

Source Protection Plan Assessment Reports and Policy Agricultural Representative Pathogen Primer

This 'Pathogen Primer' summary is intended to provide some perspective and background when dealing with agricultural pathogen significant drinking water threat (SDWT) situations.

Appendix A includes excerpts from refereed journals. The papers support the position that science and sound data, not preconceived biases and perceived notions, should guide pathogen management in watersheds.

Appendix B is a summary of some relevant Ontario research on agricultural source pathogen risk mitigation practices.

There is a concern that the Source Water Protection Assessment Reports, the Tables of Drinking Water Threats and the proposed Source Protection Plan Regulations (EBR Registry Number: 010-8766) does not equally consider livestock, human and wildlife sources of pathogens.

There is also concern that the MOE is proposing to develop a catalogue of risk management measures that can be used to support Source Protection Committees, Risk Management Officials and property owners in determining the level of effort required to manage pathogen risk. To date, there has been no consultation with agricultural groups in order to evaluate and determine the most cost-effective, practical and efficient agricultural source-pathogen mitigation practices.

Why are wildlife and pets (companion animals) pathogen sources not included in the Tables of Drinking Water Threats?

Agricultural groups remain disappointed that wildlife and companion animal source pathogen threats are not included in the Tables of Drinking Water Threats. Appendix A includes abstracts from scientific journals that clearly indicate that wildlife contribution to the pathogen load to watersheds. Ontario research has shown that even in intensive agricultural watersheds 40% of the E. coli is from sources other than livestock agriculture. The level of impact would be expected to vary depending on the watershed characteristics and the proximity of the intake to wildlife habitat.

Although wildlife can not be directly managed through the Planning Act or other prescribed instruments other Best Management Practices and mitigation strategies, under the supervision of the Risk Management Official (RMO), could be developed. Overlooking and ignoring wildlife-source pathogens inappropriately focuses almost all of the mitigation effort on livestock agriculture.

Why are microbial source tracking (MST) studies not part of the Assessment Report and Significant Threat determination process?

Ministry of Environment Draft Issues Evaluation and Threats Inventory Module 5 October 2006
Microbial source tracking (MST) is an emerging field of study that seeks to predict the source of microbial contamination in the environment. The field has been developing rapidly to address growing needs to determine the source of fecal contamination in aquatic environments. Using MST, for example, may assist in the determination of whether high e. coli counts in the source water are the result of farm animals, wildlife or of human origin (from STPs). There is no

standard MST method at this time. A number of different MST techniques have been developed including ones where a “library” of local micro-organism are collected, and others where a library is not required. It should be recognized that microbial source tracking studies can be expensive and time consuming and the current state of the science may not be able to conclusively identify the sources, especially where there are multiple sources over large temporal and spatial scales. At this time, the Ministry does not recommend that MST be used as part of Source Protection Planning, as the science is still new and relatively unproven (adapted from T. Edge, Environment Canada).¹

I recently spoke with Dr. Edge (Environment Canada) to learn if the MOE position expressed in 2006 is still valid. Dr. Edge made the following comments.

1. The MOE statement seems OK, but I think the science has advanced to where MST methods can be more useful. However, the usefulness of MST is likely to be very site or situation-specific, and best for local problems to discriminate between relatively few fecal sources
2. The field is progressing rapidly, and methods are now better validated (e.g. Bacteroides DNA markers like the human one show considerable promise for source water protection purposes). A draw back is that there are no standardized methods yet, and work is still largely being done in relatively few research labs.
3. I'm a supporter of getting into the environment and measuring what is going on.
4. The value of carefully designed MST studies is that sometimes, closer scrutiny indicates that widely perceived notions of prominent fecal pollution sources may not be as significant as first thought (e.g. sewage plant effluents in Hamilton Harbour).

Is it possible that the real reason for the MOE recommendation to not apply MST technology is because a) MST may be costly and the Province (MOE) is responsible for covering the cost of Source Protection Plan development; b) MST may result in the identification of 'unexpected' sources, such as wildlife (geese and seagulls) & pets and this presents a difficult policy challenge for the Province, and c) less rigorous methods of attributing pathogen load pose little cost risk to the Province. Attributing pathogen load to livestock producers and municipal (sewage & combined sewer overflow) ultimately downloads cost to those parties - not the Province.

Why are all human sources of pathogens exempt from Risk Management Official (RMO) authority? Does this mean that the only pathogen source subject to RMO authority is livestock agriculture?

Section 19.4 of the Draft Regulations provides special status to the prescribed instruments dealing with waste disposal sites, municipal sewage treatment plants and residential septic systems. The Draft Regulations specify that these activities are exempt from RMO authority and must be managed through the prescribed instrument. The SPC retains the legal authority to amend the provincial prescribed instrument.

While the intent of Section 19.4 is to avoid unnecessary duplication, the effect is to isolate livestock agriculture as the only source of pathogens subject to the RMO authority. Obviously, agricultural source pathogens are treated differently from human-source or wildlife-source pathogens. Does this reflect a bias against livestock agriculture?

¹ Source: Page 40 Ministry of Environment Draft Issues Evaluation and Threats Inventory Module 5 October 2006

Will the Nutrient Management Act be recognized as the prescribed instrument for managing agricultural pathogen significant drinking water threats (SDWT)?

Unknown.

Livestock groups support the use of the NMA as the prescribed instrument for managing agricultural pathogen threats. The purpose statement of the NMA clearly demonstrates that the scope and intent of the Act is to mitigate and manage all of the risks associated with nutrient application.

Purpose –[Nutrient Mgt Act 2002]

1. The purpose of this Act is to provide for the management of materials containing nutrients in ways that will enhance protection of the natural environment and provide a sustainable future for agricultural operations and rural development. 2002, c. 4, s. 1.

Currently, only >300 NU livestock farms and livestock producers that applied for a building permit (since 2005) are phased-in under the NMA. Producers that do not hold a Nutrient Management Record of Approval may be subject to the RMO authority.

Under Ontario conditions, which agricultural source-pathogen mitigation options are the most promising?

A review of current Ontario research (Appendix B) indicates that there is some uncertainty related to the efficacy and efficiency of agricultural-source pathogen mitigation practices. Additional research is needed.

There is some evidence that land application of livestock manure at agronomic rates following an approved Nutrient Management Plan poses little risk to the environment. The critical factors are a) the length of time between land application and the first major rain and runoff event and b) the concentration of pathogens in the manure at the time of application.

The vast majority of waterborne pathogens affecting people do not originate from agricultural sources. Human contamination or inadequacies at water treatment plants have been implicated in almost all largescale waterborne outbreaks. The potential does exist for contamination of water with pathogens from agriculture, warranting a proactive approach for reducing this source in watersheds. Because of the large amount of fecal material produced and used on the farm, as well as the spreading of human waste (sewage and sludge), this potential exists. At this point in time, scientific literature indicates that sound agricultural practices currently in place significantly reduce the opportunity for the introduction of pathogens to the watershed.²

The MOE is proposing to develop a catalogue of risk management measures that can be used to support Source Protection Committees, Risk Management Officials and property owners in determining the level of effort required to manage pathogen risk. There was assurance from MOE that there would be broad consultation and an opportunity for agricultural input into the development of this catalogue.

To date, there has been no consultation with agricultural groups.

² **Waterborne Pathogens in Agricultural Watersheds** by **Barry H. Rosen** NRCS, Watershed Science Institute, School of Natural Resources University of Vermont, Burlington