

Threats Factsheet - ROW CROPS



OVERVIEW

Now is a great time to start managing your operation so that it does not pose a threat to drinking water sources. The drinking water source that landowners are most likely to impact by their actions is their own. This fact alone should be an encouragement to implement best management practices. Drinking Water Source Protection has been studying local municipal drinking water systems in order to learn where the water that contributes to these systems comes from. The activities that take place in some contributing areas can have an impact on the groundwater or surface water quality.

This factsheet outlines the different threats that might pertain to row crop farmers. It also provides examples of measures that may help manage these threats. Other threats will be covered in other landowner factsheets in this series. If you are in a vulnerable area and there are significant threats on your property, based on the Assessment Report, you will be contacted by the local Drinking Water Source Protection office. Policies will be developed for all significant threats. Information on the threats list and the Assessment Report can be found in "Threats Factsheet - General" and on www.waterprotection.ca.

The material in this factsheet is a summary of legislation. The reader should refer to the complete *Clean Water Act* and associated regulations for full details. Please note that other legislation outside of the work of the *Clean Water Act* may apply to your property. It is suggested that you consult with other regulatory agencies relevant to your operation.

WHAT ARE THREATS?

A threat is an activity that has a harmful effect, or the potential to have a harmful effect, on the quality or quantity of drinking water sources. The Ministry of the Environment for the Province of Ontario created a list of 21 threats, two of which are quantity threats and the rest are quality threats.

THE THREATS COVERED IN THIS FACTSHEET

Quality Threats

2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage.
6. The application of non-agricultural source material to land.
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer to land.
9. The handling and storage of commercial fertilizer.
10. The application of pesticide to land.
11. The handling and storage of pesticide.

The complete Provincial Table of Drinking Water Threats (Threats Tables) can be found on the Ministry of the Environment website at: <http://www.ene.gov.on.ca/en/water/cleanwater/cwa-technical-rules.php>

THREAT 2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage.

The circumstances whereby a landowner in a vulnerable area would have a significant threat in this category is if you have: i) any of the systems listed below servicing your property and ii) the discharge from the system may result in the presence of certain compounds (Acetone, Chloride, Dichlorobenzene-1,4 (para), nitrogen, sodium) in groundwater or surface water.

- earth pit privy
- privy vault
- grey water system
- cesspool
- leaching bed system and its associated treatment unit
- holding tank
- a sewage works within the meaning of the *Ontario Water Resources Act*

Water that goes down house drains can be either black water or grey water. Black water is the wastewater from toilets and grey water is from sinks, showers/bathtubs, dishwashers, and washing machines. Septic systems are designed to treat these wastes. Septic systems are not meant for garbage. There are bacteria in the tank that are able to breakdown human digested waste but can be harmed by inappropriate products. A septic system is not able to manage hazardous chemicals, prescription medications, food waste, feminine hygiene products, or excessive use of anti-bacterial products. Household hazardous waste days operated by municipalities or your county are the best option for disposing of these products.

A conventional septic system includes a concrete tank and tile bed. Advanced septic systems include another treatment step between the tank and bed. If you are in a particularly vulnerable area, an advanced system may provide additional treatment to protect water quality.

A septic system requires regular maintenance to function properly. The system should be inspected and pumped every 3-5 years. Proper maintenance of a septic system is recommended including regular inspections and pump outs whenever the sludge and scum content reaches 1/3 of working capacity of the tank. Access risers are used to access effluent filters in newer tanks. These can be rinsed or washed off yearly by landowners following the manufacturer's guidelines.

Septic systems should be located at least 15 metres from any drilled well with six metres of casing or 30 metres from a large diameter well to avoid contamination. Tile beds should not be parked or driven on by heavy equipment or vehicles. The cover for this area should be simple grass, not mulch or trees. Water-seeking trees (e.g., willows) can cause damage and the malfunctioning of the tile bed when roots invade the tile runs. A tile bed needs air flow from the surface to function properly, so anything that might compact or compress the soil and reduce air flow should be avoided.

Sump pumps, downspouts and eavestroughing should not be connected to septic systems, as excess water can overwhelm the system and cause untreated solids to be prematurely distributed to the tile bed. Any clear water that accesses the tile bed can also affect its ability to work properly, so diversion should be practiced to avoid bed saturation.

Household water use should be spread over time so that all wastewater entering the tank has time for the tank bacteria to degrade wastes; for example, avoid washing five loads of laundry in one day. Water softeners should discharge to a separate drain tile, since excess salt can harm the functioning of a septic system. Water softeners should be turned off when you go on vacation, as their continued operation can release salt unnecessarily into the environment and waste your money for salt purchases. Alternatives to traditional salt may also be considered.



THREAT 6. The application of non-agricultural source material (NASM) to land.

Non-agricultural source materials (NASM) can include pulp and paper biosolids, sewage biosolids, food processing wastes, anaerobic digestion output, and similar materials applied to land as nutrients (see O.Reg. 267/03 s. 1(1) under the *Nutrient Management Act*). The following is a summary of the chemical threats that are significant for vulnerable areas.

- Column 1 - the non-agricultural source material is applied to land located in a vulnerable area and the managed land map shows a managed land percentage for the applicable area
- Column 2 - the livestock density map shows a livestock density for the applicable area that is sufficient for annual application of non-agricultural source materials at a rate
- Column 3 - under the circumstances from Columns 1 and 2, if the application may result in a product listed in this column, it is a significant threat.

Table 1: Managed Lands and Livestock Density Circumstances

Column 1 -Managed land %	Column 2 -Livestock Density for area that it is sufficient to annually apply ASMs at a rate of:	Column 3 -Application may result in presence of this element in groundwater or surface water
Less than 40%	More than 1.0 NU/acre	Nitrogen or Phosphorus
At least 40% not more than 80%	At least 0.5 not more than 1.0 NU/acre	Nitrogen or Phosphorus
	More than 1.0 NU/acre	Nitrogen or Phosphorus
More than 80%	Less than 0.5 NU/acre	Nitrogen or Phosphorus
	At least 0.5 not more than 1.0	Nitrogen or Phosphorus
	More than 1.0 NU/acre	Nitrogen or Phosphorus

This threat is classified as both a chemical and pathogen threat. Table 1 above contains circumstances related to this category that may make it a significant threat in vulnerable areas. The greatest concern is that nitrogen or phosphorus may make its way into groundwater or surface water.

Proper permits or certificates of approval need to be received before using non-agricultural source material as a nutrient source on your farm. The procedure involved in acquiring this permission includes soil testing and NASM testing for certain parameters. Land application and material quality standards must be observed when dealing with NASMs. Waiting periods and setback distances (e.g. from surface water) have also been developed as part of the most current regulations. As of January 1, 2011, OMAFRA will be responsible for approvals to apply NASMs to agricultural land.

For chemical threats, the Provincial Table of Drinking Water Threats lists details such as the substance, the quantity of this substance, the vulnerable area, and the vulnerability score necessary for an activity to be considered as a significant, moderate or low drinking water threat. Chemical threats can exist in any vulnerable area, but the risk rating decreases with a longer time of travel.

Pathogen threat ratings take a similar approach; however, the circumstances do not specify minimum storage or application quantities for pathogen threats. A pathogen threat can exist in any part of an intake protection zone. To account for relatively short survival times of pathogens, the risk rating is “none” if the time of travel from the activity to the well exceeds two years in a wellhead protection area (WHPA). Thus, pathogen threats can only exist in zones A and B of a wellhead protection area and, when surface water can influence the well, zones E and F also.

More information and an example for managed lands is included later in this factsheet on page 10.

THREAT 7. The handling and storage of non-agricultural source material.

This threat is classified as both a chemical and pathogen threat. There are circumstances related to this category that make it a significant threat in vulnerable areas. The greatest concern is that nitrogen, phosphorus or pathogens may make their way into groundwater or surface water.

Significant chemical threats circumstances associated with the handling and storage of non-agricultural source material in a vulnerable area may occur if:

- The non-agricultural source material is stored in or on a permanent nutrient storage facility or on a temporary field nutrient storage site.
- The mass of nitrogen in the non-agricultural source material stored is at least 0.5 tonnes but not more than 5 tonnes.
- A spill of the material or runoff from the area where the material is stored may result in the presence of nitrogen in groundwater or surface water.
- A spill of the material or runoff from the area where the material is stored may result in the presence of phosphorus (total) in groundwater or surface water.

The significant pathogen threat circumstances that are associated with the handling and storage of non-agricultural source material relate to the material generated by a meat plant in a vulnerable area where:

- any portion of the material that is stored, or if a spill of the material or runoff from an area where the material is stored, may result in the presence of one or more pathogens in groundwater or surface water

Land application and material quality standards must be observed when dealing with NASMs. Waiting periods and setback distances (e.g from surface water) have also been developed as part of the most current regulations. As of January 1, 2011, OMAFRA will be responsible for approvals to apply NASMs to agricultural land.

Proper permits or certificates of approval need to be received before using non-agricultural source material as a nutrient source on your farm. The procedure involved in acquiring this permission includes soil testing and NASM testing for certain parameters.

THREAT 8. The application of commercial fertilizer to land.

The circumstances that relate to the application of commercial fertilizer being a significant threat are the same as those for Threat #6 - Application of NASMs. Please see Table 1 above for circumstances. The concern is that activities would result in nitrogen or phosphorus entering groundwater or surface water.

Best management practices for commercial fertilizer would include, but are not limited to:

- Apply fertilizers when crops can make use of them
- If you have excessively drained or shallow soils on fractured bedrock, you need to be more cautious; soil texture will affect absorption rate
- Cover crops can use nutrients when leaching is most likely to occur
- Break up soil before applying any liquid nutrient to break up any flow paths in soil
- Monitor your tile drains
- Rotate crops to use up nutrients that others may leave behind
- Apply fertilizer based on soil tests, crop usage and expected yields for your area
- Consider other inputs including: manure, crop residue, cover crops, and NASMs, as these can greatly increase your soil nutrient reserves
- Ensure that your fertilizer spreader is properly calibrated and check to make sure it does not get plugged during application
- Apply fertilizer in a band after crop is established.

Source: "Best Management Practices - Water Management", OMAFRA

THREAT 9. The handling and storage of commercial fertilizer.

The significant chemical threats related to handling and storage of commercial fertilizer are associated with: i) retail operations and ii) quantities that are more than 2500 kg of liquid or solid. The significant threat is that a spill of fertilizer or material containing fertilizer may result in the presence of nitrogen or phosphorus in groundwater or surface water.

On a farm, it is important to handle and store your commercial fertilizers in a protected location where rain or other precipitation will not allow the fertilizer to mix and run off into the soil and into your groundwater. Also, keep fertilizer away from children and animals that may eat this product.

Common sense when handling and storing fertilizer will do much to protect water supplies and prevent costly losses. Fertilizers contain nutrients including nitrogen, phosphorus, potassium, and other micronutrients



that help to improve or maintain crop yields. Runoff of these same nutrients can accelerate plant growth in streams. Spilled fertilizer can leach to groundwater and harm your water supply. Nitrate contamination of well water is of particular concern. In most cases, small amounts of fertilizer are stored on the farm and with proper management should not affect water quality.

Storage best management practices:

- Store only small amounts of fertilizers for short periods, prior to application
- Make sure all containers are clearly labeled and free of holes, tears or punctures
- Restrict access to the storage area
- Protect dry fertilizer (bulk or bagged) from weather and cover and store on a solid surface, such as sealed concrete
- Contain and store liquid fertilizer on a solid surface with a separate, adequately-sized runoff containment area, as this will prevent water contamination if a spill occurs

Mixing and loading practices:

- Where possible, locate a fertilizer mixing and loading area away from the well - 91 metres (300 ft) is the Environmental Farm Plan suggestion
- Use an anti-backflow device and/or a 14cm (6 inch) air gap above the sprayer tank to prevent any back-siphoning into the water source
- Use a separate water tank for your water supply where possible
- Use a mixing/loading area with a curbed solid pad (such as sealed concrete) and runoff containment to contain any spilled fertilizer

Source: “Best Management Practices - Water Management”, OMAFRA

THREAT 10. The application of pesticide to land.

Pesticide application is considered a chemical threat. If you are in a vulnerable area, please review Table 2 below to see if your pesticide application could pose a significant threat. If your area of land is (Column 1), and if application of pesticide (Column 2) may result in the presence of that pesticide in groundwater or surface water, it could pose a significant threat. A selection of common or trade names for pesticides is included in Column 3 for your reference. There may be other products that have the listed ingredient mentioned in Column 2. This is not intended to be a complete list.

Table 2. Pesticides of Concern

Column 1 - Area of land	Column 2 -Pesticide of concern	Column 3 -Common or trade names
Less than 1 ha	MCPA (2-methyl-4-chlorophenoxyacetic acid)	Checkmate, MCPA Ester, MCPA –Sodium Salt, MCPA Amine, Trophy
	Mecoprop	Mecoprop, Compitox
At least 1 ha, but not more than 10 ha	Atrazine	Aatrex, Clean Crop Atrazine 480, Converge 480
	Dicamba	Banvel, Oracle, Vanquish
	Dichlorophenoxy Acetic Acid (D-2,4)	D-2,4
	Dichloropropene-1,3	Telone
	MCPA (2-methyl-4-chlorophenoxyacetic acid)	Checkmate, MCPA Ester, MCPA –Sodium Salt, MCPA Amine, Trophy

Column 1 - Area of land	Column 2 -Pesticide of concern	Column 3 -Common or trade names
At least 1 ha, but not more than 10 ha	MCPB (4-(4-chloro-2-methylphenoxy)butanoic acid)	Clovitox Plus, Topside, Tropotox Plus
	Mecoprop	Mecoprop, Compitox
	Metalaxyl	Apron seed treatments, Allegiance, Cruiser
	Pendimethalin	Prowl
Greater than 10 ha	Atrazine	Aatrex, Clean Crop Atrazine 480, Converge 480
	Dicamba	Banvel, Oracle, Vanquish
	Dichlorophenoxy Acetic Acid (D-2,4)	D-2,4
	Dichloropropene-1,3	Telone
	MCPA (2-methyl-4-chlorophenoxyacetic acid)	Checkmate, MCPA Ester, MCPA –Sodium Salt, MCPA Amine, Trophy
	MCPB (4-(4-chloro-2-methylphenoxy)butanoic acid)	Clovitox Plus, Topside, Tropotox Plus
	Mecoprop	Mecoprop, Compitox
	Metalaxyl	Apron seed treatments, Allegiance, Cruiser
	Pendimethalin	Prowl
	Glyphosate	Credit, Glyfos, Renegade, Roundup, Vantage, Vision
Metolachlor or s-Metolachlor	Dual	

Pesticides should be applied under conditions that avoid: product drift, runoff into surface water or infiltration into groundwater. This application should take place by an authorized or licensed applicator with experience in this activity in order to calculate rates correctly and ensure that nozzles and other parts of the sprayer are working properly. A 15 metre buffer between the area where product is being applied and sensitive areas, including water wells and surface water, should be maintained. Ensure your sprayer is calibrated properly so that the amount you intend to apply is the actual rate. Use proper timing of day to get crops at their most receptive stage for the product.

The following are measures from the Risk Management Measures Catalogue (RMMC), which has been compiled by the Ministry of the Environment.

Use of Source Volume Reduction - Integrated Pest Management (IPM)

Use of Source Volume Reduction - IPM Scouting Field for Weeds

Measures can be applied to reduce the volume of pesticide that needs to be applied. Integrated pest management can be used, which combines several different methods that work together to manage pests more effectively. Scouting fields for weeds and matching the management approach to the weed problem can be used, as well as evaluating reduced or split application rates, rotating herbicide and pesticide modes of action, and precision application. Incorporating herbicides and pesticides into the soil will achieve maximum infiltration and reduced runoff, minimizing the amount of product that needs to be applied. Fertilizer applications should be based on soil tests to avoid the economic and environmental costs that can be incurred with excess fertilizer use. A soil test will show the levels of phosphorus and potassium present; however, soil tests for nitrogen are rare. Samples can be tested using readily available field kits or submitted to a private laboratory or cooperative extension service for testing and interpretation.

Field application of pesticides

Management of pesticide application:

- The use of proper equipment to reduce the risk of drifting including using a larger nozzle and less pressure, and proper water volume rates.
- Adjustment of rates and frequencies (e.g. based on field scouted need) and short half-life pesticides to reduce fall soil water concentrations to half WQ standards.
- No application prior to forecasted heavy rainfall (likely to induce runoff events).
- Protection from drift by wind.
- Management practices to reduce soil erosion to <6T/ha.
- Full Integrated Pest Management.
- Irrigation water management to minimize leaching, erosion and water management to reduce pesticide concentrations in runoff to one half WQ standards prior to release.

THREAT 11. The handling and storage of pesticide.

“Pesticide storage should be designed to store the chemicals, prevent spills and contain any spills should they occur. Pesticide storage buildings should be dry, heated, well-ventilated, have a curbed floor, locked door, and signs posted. All products should remain in original containers with label.” (“Best Management Practices - Water Management”, OMAFRA)

Locks help to keep family members safe and prevent theft. A separate storage facility helps to keep these products away from livestock, pets and people who are unfamiliar with the products, their uses and their associated hazards. Do not store any pesticides in a container that has been used for human consumption – pop bottles, etc.

Water is an important component in making sure your crop protection products work effectively. Nurse tanks or portable water tanks are a valuable way to transport water to spraying sites and avoid contamination of your private water supply. Avoid filling your sprayer directly so that any contamination of the hose and water line does not contaminate your entire water system. If you are planning to fill nurse tanks or sprayers ensure that your faucet has an anti-backflow device so that contaminated water cannot be siphoned back into your personal water system or well.

Proper disposal of sprayer containers is important. Following industry standards and performing a triple rinse will allow you to get full value of your product. Recycle containers at a local drop off site with labels removed. If you are unsure, check with the retailer that sold you the product for safe disposal methods.

To determine if your activity is a significant threat, refer to Table 3 below.

Table 3. Pesticide Storage

Scenario A. A pesticide is stored at a facility where it is manufactured or processed, or from which it is wholesaled, excluding storage related solely to retail sale or for use in extermination within the meaning of the <i>Pesticides Act</i> and Column 1 applies and may result in Column 2.	
Column 1 - The total mass of all materials stored that contain the pesticide, in any form including liquid or solid, is:	Column 2 - A spill of this pesticide or material containing this pesticide may result in their presence in groundwater or surface water
More than 2500kg	- MCPA (2-methyl-4-chlorophenoxyacetic acid) - Mecoprop

Scenario B. A pesticide is stored for retail sale or for use in extermination within the meaning of the <i>Pesticides Act</i> and Column 1 applies and may result in Column 2.	
Column 1 -The total mass of all materials stored that contain the pesticide, in any form including liquid or solid, is:	Column 2 -A spill of this pesticide or material containing this pesticide may result in their presence in groundwater or surface water of:
More than 250kg but not more than 2500kg	- MCPA (2-methyl-4-chlorophenoxyacetic acid) - Mecoprop
More than 2500kg	- Dicamba - Dichlorophenoxy Acetic Acid (D-2,4) - Dichloropropene-1,3 - MCPA (2-methyl-4-chlorophenoxyacetic acid) - MCPB (4-(4-chloro-2-methylphenoxy)butanoic acid) - Mecoprop - Metalaxyl - Metolachlor or s-Metolachlor - Pendimethalin



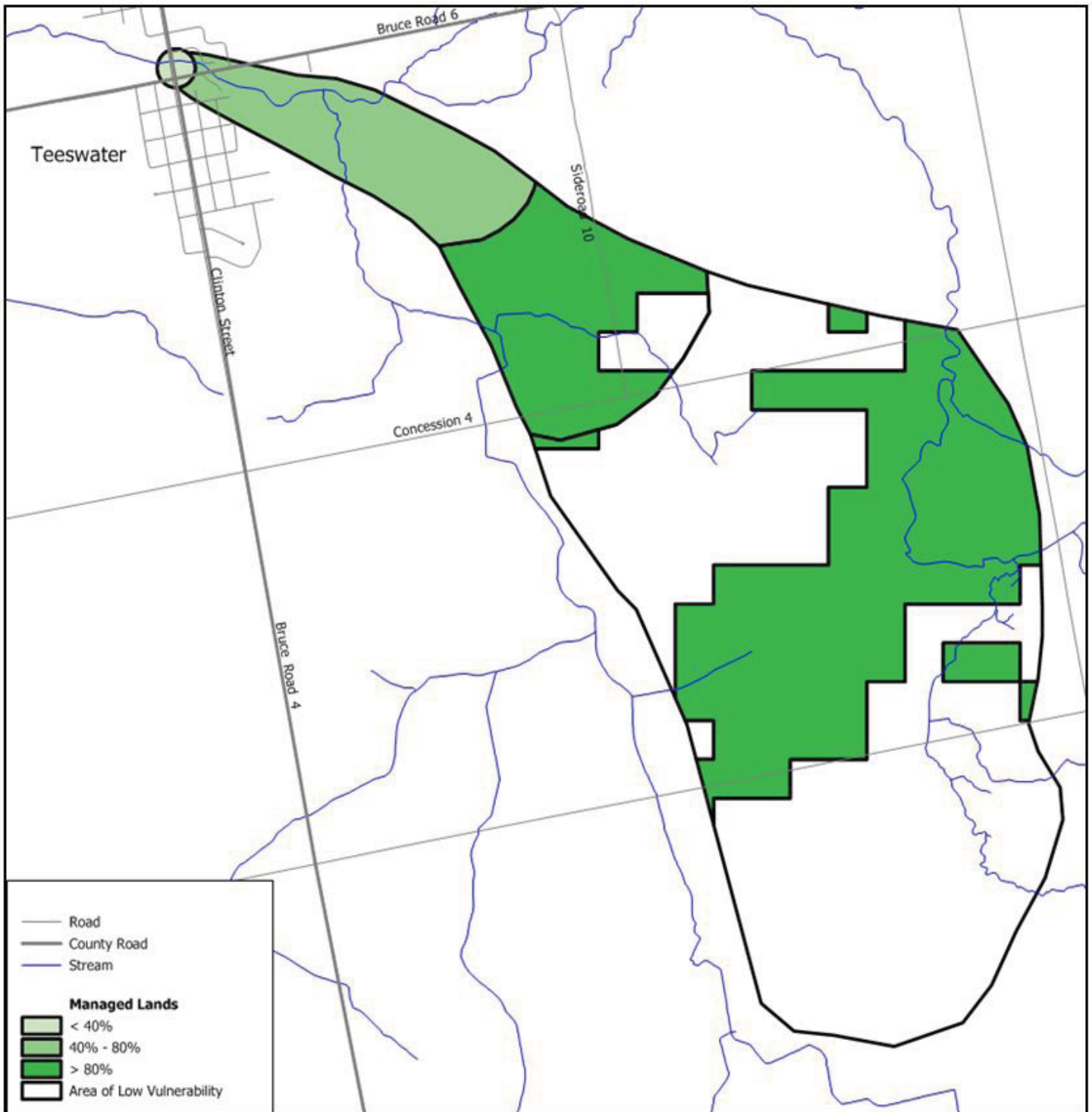
Wells

At left is an example of a drilled well.

At right is a large-diameter well.

Consider proximity to wells when planning activities that could result in groundwater or well contamination.





Managed Lands

Managed Lands delineation for Teeswater, Municipality of South Bruce. Managed land is described, in Rule 16 (9) of the Director’s Technical Rules under the *Clean Water Act*, as “land to which agricultural source material, commercial fertilizer or non-agricultural source material is applied”. The categories of managed land are calculated based on the amount of managed land per zone in each vulnerable area. These categories are: < 40%, 40% - 80%, > 80%. ‘Area of Low Vulnerability’ represents an area where the vulnerability score was too low for the managed lands rules to apply. (Additional data provided by the Queen’s Printer for the Ontario Ministry of Natural Resources, 2010) Further details and maps can be found in the Assessment Reports for the Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region at www.waterprotection.ca.

Proper Storage

Chemicals in storage should be stored on pallets, in case of spills.



Chemical storages should be marked with warning signs and locked at all times when unattended.



Examples of Best Management Practices

Sprayers equipped with guidance systems can reduce the amount of product applied to a field, which saves the landowner money and saves the environment from excess chemical application.



Leaving a buffer between cropped areas and water bodies is important to avoid water contamination from fertilizers or crop protection inputs.

Funding Programs Available to the Agricultural Community

Environmental Farm Plan: An excellent way to take inventory of your farm activities is to complete an Environmental Farm Plan. There is cost-sharing through this program that can provide funds for on-farm projects. The Environmental Farm Plan is administered by Ontario Soil and Crop Improvement Association. Contacts for these programs locally can be found at www.ontariosoilcrop.org.

Ontario Drinking Water Stewardship Program: The Early Response Program, administered by Drinking Water Source Protection, will be available to landowners with significant threats. Eligible projects must be risk management measures in the Ministry's Provincial Risk Management Measures Catalogue. To access this catalogue use the following URL: <http://maps.thamesriver.on.ca/swpCAMaps/rmc/disclaimer.aspx>. For more information, contact Drinking Water Source Protection at 519-470-3000 or 1-877-470-3001.

Municipal or County programs: Check with your county or municipality. They may have a program available for clean water projects.



This project has received funding support from the Ontario Ministry of the Environment. Such support does not indicate endorsement by the Ministry of the contents of the material.

"Threats Factsheet - Row Crops" is one in a series of Commodity Best Management Practice factsheets related to the Drinking Water Source Protection program. These fact sheets give an overview of potential drinking water threats and circumstances that are significant. Also included are some possible measures to manage these circumstances. Visit www.waterprotection.ca to view them online or visit your local OMAFRA office for a copy.

Titles in the Threats Factsheet series: General; Row Crop; Livestock; Horticulture; Chemical & Fuel.

This factsheet was prepared for the Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region. This region covers the Saugeen Valley and Grey Sauble watershed regions, as well as the Municipality of Northern Bruce Peninsula.



Drinking Water Source Protection
Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region
RR4, 237897 Inglis Falls Road
Owen Sound, ON N4K 5N6
519-470-3000 or 877-470-3001
www.waterprotection.ca mail@waterprotection.ca