack of resources and clear decision-making responsibilities (among all stakeholders), expectations that a solution will emerge anytime soon must be considered ambitious if not unrealistic.

The fact that most CDs are not formally or legally defined on watershed boundaries leads to several management problems. The "functional area" on which most CDs are administratively designed is not consistent with the natural systems the CDs are trying to manage effectively. Most CDs do not have authority over all of the contributing headwater areas – or all collecting waterways downstream. As a result, many more stakeholders than necessary must be engaged for any surface water management plan to be effective, and this consumes valuable time and precious resources.

When the 1959 watershed-based version of the CD Act was repealed– in favour of a municipal boundary-based framework – the stage was set for a continued struggle over all aspects of land drainage in Manitoba, a struggle which continues today.

Manitoba's CDs are now being expected to play a central role in addressing the challenge of declining water quality in Lake Winnipeg (Manitoba Government 2007). This challenge was not foreseen as a CD responsibility during initial program design. At this point, Manitoba's CDs are not adequately prepared to meet this challenge.

There is a need for substantial reallocation of existing human, technical, and financial resources – resources which abundantly exist through the ongoing work of numerous provincial government departments and programs. These existing efforts and initiatives are focused on a myriad of activities which may be easily demonstrated as highly relevant and related to the logical governance, implementation, and performance measurement objectives of an ideal IWRM framework for Manitoba.

Dealing with Lake Winnipeg's water quality will face the same challenges as surface water management: a lack of clear decision-making authority among several stakeholders; a lack of resources at all levels; and the fact that most CDs do not function within complete watershed boundaries. In terms of the Lake Winnipeg challenge, a lack of coordinated planning and management throughout its huge watershed (across multiple and complex political jurisdictions) is also recognized as a critical influencing and limiting factor.

There have been at least eight major reviews of Manitoba drainage policy since the agricultural settlement period. Through decades of study and several Provincially appointed commissions, various aspects of the watershed management challenge have gradually became more clearly defined.

The roots of these complications and problems are found in the establishment of a system which, from 1895 to 1935, brought about the drainage of two million acres of natural inherently wet but extremely fertile land for agricultural development – without an effective long-term plan for surface water management or water quality protection.

While the current CD Act enables and encourages local decision-making in support of soil and water conservation, the ultimate authority for surface water drainage largely lies with the Province of Manitoba, as does the challenge of Lake Winnipeg water quality. However, the support of other partners – including the federal government, municipalities, and individual landowners and other citizens will be required – if measurable progress is to be achieved.

Table: 2-1: Overview of IWRM Progress in Manitoba: East Souris River Watershed Plan

	Leadership	Planning, Coordination, and Participation		Implementation	Monitoring, Evaluation, and Improvement
		Provincial Planning	**Multi-level Coordination and Participation**		
Manitoba East Souris River Watershed	Strong local leadership has propelled the ESR plan, including strong local commitment to key guiding principles as a foundation for the plan. The provincial WPAT process was not in place before the TMCD initiated IWRM efforts; the WPAT model evolved with this first plan. Broad, locally-driven goals are supported with specific objectives, target areas, timelines, and budgets. Less priority is placed on federal-provincial policy or other NGO and private funding priorities vs. local needs; this may represent a funding challenge in terms of plan implementation. ESR is the first and only IWRM plan to be adopted by MB Water Stewardship. Some important SD areas not addressed (i.e. climate change, economic, social).	The ESR plan contained strong departmental participation on the WPAT, with coordination assistance from DUC. While a secretariat exists to support the development of new conservation districts in Manitoba (which are central to IWRM planning), there are limitations on its ability to support CDs in their watershed planning processes or to coordinate WPAT participation and/or intergovernmental roles. Manitoba departments of Finance and Health were not involved in the ESR plan. The Manitoba Conservation Districts Commission (an interdepartmental body), could and should play a larger role in providing IWRM direction. The CD program provides a solid foundation for IWRM planning, but most CDs are not watershed-based at this time. There is little provincial support for alternatives to the CD-led model, although legislation permits this – a lost opportunity for experimentation and new forms of knowledge generation.	Only the municipal-based CD program is recognized by the province for the development of IWRM plans via Watershed Planning Adv. Teams (WPATs), although other groups do exist. Ideal federal IWRM support roles are not clear, although some departments (AAFC, EC, FOC) have major funding, monitoring, and/or regulatory impacts. Significant portions of the ESR watershed are located in other jurisdictions (ND and possibly SK), although these jurisdictions did not participate in the plan. Manitoba's CD program ensures strong municipal participation in IRWM initiatives, but RMs can dominate the process and may not demographically represent the watershed community as a whole. The lack of industry participation suggests the ESR plan may be quite limited in its scope in terms of sustainable development. Aboriginal participation was non-existent, suggesting the magnitude of this IWRM challenge. There is a need to engage more women/youth in IWRM plans.	Effective IWRM requires the coordinated and focused actions of a large number of landowning residents within a watershed/subwatershed. This is a new role for the conservation districts. ESR target areas include specific subwatersheds or headwater regions, but no structured means to focus or facilitate and/or fund this participation and progress. Clear responsibilities are outlined for WPAT members, but firm commitment levels or pledges are not defined. There is a balanced mix of instruments in the ESR plan, containing a strong focus on economic incentives, including EG&S payments – outlined within three plan objectives. Various stages of budget readiness exist to implement the plan, while funding costly incentive programs will be a challenge. There is a need to develop innovative mechanisms for financing the IWRM plans.	A coordinated data collection and analysis system to establish baseline planning conditions and monitor watershed management progress has also been identified as a critical requirement for Manitoba CDs. All ESR plan objectives include general monitoring and evaluation plans, but budgets do not exist. Annual and Five Year Watershed Reports are planned for the ESR with a focus on water quality. MB Water Stewardship has yet to develop its State of Watershed framework or protocols, and there is a lack of monitoring infrastructure. The ESR plan is to be reviewed every five years, with some "watershed health" performance indicators to be developed. There may be accuracy and quality-control concerns with locally collected data.

2.6 A Watershed Planning/Performance Model from Saskatchewan

The Saskatchewan Watershed Authority (SWA) is primarily responsible for the management of Saskatchewan's water resources, while the Saskatchewan Environment department coordinates the *Safe Drinking Water Strategy* and serves as a regulator and standards setting agency. The SWA reports to the Minister of Saskatchewan Environment and comprises an Operations division responsible for management of surface and groundwater, and a Stewardship division that provides watershed monitoring/assessment services and watershed/aquifer planning support to communities.

SWA-initiated watershed management plans take the form of Source Water Protection Plans. The Source Water Protection Plan for the Lower Souris River (LSR) was the first of its kind, and was released in March 2006 (SWA 2007). This plan and affiliated documents, including an action plan for the Lower Souris by the Lower Souris Watershed Committee (LSWC 2007) and the State of the Watershed Report from March 2007 are analyzed for the purposes of this research.

The SWA (Stewardship Division) was largely responsible for the watershed plans and the watershed committees that made the LSR plan possible. Significant provincial funding initiated the watershed plans and their implementation. Additionally, The Safe Drinking Water Strategy (SDWS) is one of the province's first *Key Cross-Government Strategies* developed under Saskatchewan's *Interdepartmental Planning Guidelines*, part of a government-wide "managing-for-results" initiative.

Six provincial government departments participated in developing the LSR plan, including those relating to environment, agriculture, industry, health, government relations, and the SWA. Key Cross-Government Strategies are deemed to have province-wide importance, "transcending the mandate of any one department and necessitating a collaborative effort among two or more departments and/or agencies to achieve more meaningful results." Saskatchewan's Interdepartmental Planning Guidelines apply to interdepartmental initiatives that are "strategic, collaborative, and directly related to government priorities" (Saskatchewan Finance 2007)

Saskatchewan released its State of the Watershed Reporting Framework in January 2006 and subsequently its first State of the Watershed Report Card in March 2007. This report card uses indicators to assess the current health of Saskatchewan's watersheds, provide information about human activities that impact the environment within watersheds, and evaluate the effectiveness of the management activities. The indicators include "condition indicators such as water quality and quantity based indicators, riparian buffer indicators, "stressor indicators" including human populations, roads, water use and water allocation, and "response indicators" including water conservation and water education based indicators. Monitoring and management of water quality and water quantity are also included in the response indicators.

Annual reporting processes via Saskatchewan Finance Department accountability frameworks is advanced. Evaluation processes are in place in Saskatchewan via a steering committee for the Safe Drinking Water Strategy, which is comprised of deputy ministers, is responsible for the annual review of the strategy. While Saskatchewan has released its first State of the Watershed Report Card in recent months (March 2007), follow-up management actions on regions identified as stressed or impaired on the basis of these indicators is yet unclear, although the challenge to local watershed organizations is clearly implied.

3 Review of Provincial Planning Legislation

3.1 The Planning Act

The *Planning Act* has undergone a number of significant revisions since its first adoption in Manitoba (1916). It is a very substantial and significant piece of legislation, which governs local decision-making throughout the province. Manitoba's Rural Municipalities have utilized its provisions extensively since the 1950s (Manitoba Intergovernmental Affairs 2007)

3.1.1 Provincial Land Use Policies

Part 2 refers to *Manitoba Provincial Land Use Policies* which may be established by regulation "to guide sustainable land use and development in the province" (Manitoba Statutes 2005). These policies serve as much of the foundation for the *Planning Act* and are articulated in detail within the *Provincial Land Use Policies Regulation* (MR 184/94, along with amendment MR 193/05 (Manitoba Statutes 1994).While they are basically "planning guidelines," these policies set the tone for the development decisions made by local authorities throughout the province, and several have significant implications for water quality, water quantity, resources management, and agriculture.

Of note are policies 2, 4, and 7 which have direct linkages to the management of agricultural watersheds. Policy 2-Agriculture has the following objectives (Manitoba Statutes 1994):

1. to maintain a viable base of agricultural lands for present and future food production and agricultural diversification;

2. to protect agricultural operations from encroachment by other land uses that may adversely affect the ability of a producer to efficiently manage, expand or diversify an operation;

3. to foster the use of land that is consistent with the Principles and Guidelines of Sustainable Development and encourages the sustainable use of the resource base for agricultural production.

In terms of policy application, a number of additional planning guidelines are also included within the regulation. One of these is in fact now a requirement – that all local authorities must incorporate a "Livestock Operation Policy" into their development plans by 1 January 2008. As noted in Policy 2-Agriculture (s.6), a Livestock Operation Policy is to account for:

(a) soils;

(b) the size of a livestock operation, based on the number of animal units in the

operation;

(c) proximity to significant surface water bodies, such as lakes, rivers and wetlands;

(d) flood risk areas identified by the province;

(e) groundwater vulnerability areas identified by the province;

(f) proximity to areas designated in the development plan as

(i) urban centres or settlement centres,

(ii) rural residential or seasonal residential areas, and

(iii) parks or recreational areas; and

(g) existing land uses in the area.

Policy 4-Water and Shoreland seeks to (Manitoba Statutes 1994):

1. to maintain and manage land and water resources to meet important needs including: the domestic water supply, recreation, tourism, flood and erosion protection, bank stability, water table retention, waste assimilation, irrigation, hydro-electric power generation, heritage resource preservation, and to ensure the viability of critical flora and fauna habitat; and

2. to support use, development of, and access to the province's waterways, water bodies and shoreland where appropriate.

This policy also provides extensive policy application guidance regarding the means by which water and shoreland areas may be protected through sound development planning:

1. Land should be developed in a manner which ensures that waterways, water bodies

groundwater and shoreland having environmental, economic, recreational, fishery or cultural significance are sustained.

2. Waterways, water bodies, shoreland and groundwater requiring protection shall be identified. The type and extent of protection afforded to the waterway, water body, shoreland or groundwater will depend upon local circumstances including the size and configuration of the water body, waterway, shoreland or groundwater, the need for public access, environmental characteristics, and economic potential.

3. Shoreland reserves or parks may be created by local authorities or the Province to protect shoreland, waterways and water bodies. Where appropriate, public acquisition may occur by direct purchase, dedication through the subdivision approval process, easement or lease. The amount of land acquired and the provision of access to the shoreland, waterway or water body shall be designed to suit the local situation.

4. Development shall occur in a manner which sustains the yield and quality of water from significant aquifers.

5. Ground water pollution hazard areas identified by the Province should be taken into account in land use plans at the provincial and local levels. Provisions required to safeguard such areas should be applied through these plans in respect of land uses and structures such as wells, commercial chemical or fertilizer storage facilities, septic systems, fuel tanks, waste disposal grounds, lagoons that store or treat substances that are potential pollutants, and other uses or structures that could potentially pollute groundwater.

Policy 7-Flooding and Erosion recognizes the interconnected nature of land use and downstream water management while also attempting to (Manitoba Statutes 1994):

1. to minimize property damage and public expenditures for flood relief or protection;

2. to enhance sustainability by managing development in order to minimize personal hardship and inconvenience, adverse effects on property and danger to public health and safety due to flooding and erosion;

3. to restrict development or land use that would accelerate or promote environmental damage arising from causes such as erosion or bank instability;

4. to maintain the natural capability of waterways to convey flood flows; and

5. to restrict development or land use that could reduce the benefits derived from existing flood control works.

The following flooding and erosion policy application measures are also outlined:

(a) development shall not adversely alter, obstruct or increase water flow, flow velocities or flood levels. Development should be allowed only if the cumulative effect of all foreseeable development in the flood prone area is within water flow, flow velocity, or flood level limits that may be specified in regulations or by-laws for the area;

(b) there shall be no added risk to life, health, or safety;

(c) all structures and services shall be protected against damage and shall be functional under hazardous conditions;

(d) activities such as dumping, excavation and clearing, which accelerate or promote damage due to causes such as erosion or bank instability, shall be prohibited; and

(e) natural tree and vegetative cover shall be preserved to reduce erosion and assist in maintaining bank stability.

It is interesting to note that at least three *Provincial Land Use Policies*, relating to Agriculture, Water and Shoreland, and Flooding and Erosion have direct and clear relationships to rural land use and the hydrologic functions and impacts of flowing water within a natural drainage system. It is equally significant to note the strong connections to these policies – within numerous provisions contained within the *Water Protection Act* and the *Conservation Districts Act*.

3.1.2 Planning Districts and Individual Municipalities

Part 3 of the Act outlines the roles of *Planning Authorities*, which may be either: 1) an individual municipality, 2) a planning district, or 3) a planning commission. Prior to the 1970s, most rural municipalities considered proposed livestock operations within their boundaries as "conditional uses," a term which has remained in use today – even with the evolution of the *Planning Act* in Manitoba – which has moved toward the use of *Development Plans* and *Zoning By-laws* since major revisions to the *Planning Act* in 1976 (Manitoba Intergovernmental Affairs 2007).

Since 1976, Manitoba's Rural Municipalities have been encouraged to form *Planning Districts* in accordance with the Act (Manitoba Statutes 2005, s.14-30).

14 When a planning district is established, its board is responsible for:

(a) the adoption, administration and enforcement of the development plan by-law for the entire district;

(b) the administration and enforcement of

(i) the zoning by-laws of its member municipalities, or the district's own zoning by-law if it has adopted a district-wide zoning by-law under section 69,

(ii) any secondary plan by-law in force in the district,

(iii) the building by-laws of its member municipalities, and

(iv) the by-laws of its member municipalities dealing with minimum standards of maintenance and occupancy of buildings.

In the absence of a planning district, individual municipalities are responsible for the "adoption, administration, and enforcement of the development plan by-law, zoning by-law, and all other by-laws respecting land use and development for the municipality." Another type of planning authority (a planning commission) may be formed by planning districts or individual municipalities to help address issues related to zoning variances and conditional use applications (s. 33)

3.1.3 Development Plans and Livestock Operation Policies

Either a planning district (or a municipality, if not a member of a planning district) must prepare a development plan to govern future land use decisions within its boundaries. Effective 1 January 2008, this plan must also contain a Livestock Operation Policy. The basic details of these requirements are outlined below. The development plan is adopted by by-law.

42(1) A development plan must

> *(a) set out the plans and policies of the planning district or municipality respecting its purposes and its physical, social, environmental and economic objectives;*
>
> *(b) through maps and statements of objectives, direct sustainable land use and development in the planning district or municipality;*
>
> *(c) set out measures for implementing the plan; and*
>
> *(d) include such other matters as the minister or the board or council considers advisable.*

42(2) The development plan must include a livestock operation policy that guides zoning by-laws dealing with livestock operations by

> *(a) dividing the planning district or municipality into one or more areas designated as follows:*
>
> > *(i) areas where the expansion or development of livestock operations of any size may be allowed,*
> >
> > *(ii) areas where the expansion or development of livestock operations involving a specified maximum number of animal units may be allowed,*
> >
> > *(iii) areas where the expansion or development of livestock operations will not be allowed; and*
>
> *(b) setting out the general standards to be followed in the planning district or municipality respecting the siting and setback of livestock operations.*

Also of note is the following section – in which a planning district or municipal council must consider relevant aspects of the *Water Protection Act* in the preparation of a development plan. However, it is equally interesting to note the guidance provided by s. 191 below.

62.1 When preparing a development plan or amending or re-enacting a development plan by-law, a board or council must consider the application of the following insofar as they relate to land within the planning district or municipality:

> *(a) any regulation made under section 4 of The Water Protection Act governing, regulating or prohibiting any use, activity or thing in a water quality management zone designated under that Act;*
>
> *(b) any watershed management plan approved under The Water Protection Act.*

191 Where there is a conflict between a provision of this Act and a provision of The Conservation Districts Act, the provision of this Act prevails.

To date, all watershed management plans formally initiated under the auspices of the *Water Protection Act* have been coordinated by Manitoba's Conservation Districts, as local *Water Planning Authorities* approved by the Minister of Water Stewardship. It is logical that a development should incorporate relevant aspects of a watershed management plan, but the fact that the *Planning Act* so clearly overrides the *Water Protection Act* should be of significant concern.

3.1.4 Conditional Use Decisions and Technical Review Committees

A "conditional use" is defined as "a use of land or a building that may be permitted under a zoning by-law (Manitoba Statutes 2005). Part 7 of the Planning Act outlines the requirements and general process for the review and/or approval of conditional uses by planning districts or municipalities.

For livestock operations under 300 animal units, a planning district or municipality cannot reject a development proposal, but as per s. 107(1), can only place conditions related to:

> *(a) measures to ensure conformity with the applicable provisions of the development plan by-law, the zoning by-law and any secondary plan by-law;*
>
> *(b) one or both of the following measures intended to reduce odours from the livestock operation:*
>
> > *(i) requiring covers on manure storage facilities,*
> >
> > *(ii) requiring shelter belts to be established;*
>
> *(c) requiring the owner of the affected property to enter into a development agreement dealing with the affected property and any contiguous land owned or leased by the owner, on one or more of the following matters:*
>
> > *(i) the timing of construction of any proposed building,*
> >
> > *(ii) the control of traffic,*
> >
> > *(iii) the construction or maintenance — at the owner's expense or partly at the owner's expense — of roads, traffic control devices, fencing, landscaping, shelter belts or site drainage works required to service the livestock operation,*
> >
> > *(iv) the payment of a sum of money to the planning district or municipality to be used to construct anything mentioned in subclause (iii).*

As denoted in s. 107(2), a planning district or municipality cannot place any conditions "respecting the storage, application, transport, or use of manure from a livestock operation described in 107(1), other than a condition permitted under clause (1)(b)."

Larger livestock operations (above 300 animal units) are dealt with via a separate process, typically involving consideration of a development proposal by a *Technical Review Committee* comprised of several applicable departmental representatives. As per s. 113(4), this committee provides a report with recommendations regarding the development application. The report is public and is provided as advice to the planning district or municipality (or planning commission) in advance of a public hearing to review the proposal.

116(1) After holding the hearing, the board, council or planning commission must make an order

(a) rejecting the application; or

(b) approving the application if

(i) the Technical Review Committee has determined, based on the available information, that the proposed operation will not create a risk to health, safety or the environment, or that any risk can be minimized through the use of appropriate practices, measures and safeguards, and

(ii) the proposed operation

(A) will be compatible with the general nature of the surrounding area,

(B) will not be detrimental to the health or general welfare of people living or working in the surrounding area, or negatively affect other properties or potential development in the surrounding area, and

(C) is generally consistent with the applicable provisions of the development plan by-law, the zoning by-law and any secondary plan by-law.

The planning authority is again limited on the conditions it can impose if it chooses to approve the application. These include measures outlined in s. 116(2) related to development plan consistency, implementing Technical Review Committee (TRC) recommendations, and odour reduction efforts (manure storage covers and/or shelter belt planting). Section 116(3) again notes that the planning authority cannot include conditions related to manure storage, application, transport, or use.

Typically the TRC has included departmental staff from Manitoba Agriculture, Food and Rural Initiatives, Manitoba Intergovernmental Affairs and Trade, Manitoba Water Stewardship, and Manitoba Conservation. Despite some expectations to the contrary, the TRC process was not designed to serve as an environmental assessment. It is a general overview of the livestock development proposal and a cursory technical assessment of the project's potential impacts, along with recommendations on these can possibly be mitigated (Manitoba Intergovernmental Affairs 2007, Province of Manitoba 2006).

If a planning district or municipality decides to approve a livestock operation development, a number of provincial permits are required before the development can proceed. These include a manure storage permit and approval of the operator's manure management plan under the *Livestock Manure and Mortalities Management Regulation* of the *Environment Act* as well as a licence under the *Water Rights Act*. Figure 3-1 outlines this process.

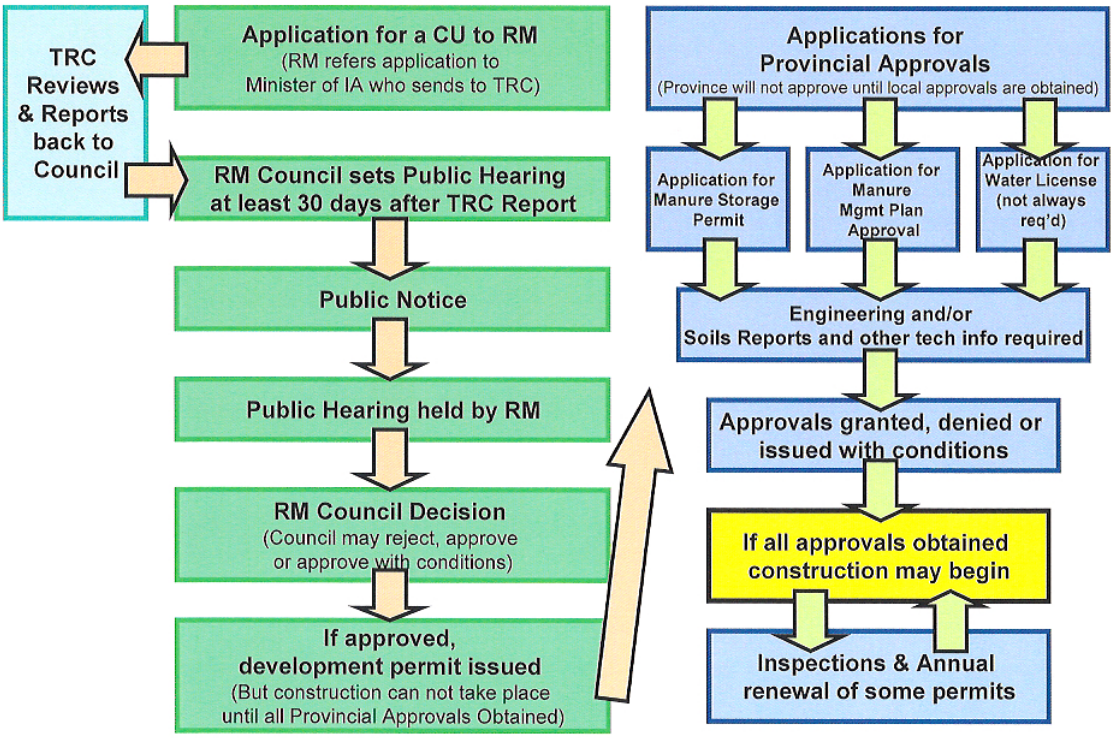


Figure 3-1: Current Livestock Operation Application Approval Process (300+animal units)
Source: Manitoba Intergovernmental Affairs 2007

3.2 Policy Review Findings

Considering the *Total Nutrient Loading Framework* developed in Task 1 of this research, a review of relevant provincial legislation was conducted, with a focus on the *Manitoba Water Strategy* and *Water Protection Act*; the *Environment Act* and *Livestock Manure and Mortalities Management Regulation*; the *Conservation Districts Act* and related challenges/innovations in *Integrated Water Resources Management*. Finally, the *Planning Act* was reviewed in detail with regard to its role in rural planning related to natural resources and the *Technical Review Committee* process related to hog industry development decision-making at the local level.

What became abundantly clear is that a provincial policy conflict appears to exist. This conflict is associated with the logic of having Manitoba's *Planning Act* responsible for at least three *Provincial Land Use Policies* (related to Agriculture, Water and Shoreland, and Flooding and Erosion) which are directly related to the planning and management of agricultural watersheds. Based on this legislation, either Planning Districts or Rural Municipalities, as local *Planning Authorities*, are to be responsible for planning related to these land uses.

However, under the *Conservation Districts Act*, Manitoba's Conservation Districts also have substantial responsibilities (and in fact were initially established) to assist in reducing agriculture's impact on downstream water bodies through a combination *of Total Land and Water Management* initiatives. While the historical performance of conservation districts in addressing these challenges is certainly debatable, the intent of the Act was clear, particularly with the initial 1959 legislation.

Furthermore, in February 2007 The Minister of Water Stewardship declared that the Lake Winnipeg Stewardship Board would be responsible for coordinating provincial nutrient management plans through Manitoba's Conservation Districts – implying a greatly expanded role for the conservation districts – in addressing the province's nutrient challenge (Manitoba Government 2007).

The fact that Manitoba's Conservation Districts are largely not watershed-based and are significantly under-resourced – both in their financial and technical capacity – does not suggest that they could not play an effective future role in addressing Manitoba's *Total Nutrient Loads*. The fact the *Planning Act* and Manitoba's Planning Districts expressly supercede the powers of the *Conservation District Act* and Manitoba's Conservation Districts reflects a serious lack of policy and practical understanding associated with the comprehensiveness and complicated elements which must be addressed through *Integrated Water Resources Management*.

Meaningful progress on Total Phosphorus Reduction or reducing overall nutrient loading will not occur until Manitoba's "Planning – Conservation Conflict" is addressed.

One means to address this conflict has been presented by Manitoba's *Water Protection Act*, which outlines the powers, roles, and responsibilities for local *Water Planning Authorities*, which are to prepare watershed management plans across the province. To date, all designated authorities are in fact the boards of Manitoba Conservation Districts, suggesting an important new role for these organizations is on the horizon.

However, both the technical capacity of conservation districts, applicable provincial departments (particularly Manitoba Water Stewardship), and the province in general, must be substantially increased if this role is to be fulfilled. It is equally clear that the Province of Manitoba must also step up its attention to addressing the *Total Nutrient Loading* challenge – by realizing the need for a *Cross-Government Strategic* approach to implementing Integrated Water Resources Management on a province-wide scale, with the full resources and technical capacity of all relevant departments.

Finally, given the apparent legislative duplication which exists among some elements of the reviewed policy, there are real opportunities to streamline several aspects of provincial decision-making related to Manitoba's land and water resources, and likely the *Technical Review Committee* process itself – for the benefit of all stakeholders affected by the hog industry.

Several proposed recommendations for addressing these issues and opportunities are contained within the *Summary Conclusions and Recommendations* of this report (Section 4), encompassing our findings and learnings from both Task 1 and Task 2 of this research.

3.3 Exploring the Technical Review Committee Process

Individual meetings were conducted with organizations associated with the Technical Review Committee process, including Manitoba Agriculture, Food and Rural Initiatives, Manitoba Water Stewardship, Manitoba Conservation, and Manitoba Intergovernmental Affairs, several municipal representatives, the Clean Environment Commission, the Manitoba Pork Council, The Manitoba Eco Network Water Caucus, the Manitoba Conservation Districts Association, the Farm Stewardship Association of Manitoba, and two private consultants.

The focus of each meeting was the TRC process for the hog industry, but latitude was given to ensure the individuals were able to raise and discuss hog industry concerns not necessarily associated with the TRC. Numerous issues were raised about the current process for expansion within the hog industry as well as a few suggestions for improved production practices.

The issues discussed have been grouped into four key areas: policy issues, resource issues, TRC process and manure management. Some of the issues were cross cutting over these key areas, and will be outlined in the most appropriate section but mentioned in all relevant areas.

3.3.1 Policy Issues

Policy Issues were identified by most of the individuals involved in the meetings. The issues extended across provincial policies and rural municipalities. The following is a brief description of the issue.

- Provincial departmental silos
- Current policies and regulations not effectively managing water issues
- Merging of planning and conservation districts
- Vague relationship between TRC and Planning Act
- Conditional Use Hearing Triggers
- Training of RM staff
- Odour issues
- Impacts of "Pause"

Several individuals mentioned that many of the provincial departments are focusing on their mandates without recognizing some of the linkages and impacts of their activities and the mandate of other departments. It was pointed out that MAFRI promotes the expansion of the hog industry since it is a significant contributor to economic growth, which it is, but has not allocated the resources to ensures it does not interfere with the Water Stewardship's mandate to promote health water resources in Manitoba. Some of the participants suggested that there needs to be better communication between provincial departments and strategies developed so they can work more effectively together.

The Technical Review Committee is a good example of the departments working together to provide background information to RMs about proposed livestock operations. Some participants pointed out though that some departments take these reports more serious than others. Manitoba Conservation provides very basic information in the TRC report, but does get into more detailed analysis for the permitting portion of the livestock operation application.

Manitoba's water resources are impacted by its economic, social and environmental policies. Many of the policies are designed to address a particular policy area and impacts in other sectors are unintentional. Some policies have specific water goals in mind, but lack the resources to fulfill their objectives. None of the review processes examine the potential cumulative effects of adding more livestock operations to a region or watershed. The current restrictions are based on number of animals per barn. Some proponents have circumvented the process by establish more barns but under the 300 AU limit. This effectively increases the number of animal units in an area without the hassles of a conditional use hearing. The impact of more animal units in a given area increases the potential risk to the water resources.

Concerns were raised about the number of organizations were been formed that were similar in nature to some extent and the possibility to combine their functions. The Planning Districts and the Conservation Districts were identified as another layer of quasi-government operating in a region when the Provincial government is trying to cut costs. Although there are differences between the two groups, there was a consensus that these groups need to work closely together to establish realistic agriculture and in particular livestock zones.

The Planning Act was discussed by several of the interviewees, with most considering the Planning Act too ambiguous by not being more definite in the role of the TRC and how the planning districts would work with other groups, such as the conservation districts as well as rural municipalities. It was also mentioned that the Planning Act requires each municipality to have established agricultural zone for livestock operations. The RMs have until January 2008 to have determined their agriculture zones. Many RMs have put this on hold until the results of the pause are known.

The number of animal units in a barn determines whether or not a conditional use hearing or TRC process is required. Concerns were raised that some operations use multiple barns of less than 300 AU to avoid the hassles of conditional use hearings and other regulations. Some participants felt the current number of 300 AU is appropriate, but there is a need to ensure multiple barns and other techniques to avoid regulations are not allowed. In Quebec, for example this is no lower limit. All operations are reviewed.

Concerns were that in some of the RMs did not have the resources or staff equipped to handle the livestock activities. Some of the RMs have been conducting conditional use hearings on a regular basis, while others are new and are having significant issues. Examples were given of RM Councilors requiring police escorts and having threats made against them. Better training of RM staff was suggested as one method to avoid some of these conflicts. Record keeping was an area of concern that better training might improve.

Currently odour is the responsibility of the RM, and concerns were raised that not all of the RMs addressed the issue adequately. During the conditional use hearings, RMs have the opportunity to establish rules for the livestock operation in terms of odour management. These rules could include covers over manure storage and the use of shelter belts to reduce odour due to wind. After the hearings, and establishment of the facility however, any odour complaints are required to be sent to the Farm Practices Review Board. The FPRB determines if the farm is operating responsibly and using accepted farm practices.

Currently a temporary ban on the establishment of any new barns for hog production purposes exists. The "Pause" has resulted in a number of policy related impacts, such as agriculture zones in RMs. The Planning Act requires that RMs develop a livestock by-law, but many have discontinued the development of their by-laws because of the additional expenses. The RM's do not want to invest in these by-laws until the results of the pause are known. Another concern raised was the potential for a large rush on the TRC process from farmers waiting for the Pause to end. It was estimated that for new barns to be ready for 2009, the Pause would need to be lifted by the end of November. The Pause does not impact existing operations.

3.3.2 Resource Issues

A variety of resource issues were identified has significant problems. Like the policy issues the resource concerns were wide ranging including provincial and municipal governments and farmers.

- Quality of data (regulations based on questionable science)
- Manure data problems and gaps
- Lack of resources for proper assessments and follow-up
- Enforcement and monitoring
- Farmers ability to make changes

Questions were raised about the quality of the data used to develop policies and regulations for water resources and manure management, in particular the nutrient loading in Manitoba watersheds. The study being used now is preliminary data that was developed using coefficients not ideal for the general Manitoba landscape. Comments were received from some of the participants that the nutrient loading estimates could be as much as 40% out. It was suspected that agriculture was under-estimated while the natural lands were over-estimated.

The Manitoba hog population is difficult to determine because small operations have incentive not to share this information due to contract negotiations with the processors. The Manitoba Pork Council does not have precise information of the number of hogs, even though their funding comes from a check off program. Statistics Canada has the best estimates of hogs on Manitoba farms.

The identification of spread fields and the annual amount being applied to the fields was identified as a major concern by a variety of the participants. While efforts are being made to collect the data and improve the information being made available, significant problems exist in tracking the information and having it available for the TRC and subsequent conditional use hearings. Manure management plans are required on an annual basis from each farm over 300 animal units. Farms below the 300 AU are not filing these manure management plans. There is a potential for some fields to be receiving excess quantities of manure.

Nitrogen has been the main focus of the data collected until very recently, so with the addition of phosphorus to the manure limits, the area of spread fields required has increased significantly for proposed new developments and existing livestock operations. The manure management plans require that the farmer submits soil sample from the spread fields before and after manure application. 10% of these samples are audited to ensure compliances with the regulations. 80% of the audit samples were within the regulation limits. Phosphorus testing will now be included in the auditing process. Concerns were raised that this information was not being used by the TRC process to ensure proponents were not using the same fields.

The amount of information provided for the TRC report and conditional lands use hearings with respect to location and possible impacts on watersheds was called into question by several organizations. It was recognized that proponents are reluctant to pay for expensive soil and water sampling at the early stages of the review since the RM has the ability to say no without any opportunity for appeal. Some suggested that large operations should be responsible for these costs and have the analysis completed for the conditional use hearings, and that smaller family operations could have this expense back stop by some form of government fund if their application was denied before the permitting process.

Enforcement and monitoring was raised as very significant issues with several severe examples from the late 1990s. Although these examples are not indicative of the current situation, the ability to enforce the current regulations is not sufficient. It was suggested that if all federal, provincial and municipal regulations were followed, Manitoba's water resources would not be threatened. Monitoring and enforcement resources were seen as very limited. One RM pointed out that Hog Watch was responsible for the initiation of several investigations and not their own monitoring system.

Another resource issue raised was that many farmers are in difficult financial situations, and can not afford to adopt new technologies to manage nutrients outflows. Beneficial management practices are available to address manure management, but still require significant funds from the farmer. Not all farmers are taking advantage of some of the programs available to them to improve their environmental impacts.

3.3.3 Technical Review Committee

The Technical Review Committee was the subject of most of the discussions, and as a result several issues and suggestions were discussed. The issues discussed are highlighted below:

- Purpose of the TRC
- Membership of the TRC
- Utility of the TRC report
- Public input into TRC process and RM decision
- Environmental assessment v.s. conditional use hearing

Several participants in the discussions were concerned about the purpose of the TRC, many felt the TRC needed to provide much greater detail to improve the RM's ability to make informed decisions. Most recognized that the TRC was initially established to provide background information to the RM council before making decisions about livestock operations. Some participants complained that the TRC reduced the ability of non-members from the provincial government to provide relevant input into the conditional use hearings and the reports. The most common complaint was the lack of detailed information being made available to the RMs.

Membership of the TRC was also discussed in detail, particularly around the idea of more local knowledge. Potential additional members included a representative from the RM, such as the CAO, a representative from the local conservation district, as well as other provincial departments (highways) or federal departments (PFRA). It was recognized that making the membership of the TRC too large would significantly reduce the efficiency. One suggestion was to have the TRC members actively solicit comments from external sources, such as the potential membership listed. The purpose of expanding the membership of the TRC was to inject more local knowledge and other areas of potential conflict.

The utility of the TRC report was questioned by several of the participants as they felt more information should be made available in a timely fashion. Some departments used standard boiler plate information in each report, which was not specific to the potential barn location, while others only address a portion of the issue. The permitting process that follows the conditional use hearing, where the TRC is discussed, provides much more information about the water resources in the area.

Public input into the TRC process and conditional use hearings was a contentious issue as some felt it was acceptable and others thought it was too little. The argument for more public participation focused on some RMs were livestock friendly and were allowing operations that were detrimental to other citizens in the RM. Concerns were on water resources, odours, property values etc. It was also suggested with more detailed information from the TRC process would reduce some of the concerns local citizens had about the proposed livestock operations. Concerns were also raised about participants in the conditional use hearings coming from a variety of regions not just the local RM.

To ensure a more complete evaluation of proposed livestock operations some participants have suggested removing the TRC process and replacing it with an environmental assessment. The argument for an environmental assessment is based on more detailed analysis as well as more public input into the process. Concerns are that it would be time consuming and more resources would be expended to review a livestock operation. Most RMs are opposed to an environmental assessment since control of the process would be with the provincial government, not allowing the RMs to decide if they want livestock operations or not.

3.3.4 Manure Management

The major reason for the focus on the hog industry has been around manure management and its impacts on water resources. Although current estimates are that hog production is a small contributor of nutrients to Lake Winnipeg and its watersheds, the risk for higher nutrient loading is increases with more hog barns. Tracking locations of potential nutrient hazards was seen as a priority. Several participants raised a number of suggestions to reduce the amount of nutrients released from the hog operations.

- Manure database
- Whole farm nutrient balance
- Better feeding rations for hogs
- Improved manure handling techniques

The current manure database constructed and maintained by Manitoba Conservation is not link to water resources. The database is currently linkable to soil types. Suggestions where made to expand the capacity of the manure database to be able to monitor potential nutrient loading within watersheds. Ideally the database would also be able to track barns below the 300 AU if they are in potential high nutrient loading areas.

The concept of whole farm nutrient balance was introduced by several individuals. Farmers are required to measure the amount of nutrients entering the farm and the nutrients leaving the farm. This approach reduces some of the immediate concerns of being able to track the nutrients in watersheds. Quebec and other jurisdictions have experimented with this technique and it appears to be successful. Efforts are currently underway with Manitoba Conservation to improve some of the nutrient loads from hogs using a whole farm nutrient balance.

Applying a similar technique by measuring the nutrients in hog rations to the nutrients out in the form of meat and manure provides some bases to reduce nutrient levels in the manure. In Quebec, significant reductions in manure nutrients were noticed by changing the feed rations for the animal. Although research is being conducted in this area, results have been dependent on the type of feed available. The current grains supplies are designed for human markets and not livestock, but new grains are being developed for hogs that will reduce nutrient levels in the manure.

New and old technologies exist that improve the portability of manure. Many of Manitoba's agricultural landscapes are nutrient deficient and would benefit from the addition of manure. Unfortunately, the transporting of manure distances beyond 5-10 kilometres becomes expensive. In areas of high livestock concentrations the application of manure has increased the nitrogen and phosphorus levels in the soil beyond the ability of the crops to absorb the nutrients. In the past nitrogen levels were used to determine acceptable rates of manure application. New phosphorus regulations now require phosphorus to be measured as well.

Phosphorus is considered a greater concern because the ratio of phosphorus to nitrogen is considerably higher in manure than what the crop requirements are. As a result manure applied at acceptable rates for nitrogen results in an oversupply of phosphorus, which increases the potential for phosphorus loading in the watershed. By using phosphorus as the new limits significantly more acreage of spread fields are required.

3.3.5 Synthesized TRC Findings from Meetings:

The following general recommendations were synthesized from these meetings:

- Ensure better interaction between provincial departments
- Clarify the policies associated with the hog barn proposals
    - Define the role of the TRC better in the Planning Act
    - Indicate how Planning districts and Conservation districts interact
- Enforce and tighten regulations associated with water resources
- Improve quality of water resource data
    - Consider cumulative impacts
    - Nutrient loading within watersheds
- Increase resources for assessments and monitoring
    - Expand the manure database to include risk to water resources
    - Share database in aggregate form
    - Provide site inspections
    - Improve training for RM staff to manage livestock proposals
- Clarify purpose of TRC and role at conditional use hearings
- Review membership of TRC
    - Improve local knowledge content
    - Involve other departments where appropriate
- Improve public participant at conditional use hearings
- Provide more site specific detail in TRC report
- Improve manure management
    - Introduce whole farm nutrient balance
    - Reduce nutrient levels in manure
    - Condense manure for easier transport

Overall Issue	**Key Issue**
Policy	Provincial departmental silos
	Current policies and regulations not effectively managing water issues
	Merging of planning and conservation districts
	Vague relationship between TRC and Planning Act
	Conditional Use Hearing Triggers
	Training of RM staff
	Odour issues
	Impacts of "Pause"
Resource Issues	Quality of data (regulations based on questionable science)
	Manure data problems and gaps
	Lack of resources for proper assessments and follow-up
	Enforcement and monitoring
	Farmers ability to make changes
Technical Review Committee	Purpose of the TRC
	Membership of the TRC
	Utility of the TRC report
	Public input into TRC process and RM decision
	Environmental assessment v.s. conditional use hearing
Manure management	Manure database
	Whole farm nutrient balance
	Better feeding rations for hogs
	Improved manure handling techniques

4 Summary Conclusions and Recommendations

Provincial Strategic, Policy, and Scientific Concerns

1. Given that watershed processes largely dominate the contribution of nutrient loads to Lake Winnipeg, and if phosphorus reduction is truly an overriding objective for the Province of Manitoba, **provincial efforts in support of Integrated Watershed Management (IWM) or Integrated Water Resources Management (IWRM) must be dramatically increased.** Furthermore, the Intergovernmental Panel on Climate Change Fourth Assessment Report (2007) also recommends IWRM as a key strategy for reducing climate change vulnerability – including the shock nutrient loads associated with the extreme precipitation events that are projected for the Canadian Prairies.

2. Essentially, the next stage of the *Manitoba Water Strategy* and implementation of the *Water Protection Act* logically involves significantly strengthening Manitoba Water Stewardship to actually implement "watershed-based decision-making." Manitoba Water Stewardship was originally conceived as an apex, coordinating department – exactly the role which now must be strengthened to achieve comprehensive nutrient management based on a *Total Nutrient Loading Framework*. **Internal recognition of the *Manitoba Water Strategy* as a *Key Cross-Government Strategy*, based on similar efforts already in place in both Alberta and Saskatchewan – where all participating departments are jointly accountable for strategy results – is also essential**. This would require full Executive Council support to be adopted as "province-wide" in its scope and importance – therefore harnessing the full attention, resources, and credibility of the Manitoba government. **One of the prime indicators for the success of the *Manitoba Key Cross-Government Strategy for Water* should be Total Phosphorus Reduction (TPR)**. Appropriate performance measurement would also require a watershed-based reporting framework similar to the Saskatchewan State of the Watershed Reporting System, which tracks a suite of science-based indicators within every watershed in the province. These indicators are used to assess the current health of Saskatchewan's watersheds, provide information about human activities that impact the environment within watersheds, and evaluate the effectiveness of various planning and management activities occurring within them. The indicators include "condition" indicators, "stressor" indicators, and "response" indicators. **Development of Manitoba's State of the Watershed Reporting System must begin as soon as possible – coordinated by Manitoba Water Stewardship, but also involving all other applicable departments**.

3. The Manitoba Water Strategy and the Water Protection Act are fundamentally consistent with the principles of sound land and water management based on watersheds, as well as a watershed-based framework for the reduction of nutrient loading. It is now time to begin making the difficult governance and jurisdictional accountability choices which are required to actually implement IWRM and TPR. **Meaningful progress on The *Manitoba Key Cross-Government Strategy for Water* would by definition require a high degree of formalized interdepartmental planning and cooperation involving all departments with applicable roles in achieving strategy progress**. There is currently a significant lack of formal Manitoba Government interdepartmental cooperation occurring currently in the area of natural resources management and development. However, opportunities do exist to coordinate this function through the Community and Economic Development Committee of Cabinet, the former Sustainable Development Committee of Cabinet, the Manitoba Round Table on Environment and Economy (if it includes Cabinet participation), the Interdepartmental Planning Board of Deputy Ministers, the Conservation Districts Commission of Deputy Ministers, and possibly the Lake Winnipeg Stewardship Board. Based on the following recommendations however, it is proposed that **the current Conservation Districts Commission should be renamed with increased responsibilities for ensuring clear program direction and evaluation, performance measurement, and interdepartmental planning, cooperation, and support as the *Watershed Authorities Commission* – reporting to the Minister of Water Stewardship**. This proposal is consistent with current government policy on water, as well as the original intent of the *Manitoba Water Strategy* and the *Water Protection Act*.

4. In order to properly assess the incremental phosphorus contributions of new individual hog development proposals, **a better scientific understanding of Manitoba's proportion of *Total Phosphorus Loading* is fundamentally required**. There are multiple sources of these loads beyond hog manure, particularly regarding the interrelated components of *Manitoba Watershed Processes* and particularly within the Red River Basin, where the majority of these loads appear to be generated. Focused and comprehensive research into these sources is required at several nested watershed scales – at specifically the individual hydrologic unit, the minor watershed, subwatershed, and watershed levels – towards the generation of long-term Manitoba data which will contribute to a clarified understanding regarding watershed process –based nutrient loading, including agricultural contributions, as well as the impacts of beneficial management practices (BMPs). **The only location where logical where relevant watershed science research is occurring in Manitoba is in the Tobacco Creek Watershed, where Manitoba's only long-term dataset regarding agricultural impacts on water quality and quantity is based**. This research has taken place for two decades mostly through community initiative and without long-term funding commitments from government at any level. **The Province of Manitoba should significantly increase its participation in this research – and through the proposed *Watershed Authorities Commission* and the proposed *Manitoba Watershed Science Center*** (see below), initiate comparable research in other Manitoba watersheds.

5. Strengthening the watershed science capacity generally within the province will require long-term commitments by the Manitoba Government toward building professional expertise focused on all aspects of watershed management. The Watershed Science Centre at Trent University in Peterborough, Ontario is an important model for government-academic partnership that could be emulated in Manitoba – in cooperation with this province's universities. **The important role of social science in supporting the fundamental governance and community participation elements of IWRM should be included as part of the general strengthening of watershed science in the province, including that undertaken by a *Manitoba Watershed Science Centre***. Manitoba Water Stewardship should ultimately become the repository or central access point for all provincial data applicable to the province's watersheds – to be utilized by Manitoba's Local *Watershed Authorities* in their exploration and consideration of watershed issues (see below).

Local Watershed Authorities for Planning, Monitoring, and Management

6. There is a great need to improve the means by which new hog developments are reviewed and approved. While inherently local in nature, these decisions must be considered within the broader context of Total Nutrient Loading (or Total Phosphorus Loading to start). While Lake Winnipeg has been identified as an iconic feature and focus to address growing public concerns regarding water quality in Manitoba and significant nutrient loads to Lake Winnipeg do come from beyond Manitoba's borders, it is important to note that fully 47% of phosphorus loads and 49% of nitrogen loads are generated within Manitoba. In terms of phosphorus alone, *Manitoba Watershed Processes* are estimated to be equal in scale to US sources (at 32% of Total Phosphorus Loads), with this total almost evenly comprised of "natural background/undefined" and "present day agriculture" and the vast majority of this generated within the Red River Basin, both in Manitoba and the US (54% overall). **These watershed processes (and their subsequent nutrient loads) are fundamentally hydrologic in nature. As such, there is a need for greater scientific, technical, and decision-making capacity regarding the interrelated elements of both agricultural land use and the flow of water within local watersheds (including their individual hydrologic units, minor watersheds, and subwatershed systems)**.

7. While appearing as logical existing entities to assume greater responsibility for local watershed planning and decision-making, Manitoba's Conservation Districts will have difficulty fulfilling this role until they can develop greater professional capacity to provide accurate scientific and technical information regarding all aspects of the watersheds they should be responsible for. **There is a need to integrate the emergent watershed planning functions of conservation districts with the existing land use planning functions of planning districts – for the benefit and use of their member municipalities. Doing so would provide the opportunity for a comprehensive, watershed-based planning, management, and monitoring framework – through which the potential impacts (i.e. phosphorus loading) arising from an incremental increase in hog manure (or other forms of development) could be appropriately considered in the broader context of *Total Land and Water Management*.**

   Manitoba's Conservation Districts should now be given greater responsibility (with appropriate resources) for planning and managing the rural watershed landscapes that serve as the contributing drainage systems for their local watersheds, including nutrient budgets. In February 2007 the Minister of Water Stewardship declared essentially this intention, indicating that the Lake Winnipeg Stewardship Board would be responsible for coordinating nutrient management plans through the Conservation District Program.

8. For the most part, CDs are not watershed-based, nor do they currently have the capacity or capability to significantly influence the individual management/development decisions of landowners or the planning decisions of their rural municipal members. Equally, they currently lack the technical capacity or mandate to conduct regular scientific monitoring or provide regular reporting on the health of their local watersheds. It is recognized that some CDs are now attempting to plan and manage some watersheds sustainably under the auspices of the Manitoba Water Protection Act. It is also recognized that the provincial conservation districts program has a stated desire to move toward watershed boundaries. While Manitoba's CDs are now being expected to play a central role in addressing the challenge of declining water quality in Lake Winnipeg, this challenge was not foreseen as a CD responsibility during initial program design. At this point, Manitoba's CDs are not adequately prepared to address this capacity gap. **The Province of Manitoba can now appropriately address this challenge within the framework of existing legislation, strategies, and programming (see detailed recommendations below)**.

9. In addition to their partner municipalities, Manitoba's Planning Districts can and do have a large measure of influence over the individual management/development decisions of landowners – as they also do among their partner municipalities – during the development planning process mandated through the Planning Act. Some municipalities are not members of Planning Districts and thus must prepare their development plans on their own, which can also be problematic with regard to environmental concerns, such as those related to the flow of water, which are almost always transboundary in nature. However, **given that agricultural and other nutrient loading sources are fundamentally hydrologic in nature, it would be most appropriate if an authority responsible for watersheds were also responsible for the agricultural and land use aspects of rural land use zoning**. These activities and responsibilities must be done within the context of watershed planning and management. As such, **this function should now be transferred from Manitoba's Planning Districts to local authorities responsible for local watersheds (see below). This requires the legislative movement of these aspects of the *Planning Act* to the *Water Protection Act*, including current planning considerations for at least three relevant Provincial Land Use Policies (Policy 2-Agiculture, Policy 4-Water and Shoreland, and Policy –Flooding and Erosion) as well as provisions for the municipal consideration of new livestock developments as well as the *Technical Review Process***.

10. **Total nutrient loads are a function of hydrologic flow (through watershed processes). If the concern is *Total Nutrient Loading* in these agricultural zones, these land and water planning features/functions must be integrated. As such, agricultural zoning must be done in the context of watershed planning and management**. A long-term vision which may someday see the amalgamation of Manitoba's Rural Municipalities along watershed boundaries – is entirely consistent with the long-term goal of ecosystem-oriented governance as essential to sustainable development – and is probably inevitable in the future. However, what is required now is the creation of Local *Watershed Authorities* which are responsible for the interrelated aspects of land use and water flow as it relates to *Total Land and Water Management*, watershed health, watershed integrity, source water protection, biodiversity, drainage, and nutrient loading. These *Watershed Authorities* can and should easily be established using legislation, strategies, and programs which currently exist. **Manitoba's Conservation Districts should now be reconstituted along watershed and/or subwatershed boundaries and renamed at *Watershed Authorities* (at whatever the most *meaningful and manageable* unit is – depending and focused upon particular communities/municipalities in specific locations of Manitoba)**. Most existing activities and operations outlined within the *Manitoba Conservation Districts Act* should be transferred to the *Water Protection Act*, which outlines the source water protection responsibilities of "local water planning authorities," which should logically and simply now be called *Watershed Authorities* in the *Water Protection Act*. The *Manitoba Conservation Districts Act* could and should then be repealed as a consequential amendment. **This should be considered as the logical first step in the "review and consolidation of water legislation" which was identified as a critical element initially envisioned and clearly articulated within the Manitoba Water Strategy in 2003**.

Improving Hog Industry Development Decision-Making Towards Phosphorus Loading Reduction

11. There are significant concerns among many stakeholders regarding the current *Technical Review Committee* process for reviewing new hog industry development or expansion proposals. For many reasons, it has become clear that this process is not meeting the needs of all industry proponents, the public living within municipalities considering these developments, or the Rural Municipalities themselves. There is a need for more comprehensive technical information regarding each application, and this information must be considered and presented within the hydrologic context of watersheds and *Total Nutrient Loading* of these watersheds. As such, it is abundantly clear that **Manitoba's proposed new and appropriately resourced *Watershed Authorities* should now become responsible for coordinating the Technical Review Committee process – through the collection of provincial data and its synthesis focused on the local watershed they are responsible for**. This focused process would see Manitoba's new *Watershed Authorities* serving as an accurate source of useful information prior to a Rural Municipality's consideration of a new hog industry development proposal. **A *Watershed Authority* should be able to report effectively on the incremental *Total Nutrient Loading* impact of one additional hog development – by assembling all required data from all applicable provincial government departments – and presenting it in an understandable format which proactively addresses the needs and potential concerns of the municipality, community residents, and the development proponent (who will be able to better plan their proposed operations from the beginning)**. Participating provincial departments providing this information would all logically be members of the *Watershed Authorities Commission* chaired by Manitoba Water Stewardship.

12. While the new local *Watershed Authorities* would be responsible for much of the analysis, modeling, and professional technical research required for the effective preparation of a *Technical Review Committee* report based on the coordinated input of applicable provincial departments, Manitoba Conservation would retain its current regulatory roles regarding manure storage and spreading under the *Environment Act's Manure Management and Livestock Mortalities Regulation*. However, **the 300 animal unit threshold should be eliminated for the requirement of a manure management plan, as well as the numerical trigger for the *Technical Review Process***. All hog producers should be required to have a manure management plan based on the phosphorus saturation limits of their soils, and all new or expanded hog industry developments/barns should undergo a TRC process coordinated by the Local *Watershed Authority* on behalf of their member municipalities. **The TRC process would become dramatically more efficient and cost-effective than it is now. After initially collecting and synthesizing the required data for its local watershed, a *Watershed Authority* would simply have to update its *Total Nutrient Loading database* to reflect the subsequent incremental changes of new, expanded, or reduced hog industry developments** (in addition to monitoring other nutrient sources). The TRC would then be in a better position to provide useful information regarding other aspects of livestock industry development within agricultural watersheds/communities.

13. Data collection related to the identification and monitoring of spreadfields and the annual amount of manure being applied to these fields is a significant concern. **While efforts are being made by Manitoba Conservation to collect the data and improve the information being made available, significant problems exist in tracking the information. This data is incomplete, but represents very much of the foundation of that which would be required for the incremental assessment of hog industry expansion through the development of new hog barns**. It would also be useful to the TRC and/or for consideration at subsequent conditional use hearings. Similarly, manure management plans are required on an annual basis from each farm over 300 animal units, but farms below the 300 AU are not required to file these manure management plans. As such, it is quite likely that some fields are receiving excess quantities of manure. There is a need for a comprehensive spatial database to manage and maintain this data. The fact that this system is not already in place is a fundamental handicap. **The accurate collection of this data requires the immediate and long-term cooperation of Manitoba's cattle and hog producers (represented by their member organizations) and all applicable government departments (primarily MAFRI and Manitoba Conservation – working closing with Manitoba Water Stewardship. This level of industry-government cooperation occurs in Québec) and should be emulated in Manitoba**.

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