

Drinking Water Source Protection Background Document
**The establishment, operation or maintenance of a system that collects, stores,
transmits, treats or disposes of sewage**
Subthreat: Stormwater Management

v.3 March 2011
(Amendments in Tracked Changes)

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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. Definitions

This paper provides background information for prescribed drinking water threat 2A -- **The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage, subthreat: stormwater management.**

The intent of this paper is to consider stormwater management in the light of the *Clean Water Act, 2006*. Source Protection Committees are challenged with the task of addressing risks to drinking water sources by managing the activities which threaten drinking water sources as understood through the Tables of Drinking Water Threats. The goal of management is to produce cleaner effluent from stormwater management systems, thus reducing impacts on both surface and groundwater through the reduction of contaminants on the landscape, reduction of non-essential water use (e.g. driveway washing, lawn-watering), and improved stormwater management measures.

The definitions pertaining to stormwater are found in the *Ontario Water Resources Act* and O. Reg 525/98. **Stormwater** means rainwater runoff, water runoff from roofs, snowmelt and surface runoff. Some additional examples would include lawn watering and car washing since this water also makes its way into water bodies via the storm sewer system. Under the *Clean Water Act* the threat to drinking water is limited to stormwater management facilities. **Stormwater management facility** is defined as a facility for the treatment, retention, infiltration or control of storm water. The word “facility” is not defined thus it is assumed that this definition applies to the system of managing stormwater, including stormwater pipes that discharge directly into streams or water bodies. This paper will not deal with the issue of combined sanitary and storm sewers. While storm water management is also in place to address issues of flooding, erosion, recharge and other environmental goals, this paper will not speak to these topics

Appendix A to this report outlines the possible sources of some of the contaminants in stormwater.

Where stormwater is managed, it is often under a storm water management plan which addresses run off through conveyances and end of pipe collection and treatment systems.

Conveyance is the movement or transfer of stormwater via gutters, sewer pipes, culverts and ditches. Storm sewers collect runoff along roads, and are normally separate from sanitary sewers that collect wastewater from homes or business.

End of pipe collection and treatment systems provide quantity and quality control. There are many types of these “end of pipe” management systems. One of the most prevalent is the stormwater management pond which help capture excess runoff, allows time for settling of suspended pollutants and retains it until it can be absorbed back into the natural watercourses.

Other management techniques include oil and grit separators which are containment units designed to remove coarse sediment and oils from stormwater before it enters the storm-drain network, the ground or other treatment.

Stream restoration is also a part of stormwater management, because stream quality, as measured by bank stability, water quality and available habitat, deteriorates when impervious cover increases in a watershed.

2. What causes this activity to be a drinking water threat?

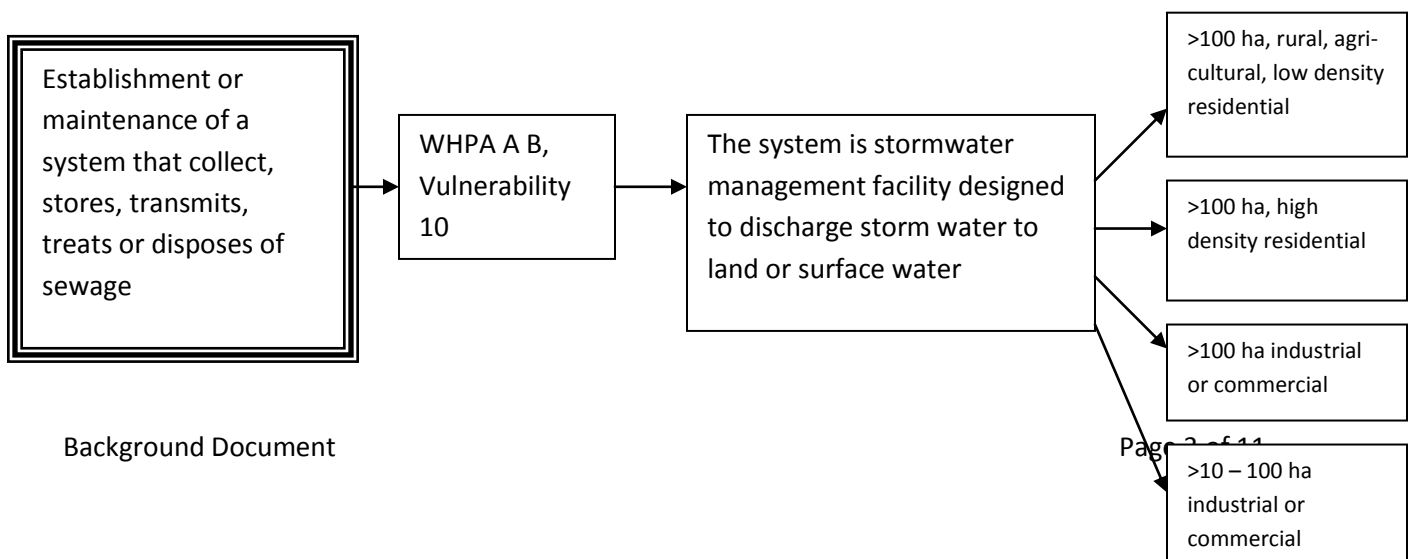
Stormwater management systems can be a significant or moderate chemical and pathogen sewage threat for rural, urban (high density residential) or industrial/commercial, depending on the size of the drainage area and which chemical.

There are twenty chemicals and pathogens included in the MOE Tables of Drinking Water Threats (Ontario Ministry of the Environment, 2009) for stormwater management facilities. Any of these contaminants can make their way into surface water and groundwater and threaten the safety of a drinking water source.

- Pathogens
- Aluminum
- Arsenic
- Cadmium
- Chloride
- Chromium VI
- Copper
- Glyphosate
- Lead
- Mecoprop
- Mercury
- Nickel
- Nitrogen
- Polycyclic aromatic hydrocarbons
- Petroleum hydrocarbons F1 to F4
- Total phosphorus *
- Zinc

* Total phosphorous is only considered for surface water because excessive inputs result in eutrophication and can cause toxic algae blooms.

The circumstances (277 to 504 and 1949) are divided based on the chemical released, the size of the drainage area the facility serves and the predominant surrounding land uses flowing into the facility.



There are 25 circumstances where the threat can be significant. In all cases the drainage area for the facility must be larger than 100 hectares and the vulnerability score must be a 10. Three of these circumstances pertain to low density or rural land uses, 7 pertain to high density residential land uses and the rest pertain to industrial/commercial land uses. There are 55 circumstances where the drinking water threat would be moderate. In these circumstances the vulnerability score may be less than 10 but the drainage area can range from 10 ha to over 100 ha depending on the surrounding land use and the chemical of concern.

It should be noted that the circumstances included in the MOE Tables of Drinking Water Threats (2008, as amended in 2009) are for **stormwater management facilities only** and do not include run off from properties where there is no management facility such as a farm field.

3. Understanding the nature of the drinking water threats

Depending on the location, drainage area and type of land use, a stormwater management facility can be classified as a significant, moderate or low drinking water threat. Appendix B displays where these threat activities in this SPA are or would be drinking water threats according to the MOE Tables of Drinking Water Threats (2008, as amended in 2009).

4. Applicable Legislation, Policies and Programs

a) Provincial

Ontario Water Resources Act (Government of Ontario, 1990)

Stormwater management facilities require a certificate of approval (C of A) issued by the MOE under the *Ontario Water Resources Act*.* The MOE "Guide for Applying for Approval of Municipal and Private Water and Sewage Works" (August 2000) is used by applicants to ensure that their proposals meet the legislative requirements for a C of A. The terms and conditions of the C of A generally address:

- criteria for operation and performance of the stormwater management facility,
- requirements for monitoring and recording of specific indicators of the environmental impact of the works (water quality, not quantity),
- reporting on incidents, and
- Provision of contingencies to prevent and deal with accidental spills.

They may also deal with such issues as:

- time limited approval,
- timing for upgrades to the facility to meet new effluent quality requirements,
- financial assurance, or

- Requirement to obtain some other approvals before commencement of the construction of the conditionally approved facility or its part.

*In some cases these responsibilities have been delegated to municipalities

Stormwater Management Planning and Design Manual

The MOE “Stormwater Management Planning and Design Manual” (March 2003) provides practical information on how to design stormwater management facilities in Ontario. It focuses on quantity and quality control and it is the main reference document for urban stormwater management within many Source Protection Areas. There are three different levels of quality treatment all relating to sediment control (see below), although the document does mention the need to consider bacteria near recreational/swimming areas and temperature for cold water streams.

- *Enhanced* – removes 80% of suspended solids and is used in areas with highly permeable soils, sensitive spawning habitat, high baseflow, clear waters and low erosion.
- *Normal* – removes 70% of suspended solids and is used in areas with some sediment loading and less sensitive spawning habitat.
- *Basic* – removes 60% of suspended solids and is used in areas with high sediment loading and significantly altered stream system with little opportunity to rehabilitate.

Pesticides Act (Government of Ontario, 1990) and Ontario Regulation 63/09 (Ontario's Cosmetic Pesticides Ban – Government of Ontario, 2009)

The MOE Tables of Drinking Water Threats identify two pesticide ingredients (glyphosate and mecoprop) that can be found in stormwater discharge and result in a drinking water threat. Ontario’s cosmetic pesticides ban applies to the majority of pesticides, including these two.

The cosmetic pesticides ban took effect on April 22, 2009. The requirements of the ban are detailed in the Pesticides Act and Ontario Regulation 63/09. The ban should have the effect of reducing the amount of pesticides in stormwater.

The provincial ban prohibits the application of pesticides for cosmetic purposes on lawns, vegetable and ornamental gardens, patios, driveways, cemeteries, and in parks and school yards. More than 250 pesticide products are banned for sale and over 95 pesticide ingredients are banned for cosmetic uses. Exceptions to the ban are made for: public health and safety, natural resources, golf courses, sports fields, specialty turf, agriculture, forestry and public works.

Local fire departments must be made aware of pesticide storage related to manufacturers, operators and vendors to protect human health and the environment.

b) RegionalConservation Authority Planning Policy

Ontario Conservation Authorities (CAs) are commenting agencies under the *Planning Act*. One of their roles is to review stormwater management plans for new development and to provide comments to their member municipalities. The following aspects are considered through this review:

- maintenance of the hydrologic cycle,
- recognition of riparian water rights, and
- retention and improvement of ecosystem health.

Flood control, maintaining baseflow in watercourses, water temperature, erosion and sediment control, limiting nutrient and bacteria loading, maintaining fish habitat, and groundwater recharge and contamination may be of interest in a particular watershed or subwatershed.

To ensure consistency in their approach to stormwater management, many CA's have various guidelines for stormwater management that form part of the Planning Policy. These guidelines outline a CA's main policies and objectives for stormwater management. Some of the CA's roles include reviewing applications for development on or in Regulated Areas, as well as providing technical advice to approval authorities.

Municipal

Municipalities throughout Ontario have varying levels of policies regarding stormwater management and natural vegetative buffers for water bodies in their official plans and in some cases Stormwater Management Facilities under the OWRA. The importance of protecting natural heritage features is also recognized for its role in decreasing stormwater runoff.

- Stormwater Management - All municipalities require stormwater management (SWM) plans to accompany subdivision applications. Most of them also require SWM plans for commercial and industrial development.
- Vegetative Buffers - Development setbacks from water bodies have generally increased from 15 m to 30 m. The intent of the water setback is to provide a buffer of undisturbed soil and vegetation along the shoreline, which will help to filter runoff, prevent soil erosion, and provide wildlife habitat. A number of municipalities require or encourage the maintenance of natural vegetation cover (trees, shrubs, vines, groundcovers) within at least 15 m of the shoreline.

5. Gaps in existing legislation, policies and programs

The provincial legislative and municipal requirements for stormwater management are comprehensive; however, interviews with key staff are needed to more accurately identify gaps.

6. Policy considerations

- *Clean Water Act* Part IV tools interim risk management plans, risk management plans, prohibition, and restricted land uses cannot be used for sewage systems, which include industrial sewage works.
- The Certificate of Approval under the OWRA is a provincial instrument to which the SPC can ~~attach~~ ask MOE to include conditions

Policy Tool	<u>Examples</u>
Education and Outreach	
Incentive Programs	<ul style="list-style-type: none"> • Recommendations to retrofit poor stormwater management facilities.
Land Use Planning	<ul style="list-style-type: none"> • Make new development subject to water sensitive urban design principles.
Prescribed Provincial Instruments	
Municipal Operations / Infrastructure	
Land Securement	
Risk Management Plans	
Prohibition	
Restricted Land Uses	

Appendix A – Contaminant Sources in Stormwater Runoff

Aluminum – Aluminum comes from roofing materials, soil erosion, scrap metal and wearing automotive parts.

Arsenic – Arsenic was used as a wood preservative for many years. It can also be found in plumbing and pesticides among other products. It occurs naturally in bedrock deposits on the Canadian Shield.

Cadmium, copper, lead, nickel and zinc – These metals can be found in vehicle exhaust, brake linings, and tire and engine wear.

Chloride – The main source of chloride in stormwater is from road de-icers and detergents. It occurs naturally in bedrock deposits.

Mercury – mercury is often associated with electronics, but it can result from atmospheric deposition (coal burning, waste incineration).

Nitrogen, total phosphorus - Nitrogen is found in fertilizers that are applied to lawns and golf courses, the decomposition of natural rock and soils, air deposition from vehicle exhaust, detergents used to wash cars on the street, and pet waste.

Glyphosate, mecoprop – these chemicals are active ingredients in herbicides.

Polycyclic Aromatic Hydrocarbons (PAHs) – These chemicals can be found in vehicle exhaust, coal tar-based sealants used on paved roads and parking lots, and creosote treated wood.

Petroleum Hydrocarbons – The sources of petroleum hydrocarbons include the disposal of used oil and other fluids on the ground or into storm drains, spills of gasoline or oil, and leaks of oil and other fluids from vehicles, hydraulic oil is at industrial sites, runoff from residential car washing.

Pathogens – Pathogens can be associated with animal waste and combined sewers.

Appendix B – 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 management of onsite sewage systems is or would be a significant, moderate, or low threat in {insert areas}.
 - This activity is most likely to occur in {insert area}
 - Maps and figures of where this is or would be a local threat

Table A - Stormwater Drinking Water Threats in the Source Protection Area

Vulnerable area		vulnerability score	significant	moderate	low
Put WHPA here	WHPA A, B	10	✓	✓	✓
	WHPA C	8	x	✓	✓
	WHPA D	6	x	x	✓
	WHPA E	7	x	✓	✓
HVA/SGRA		6	x	x	✓
Put IPZ here	IPZ 1	9	✓	✓	✓
	IPZ 2	8.1	✓	✓	✓

2. Local approaches to managing these drinking water threats.

a. Land Use Planning

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

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 C – Reference List

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. 1990 Pesticides Act. www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90p11_e.htm

Government of Ontario. 2009. Ontario's cosmetic pesticides ban. <http://news.ontario.ca/ene/en/2009/03/ontarios-cosmetic-pesticides-ban.html>

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 Ministry of the Environment. 2003. Stormwater Management Planning and Design Manual. www.ene.gov.on.ca/envision/gp/4329eindex.htm

Appendix D – Additional Resources

1. 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