

Drinking Water Source Protection Background Document

The Application and Storage of Agricultural Source Material

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NOTE TO THE READER

This document is one of eighteen background reports now under development by staff at various Conservation Authorities and Conservation Ontario in support of Source Protection Plan development. The final set of reports will cover all nineteen prescribed water quality threat types. Each report looks at the nature of one or more types of drinking water threat, describes the local occurrence (“is” and “would be”) of those threats, assesses existing policies/programs, and introduces related ‘policy concepts’ for source protection planning. ***While every effort has been made to ensure the accuracy of the information in this document, it should not be construed as legal advice or relied on as a substitute for the legislation.***

This version is considered to be a ***working draft*** because it will be going through additional review by MOE and subject experts. SPA/SPRs can use these documents with the understanding that additional refinement will occur. Any questions on these reports can be directed to Nicole Barbato, Source Water Protection Liaison (via nbarbato@conservationontario.ca). Thank you!

1. Definition

This paper provides background information for **prescribed drinking water threat 3 – application of agricultural source material to land** and **prescribed drinking water threat 4 – the storage of agricultural source material**.

Nutrients are materials that can be applied to land for the purpose of improving the growth of agricultural crops and for soil conditioning. There are three sources of nutrients to be considered through the drinking water source protection initiative: agricultural source material, non-agricultural source material, and commercial fertilizer.

According to Ontario Regulation 267/03 – General under the *Nutrient Management Act*, agricultural source materials (ASM) include the following materials that may be produced on a farm:

- manure produced by farm animals, including bedding materials
- runoff from farm-animal yards and manure storages
- wash water that has not been mixed with human body waste (e.g. from the milking centre)
- organic materials produced by intermediate operations that process the above materials (e.g. mushroom compost)
- anaerobic digestion output that does not include sewage biosolids or human body waste (anaerobic digestion is a process used to decompose organic matter by bacteria in an oxygen-limited environment)
- regulated compost (which contains dead farm animals).

ASM can be stored in a permanent nutrient storage facility (usually a steel or concrete tank or earthen lagoon), or on a temporary field nutrient storage site (only for solid ASM).

The primary consideration for reducing or eliminating drinking water threats related to the application and storage of agricultural source material is to make sure nitrogen, phosphorus and pathogens do not enter surface water and/or groundwater.

2. What causes these activities to be drinking water threats?

The Ontario Ministry of the Environment (MOE) Tables of Drinking Water Threats (Ontario Ministry of the Environment, 2009) identify nitrogen, total phosphorus and pathogens as contaminants that could make their way into surface and groundwater as a result of the application of ASM to land (circumstances 1 to 18 and 1944), and the storage of ASM (circumstances 1201 to 1224 and 1962 to 1964). The primary source of nitrogen, total phosphorus and pathogens in ASM is from animal waste and by-products.

The Drinking Water Threat Contaminants Summary (see Appendix C) includes details on relevant drinking water standards, guidelines or objectives, the health or aesthetic concerns and other useful information for these parameters.

ASM is produced on farms with livestock. Permanent nutrient storage facilities are generally, but not always, located near barns and outdoor confinement areas. Temporary field nutrient storage facilities can be located near barns and outdoor confinement areas, as well as on fields where the ASM will be applied. The storage and application of ASMs occur in the highly vulnerable aquifers and significant groundwater recharge areas, and in parts of some intake protection zones and wellhead protection areas.

3. Understanding the nature of the drinking water threats

The classification of this activity as a significant, moderate or low drinking water threat is dependent on the vulnerability score of the specific area, as well as the combination of the managed land percentage and livestock density for the vulnerable area. As a reminder:

- Managed lands include cropland, fallow land, improved pasture, golf courses, sports fields and lawns to which ASM, non-agricultural source material, or commercial fertilizer could be applied. This value was calculated based on MOE Technical Rules and is included in the Assessment Report.
- Livestock density is the number of farm animals in a given area. Livestock density is standardized to nutrient units per acres since different types of animals produce different amounts of manure with different nutrient values. A nutrient unit is based on the manure equivalent of nutrients contained in 43 kg of nitrogen or 55 kg of phosphate. The livestock density value was calculated based on MOE Technical Rules and is included in the Assessment Report.
- Total phosphorus associated with agricultural source material can only be a drinking water threat in intake protection zones (IPZs) and in wellhead protection areas (WHPAs) where the groundwater is under the direct influence of surface water (WHPA-E).
- Nitrogen associated with agricultural source material can be a drinking water threat in IPZs, WHPAs, Highly Vulnerable Areas (HVAs), and significant groundwater recharge areas (SGRAs).
- Pathogens associated with agricultural source material can be a drinking water threat in IPZs, and WHPAs including WHPA-E.

Appendix A provides detailed information on the local scale of these drinking water threats.

4. Applicable legislation, policies and programs

a. National

Fisheries Act

In general, the Canada *Fisheries Act* is enforced by Fisheries and Oceans Canada; however, the section that applies to contamination is under the authority of Environment Canada. The deposition of any deleterious substance (contaminant) is in contravention of the legislation. Section 36(3) of the *Fisheries Act* states that "... no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water." (Government of Canada, 1985).

b. Provincial

Environmental Protection Act

The *Environmental Protection Act* (EPA), which is enforced by the MOE, prohibits the discharge of contaminants into the natural environment (Government of Ontario, 1990). Although the application of animal wastes to land in accordance with normal farming practices and the regulations made under the *Nutrient Management Act* does not require approval under the EPA, farmers must ensure that ASM spills do not occur.

Ontario Water Resources Act

The *Ontario Water Resources Act* (OWRA) contains general prohibitions against discharging pollutants to surface or groundwater (Government of Ontario, 1990). Permits are required for vegetated filter strip systems and constructed wetlands, if these methods will be used to treat milking centre washwater.

Nutrient Management Act and Ontario Regulation 267/03 – General

The Nutrient Management Act passed on June 27, 2002. It addresses land-applied materials containing nutrients. This includes provisions for the development of strong new standards for all land-applied materials containing nutrients, a proposal to ban the land application of untreated septage over a five-year period, and proposed strong new requirements such as: the review and approval of nutrient management plans, certification of land applicators and a new registry system for all land applications (Government of Ontario, 2002).

The Act provides a comprehensive nutrient management framework for Ontario's agricultural industry, municipalities and other generators of materials containing nutrients, including clear environmental protection guidelines. It builds on the existing system by giving current best management practices the force of law, and creating comprehensive, enforceable, province-wide standards to regulate the management of all land-applied materials containing nutrients. The Act contains amendments to the *Environmental Protection Act*, the *Highway Traffic Act*, the *Ontario Water Resources Act* and the *Pesticides Act*, and consequential amendments to the *Farming and Food Production Protection Act, 1998* to ensure consistency and give higher recognition to the standards.

Sections 10, 14 and 28 of Ontario Regulation 267/03 – General are prescribed instruments under the *Clean Water Act*. These sections relate to the approval of nutrient management strategies and nutrient management plans, and to compliance with nutrient management strategies and plans that are in force (Government of Ontario, 2003).

Farms are regulated under the Nutrient Management Act if the farm generates greater than 300 nutrient units annually or generate between 5 and 300 NU annually and have applied for a building permit to construct a building used to hold farm animals or manure. Nutrient management strategies and plans are used by some farms to optimize the relationship between the land-based application of nutrients, farm management techniques and crop requirements; to maximize the efficient use of on-site nutrients; and to minimize adverse impacts to the environment.

Nutrient Management Strategies and Plans

Nutrient Management Strategy (NMS)

Nutrient management strategies are required for farms that generate more than 300 NU annually, if there is a building permit application to construct or expand barns or ASM storage facilities so that more than 5 NU would be generated, or if there is a regulated mixed anaerobic digester on the farm. The strategy must be approved by the Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

A NMS sets out an environmentally acceptable method for managing all prescribed materials generated at an agricultural operation. Where prescribed materials are generated in the course of the operation, the operation shall ensure that the nutrients are managed in accordance with a NMS if the operation is phased in by the Regulation, Part II. The nutrient management strategy details the storage and destination of all the manure generated on the property. It does not deal with application of manure to the land.

Nutrient Management Plan (NMP)

A NMP details how nutrients are to be applied to a given land base. A NMP is based on both the components of the nutrients used and the characteristics of the field. The NMP optimizes the utilization of the nutrients by crops in the field and minimizes environmental impacts. A person

who owns or controls an agricultural operation, which is phased in by the Regulation, Part II, and generates, greater than or equal to 300 NU or is located within 100 metres of a municipal well must ensure that nutrients are managed in accordance with a NMP if they land apply nutrients on their farm unit.

These plans are filed on the farm and are reviewed by the MOE Agricultural Environmental Officer during compliance inspections. The Officer can request OMAFRA to review and approve a nutrient management plan. Under the Regulation, a farm that is not required to have a nutrient management strategy cannot be required to have a nutrient management plan, even if the farm is within 100 m of a municipal well.

The regulation contains land application standards that include timing restrictions for application, vegetated buffers zones adjacent to surface water, and setbacks from surface water and wells that are applicable to all farms that require a nutrient management plan or NASM Plan. These standards are considered to be best management practices for non-regulated farms.

The “Nutrient Management Protocol” (Ontario Ministry of Agriculture and Rural Affairs, 2009) provides technical standards and procedures related to O. Reg. 267/03 – General. According to the Protocol, a nutrient management strategy must contain numerous components including information about the type and volume of prescribed materials (ASM and NASM) generated by the farm, the intended destination of the materials, and storage facilities. A nutrient management plan must contain numerous components including information about the nutrients that will be applied (type, content, application rate); the fields where the nutrients will be applied; and cropping practices, crop rotation and yields. The required contingency plan covers topics such as more nutrients than addressed in the ASM nutrient management strategy and/or plan, and unanticipated release of nutrients (e.g. spills).

Consultants who prepare approved nutrient management strategies and plans for ASM must be certified through the OMAFRA. Custom manure application businesses must have a Prescribed Materials Business Owners License. Employees of the custom application business who apply nutrients to an agricultural operation that requires a nutrient management plan or NASM plan must have a Nutrient Application Technician License.

Compliance

Compliance and enforcement of the *Nutrient Management Act* is the responsibility of the MOE. According to “Complying with Environmental Legislation on Farms” (Ontario Ministry of the Environment, 2009), the MOE’s on-farm compliance program uses a problem-solving approach to help farmers comply with the law and manage environmental issues through education and outreach. Minor violations can be addressed through voluntary abatement plans, authorizing document amendments (to the nutrient management strategy and/or plan), and provincial officer orders. Enforcement, including Provincial *Offenses Act* summons, investigation and prosecution, are used in situations where serious issues are identified.

Nutrient Management Act and Ontario Regulation 106/09 - Disposal of Dead Farm Animals

The Ministry of Agriculture, Food and Rural Affairs and the Ministry of the Environment, in consultation with stakeholders, developed new regulations for the disposal of deadstock in Ontario (Government of Ontario, 2009). The Dead Animal Disposal Act (1968) was replaced by the Disposal of Dead Farm Animals regulation under the Nutrient Management Act and the Disposal of Deadstock regulation under the Food Safety and Quality Act. The new regulations came into force on Friday, March 27, 2009. They provide more disposal options for livestock producers and meat plant operators, with measures that will protect the environment.

Under the *Nutrient Management Act*, one of the nine permitted disposal methods for dead farm animals is to compost the dead animals. This regulated compost is considered agricultural source material that can be applied to land. In Ontario, all on-farm compost must stay on the farm where it originates because federal regulations prohibit the sale or removal of on-farm composted material that could contain specific risk material. The Canadian Food Inspection Agency recommends that this compost not be spread on pasture or grazing land.

Composting sites are subject to various setbacks to reduce the potential for nuisance complaints (from odour) and any potential threat to water quality (from liquid runoff). The minimum setbacks for dead farm animal composting sites include a setback of 100 m from any municipal well.

Currently dead stock burial is not identified as a prescribed drinking water threat. A SPR can apply through MOE to have it added as a local threat.

Canada-Ontario Environmental Farm Plan

The Environmental Farm Plan (EFP) is a program that is delivered locally through the Ontario Soil and Crop Improvement Association with expertise provided by the Ontario Ministry of Agriculture and Food. It is a voluntary educational program for farmers delivered through local workshops. Participants progress through a risk assessment and action plan development for their farm. The risk assessment gives the farmer the opportunity to assess the current level of environmental concern in up to 23 different areas on the farm and access funding to make improvements for areas of identified risk (Ontario Soil and Crop Association, 2005). The information sheets on nutrient management for the EFP program are consistent with the requirements of O. Reg. 267/03.

c. Municipal

Municipal Act

Municipalities have the ability to pass by-laws about the economic, social and environmental well-being of the municipality, and about the health, safety and well-being of people, under the *Municipal Act* (Government of Ontario, 2001).

Appendix A includes detailed information on local land use approaches to managing these drinking water threats.

Minimum Distance Separation Formulae

Agricultural activities can include livestock facilities (e.g. barns and manure storage), and are generally permitted by municipalities on lands that are designated and zoned for agricultural and rural use. In order to reduce incompatibility concerns about odour from livestock facilities, Provincial minimum distance separation (MDS) formulae are used by municipalities to separate land uses.

Different formulae are applied to new or expanding non-agricultural uses (such as houses) that could impact existing livestock facilities (MDS I), and to new or expanding livestock facilities that could impact existing non-agricultural uses (MDS II) (Ontario Ministry of Agriculture and Rural Affairs, 2006). The formulae are applied to lands subject to most types of *Planning Act* applications and to activities that require building permits. The MDS I formulae are applied to low-intensity uses (e.g. industry, one house) proposed within a 1 km radius of the livestock facility, and to high-intensity uses (e.g. a subdivision) proposed within a 2 km radius.

MDS may have the effect of providing separation between a livestock facility and a municipal well if the municipal well is located on a non-agricultural lot zoned, for example, Institutional. However, there are cases where municipal wells are located on a large property zoned for agricultural uses or on a separate lot that has an agricultural zoning. In those instances, MDS would not be applied as the well would not fall under either of the Type A or Type B land uses.

It is possible that private wells can be afforded some separation through the application of MDS, if the private well is located on a rural residential lot. However, if the private well is located on the same lot as a livestock facility MDS would not provide separation it would be O. Reg 267/03 that would provide the minimum well separation.

d. Other Programs

Appendix A includes detailed information on local stewardship, education/outreach, and incentive programs being implemented locally.

5. Gaps in existing legislation, policies and programs

- According to MOE staff, there is limited field verification on the accuracy of the information provided in an application for a certificate of approval, and that the conditions of a certificate of approval are being met.

- Under Ontario Regulation 267/03, Strategies are required for large farms (> 300 nutrient units) and any farm that requires a building permit for barn expansion or manure storage. The idea is that at some point all livestock farms will require a building permit and then be phased into the NM regulations. For farms that do not fall under this regulation, NMS and NMP can be completed voluntarily, but cannot receive approval by OMAFRA.

6. Policy considerations

- REMINDER: The main consideration for reducing or eliminating drinking water threats related to the application and storage of ASM is to make sure that ASM does not enter surface water and/or groundwater.
- The agricultural sector has been actively raising environmental awareness and researching and implementing environmental best management practices for the last few decades.

Examples of risk management measures and policy ideas

For discussion purposes, this section of the report provides examples of risk management measures and policy ideas that could be applicable to the application of ASM to land, and to the storage of ASM. It is not an exhaustive list.

The examples are categorized by the types of policy tools that can be used to meet the source protection plan objectives. The MOE Water Quality Risk Management Measures Catalogue (Version 2, 09/07/2010 – see Appendix C) was reviewed as part of this exercise and measures were incorporated where appropriate.

Table 6.1 – Examples of risk management measures and policy ideas for ASM

Policy Tool	Examples
Education and Outreach	<ul style="list-style-type: none"> • Promote voluntary nutrient management strategies and plans for farms that are not phased into O. Reg. 267/03. • Encourage farmers within vulnerable areas to complete an EFP for self assessment of potential risks to source water. • Inform agricultural population about source water protection, including awareness that they are not being targeted more than other business sectors in urban or rural areas.
Incentive Programs	<ul style="list-style-type: none"> • Area-wide incentive programs for agricultural/rural landowners to establish best management practices which protect source water in vulnerable areas • Encourage the Ontario Drinking Water Stewardship Program to consider long term funding of BMPs in vulnerable areas

Policy Tool	Examples
Municipal Tools and Land Use Planning	<ul style="list-style-type: none"> • Prohibit new storage of ASM within vulnerable areas where it can be a significant drinking water threat, in official plans and zoning by-laws.
Prescribed Provincial Instruments	<ul style="list-style-type: none"> • Encourage OMAFRA to review approved nutrient management strategies and plans to ensure compliance with the local Source Protection Plans. • Require/encourage MOE to prioritize inspections in vulnerable areas, and to conduct regular inspections. • Do not permit application and/or storage of ASM in an IPZ or WHPA where it would be a significant drinking water threat.
Municipal Operations / Infrastructure	
Land Securement	<ul style="list-style-type: none"> • Purchase or place easements on land in IPZs and WHPAs.
Risk Management Plans	<ul style="list-style-type: none"> • Require risk management plans for farms in IPZs and WHPAs where application and storage of ASMs are or would be significant drinking water threats and are not governed under the NMA.
Prohibition	<ul style="list-style-type: none"> • Prohibit the application and storage of ASM in IPZs and WHPAs where these activities are or would be significant drinking water threats.
Restricted Land Uses	<ul style="list-style-type: none"> • Flag agricultural land uses (that are associated with the application and storage of ASM) in IPZs and WHPAs where these activities are or would be significant drinking water threats so that municipal planners and building official consider implications of proposed development.
Technological Options	<ul style="list-style-type: none"> •

Appendix A – Local Information on Drinking Water Threats

1. Local scale of the drinking water threat?

[Insert description and/or map of local threat context with reference to Table A]

- The Application of ASM is or would be a significant threat in {insert area}.
 - This activity is most likely to occur in {insert area}

- **Table A - Agricultural Source Material Drinking Water Threats in the SPA**

Vulnerable area			Application of ASM to Land				Handling and Storage of ASM			
			S	M	L	feasible	S	M	L	feasible
Name of groundwater system	WHPA A, B	10	✓	✓			✓	✓		
	WHPA C	8		✓	✓			✓	✓	
	WHPA D	6			✓				✓	
	WHPA E	7		✓	✓			✓	✓	
Name of groundwater system	WHPA A, B	10	✓	✓		✓	✓	✓		✓
	WHPA C	8		✓	✓	✓		✓	✓	✓
	WHPA D	6			✓	✓			✓	✓
	WHPA E	7		✓	✓	✓		✓	✓	✓
Name of surface water system	IPZ-1									
	IPZ-2									
	IPZ-3									

Where V.S. means vulnerability score, S means significant, M means moderate, and L means low drinking water threat.

- The Storage of ASM is or would be a significant threat in {insert area}.
 - This activity is most likely to occur in {insert area}

- Data from MOE and Statistics Canada is available so that you can determine the number of farms in your Source Protection Area that currently require nutrient management strategies or plans.

2. Local approaches to managing these drinking water threats.

a. Land Use Planning

[Insert description of local land use approaches that are being used]

- Is the land application of ASM currently addressed by municipalities?

b. Other Local Programs

[Insert discussion on local programs including Stewardship, Education/Outreach, Incentive, etc. implemented by Conservation Authority, Municipality, or other watershed/community groups.]

c. Cross Jurisdiction Considerations

[Insert discussion on policy approaches being considered by neighboring Source Protection Areas/Regions.]

3. Further Research for Specific Vulnerable Areas

- [insert additional background research needed, where applicable]

Appendix B - Reference List

Government of Canada. 1985. Fisheries Act. <http://laws.justice.gc.ca/en/F-14/index.html>

Government of Ontario. 1990. Environmental Protection Act. www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e19_e.htm

Government of Ontario. 1990. Ontario Water Resources Act. www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm

Government of Ontario. 2001. Municipal Act. www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_01m25_e.htm

Government of Ontario. 2002. Nutrient Management Act. www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_02n04_e.htm

Government of Ontario. 2003. Nutrient Management Act. Ontario Regulation 267/03 - General Regulation. www.e-laws.gov.on.ca/html/regs/english/elaws_regs_030267_e.htm

Government of Ontario. 2009. Nutrient Management Act. Ontario Regulation 106/09 - Disposal of Dead Farm Animals. www.e-laws.gov.on.ca/html/source/regs/english/2009/elaws_src_regs_r09106_e.htm

Ontario Ministry of Agriculture and Rural Affairs. 2006. Provincial minimum distance separation formulae. www.omafr.gov.on.ca/english/landuse/guide_toc.htm

Ontario Ministry of Agriculture and Rural Affairs. 2009. Nutrient Management Protocol. www.omafr.gov.on.ca/english/nm/regs/nmpro/nmprotc_09.htm

Ontario Ministry of the Environment. 2009. Complying with Environmental Legislation on Farms. www.ene.gov.on.ca/publications/7212e.pdf

Ontario Ministry of the Environment. 2009. Tables of Drinking Water Threats. 2008, as amended in 2009. www.ene.gov.on.ca/publications/cw/7561e03.pdf

Ontario Soil and Crop Association. 2005. Canada-Ontario Environmental Farm Plan. www.ontariosoilcrop.org/en/programs/programsaboutefp.htm

Appendix C - Additional Resources

1. Drinking Water Threat Contaminants Summary (DRAFT). Separate document.
2. The MOE Water Quality Risk Management Measures Catalogue (Version 2, 09/07/2010)
<http://maps.thamesriver.on.ca/swpCAMaps/rmc/disclaimer.aspx>
3. Ministry of the Environment. SPP Bulletins available at:
www.conservationontario.ca/members/members_source_protection_committee/spc_index.html (username: spcmember; password: spc123)

Available as of December 2010:

- Overview of Source Protection Plan requirements
- Notice of when Source Protection Plan preparation begins
- Existing municipal authorities and land use planning
- Section 57 Prohibition
- Overview of Prescribed Instruments
 - Table 2 – Prescribed Instruments Management of Drinking Water Threats
 - Pesticide permits
 - Renewable energy approval
 - Municipal drinking water licence and drinking water works permits
 - Example of municipal drinking water licence
 - Example of drinking water works permit
 - Nutrient Management Instruments
 - Sample letter of approval – nutrient management strategy
 - Sample nutrient management strategy and plan
 - Sample record of approval – nutrient management strategy
 - Sample multiple year nutrient management strategy and plan