

# Protecting Sources of Municipal Drinking Water



## An Overview of New Brunswick's Wellfield Protection Program

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This Guide is also available on the Department's web site at the following  
address: <http://www.gnb.ca/0009/0371/0001/index.html>

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## Why This Guide?

This Guide is designed to help you understand and comply with the Wellfield Protected Area Designation Order. It provides you with background information on groundwater, followed by an overview of common groundwater contaminants. It then examines the Designation Order by briefly explaining in plain language what is intended by each section.

## Groundwater Protection is Everyone's Concern

New Brunswickers obtain their drinking water from one of two main sources: inland bodies of surface water such as lakes and rivers; or groundwater. Both private wells and municipal wells obtain their water supplies from groundwater. People who obtain their water from these sources should recognize that certain activities carried out around these wells could directly influence the quality of the drinking water. If a groundwater source becomes contaminated it can affect the lives of an individual or an entire community.

## What is Groundwater?

**Groundwater** begins as precipitation, which falls to the earth. Once on the ground, the water may flow as runoff into streams, lakes and rivers; evaporate directly into the atmosphere or become absorbed by vegetation. A substantial quantity, however, seeps or permeates down through soil and bedrock and is stored as groundwater.

Groundwater may be stored within thick layers of sand and gravel or alternatively, in bedrock fractures. Porous layers of rock or soil that are saturated with groundwater are called **aquifers**, from which water can be extracted by the drilling of wells. A **wellfield** is a group of wells that together draw water from the aquifer to supply a public water system. Unfortunately, many land use activities associated with modern human settlements have the potential to contaminate wells.

## How Does Groundwater Become Contaminated?

The area of land where water enters the aquifer is called the **recharge area**. Contaminants usually enter the aquifer through recharge water from the surface. When harmful bacteria or chemical substances contaminate an aquifer, the contaminated water may reach the well and become an issue for those who depend on the wellfield for their drinking water. There are five general groups of potential groundwater contaminants:

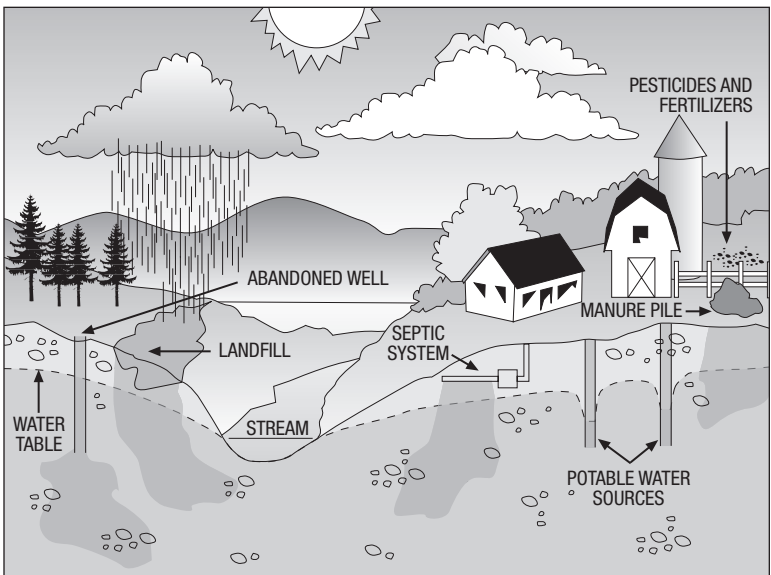
- Bacteria and viruses (Sources: septic systems/sewer lines, animal waste)
- Petroleum products and solvents (Sources: home heating tanks or underground tanks, paint thinners)



- Chlorinated solvents (Sources: dry cleaning fluids, metal degreasers)
- Pesticides (Sources: lawn care/agricultural/forestry management chemicals)
- Inorganic contaminants (Sources: road salt, inorganic fertilizers)

Residential and commercial activities carried out near a well or wellfield or in a Wellfield Protected Area can directly influence the quality of drinking water for an entire community. Problems arise most often from chemicals that have been used, discarded, spilled or stored incorrectly within a wellfield area, in ways that adversely affect the groundwater.

## Contamination Sources



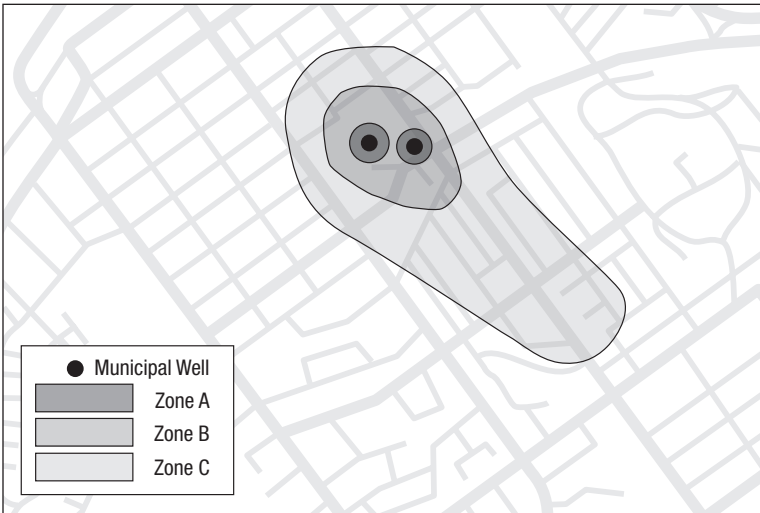
### Consider these facts

- More than 150,000 New Brunswickers in over fifty municipalities rely on municipal wellfields that are fed by groundwater.
- It costs much more – sometimes two hundred times more – to clean a contaminated municipal wellfield or to find an alternate water supply than to protect the well properly in the first place.
- Some New Brunswick communities may not have an alternate water supply if their existing wellfield becomes contaminated.

# How the Wellfield Protected Area Designation Order works

It makes far more sense to prevent water contamination in the first place, which is why the New Brunswick government developed the *Wellfield Protected Area Designation Order*. The goal of the Wellfield Protection Program is the identification and designation of **Zones**, which encompass the recharge area associated with and surrounding a wellfield. Each Wellfield Protected Area around a municipal well is divided into three smaller zones: Zone A, Zone B and Zone C. The zones reflect the fact that different contaminants persist in the environment for different time frames, move at different rates and pose different health risks.

## Sample Illustration of a Wellfield Protected Area



**Zone A** is the closest to the wellhead and is therefore the most environmentally sensitive. Within this zone, the risk of contamination is greatest, and for protection, it is necessary to have in place the most stringent number of controls on chemical storage, development and other activities that might affect the municipal wellfield. The Designation Order states that septic tanks, sewer lines, petroleum products, chlorinated solvents, pesticides and similar chemicals or activities be controlled or in some cases, restricted within this zone. Potential bacterial contaminants such as manure or new septic tanks are more restricted in this zone.

**Zone B** lies more distant from the wellhead and surrounds Zone A. The risk of bacterial contamination from land use is greatly reduced in Zone B, but significant pollution risks still persist from petroleum products, chlorinated solvents and other persistent chemicals or activities.



**Zone C** surrounds Zones A and B and is located furthest from the wellhead. Controls on some chemicals or activities are much less stringent in Zone C but are still required for chlorinated solvents and petroleum products.

## **What is not allowed in a Wellfield Protected Area?**

The following activities are prohibited in the protected area:

- Any activity that is not permitted by the Designation Order
- Use of a ground source heat pump
- New elevators that require the use of a liquid petroleum product

## **Activities Permitted in Zones A, B and C in a Wellfield Protected Area**

The following Table 1 reflects the more common, permissible activities under the Designation Order. Please see the Designation Order for information regarding other uses, including: groundwater supply systems, electrical facilities, public utilities, and mineral exploration. In Table 1, “Minister” refers to the Minister of the Environment and Local Government.

If an activity is permitted by the Designation Order within the Wellfield Protected Area, it must be carried out in such a manner that it will not release contaminants into the groundwater or aquifer, or adversely affect public groundwater. It also must conform with all applicable federal, provincial and municipal statutes, regulations, orders and by-laws.

**\*\* Note:** When reading the following Table, please bear in mind that every activity, thing or use that is permitted under this Schedule in a Zone A is permitted in a Zone B or a Zone C and every activity, thing or use that is permitted under this Schedule in a Zone B is permitted in a Zone C, unless otherwise indicated.

Permitted Activity	ZONE(S)		
	Activities Permitted in Zone A (see Section 5 of Designation Order)	Activities Permitted in Zone B (see Section 6 of Designation Order)	Activities Permitted in Zone C (see Section 7 of Designation Order)
<b>Liquid Petroleum Storage (i.e. home heating oil, diesel, gas, kerosene, hydraulic fluid)</b>	<p>Can store liquid petroleum products up to a total of 25 L, excluding fuel contained in fuel tanks of motor vehicles.</p> <p>Can install one or more new liquid petroleum storage tanks up to a maximum capacity of 25L.</p> <p>Can use liquid petroleum that is stored on a parcel of land to provide heat or power to a building as long as the liquid petroleum is situated on the same parcel of land as the building.</p>	<p>Can store liquid petroleum products up to a total of 1200 L, excluding fuel contained in fuel tanks of motor vehicles, provided that the storage tanks possess a secondary system that contains the product without leaking if the original fuel tank fails and is acceptable to the Minister.</p> <p>Can repair or install new and existing liquid petroleum storage tanks up to a total maximum capacity of 1200 L, provided that all tanks possess a secondary containment system as described above.</p> <p>Can store up to 75 L of liquid petroleum product in new or existing single-walled containers.</p>	<p>Can store liquid petroleum products up to a maximum of 2000 L.</p> <p>Can install one or more new liquid petroleum storage tanks up to a maximum capacity of 2000 L.</p>
<b>Pesticides Storage and Application</b>	<p>Can store pesticides up to a total weight of 10 kg or total volume of 10 L, whichever is less.</p> <p>Can apply pesticides using manufacturer-recommended amounts and concentrations, provided that you (1) wash or dispose of pesticide containers</p>	<p>Can store pesticides up to a total of 15 kg or total volume of 15 L, whichever is less.</p>	<p>Can store pesticides up to a total weight of 50 kg or total volume of 50 L, whichever is less.</p>

Permitted Activity	ZONE(S)		
	Activities Permitted in Zone A (see Section 5 of Designation Order)	Activities Permitted in Zone B (see Section 6 of Designation Order)	Activities Permitted in Zone C (see Section 7 of Designation Order)
<b>Pesticides Storage and Application cont'd...</b>	outside the Wellfield Protected Area (2) store and clean any pesticide application equipment outside Zone A (3) hold a certificate as required by the <i>Pesticides Control Act</i> if you are applying non-domestic pesticides as defined under that Act.		
<b>Gardening and Fertilizers</b>	<p>Can do routine gardening and lawn maintenance, including compost for residential purposes.</p> <p>Can apply lawn fertilizers (other than animal manure) between April 1 and October 31, at a rate not exceeding 75 kg in total weight or 75 L in total volume, whichever is less, per hectare per year.</p> <p>Can store fertilizers (other than animal manure) up to 75 kg in total weight, or 75 L in total volume, whichever is less</p> <p>Can apply packaged/ manufactured/processed compost products that do not contain pathogens (disease causing organisms).</p>	(Same as Activities Permitted in Zone A)	(Same as Activities Permitted in Zones A and B)
<b>Other Chemicals</b>	Can store or use chemicals referred to in Table 2 of this Guide, provided that you do not exceed the amounts stated under Zone A of that Table.	Can store or use chemicals referred to in Table 2 of this Guide, provided that you do not exceed the amounts stated under Zone B of that Table.	Can store or use chemicals referred to in Table 2 of this Guide, provided that you do not exceed the amounts stated under Zone C of that Table.

Permitted Activity	ZONE(S)		
	Activities Permitted in Zone A (see Section 5 of Designation Order)	Activities Permitted in Zone B (see Section 6 of Designation Order)	Activities Permitted in Zone C (see Section 7 of Designation Order)
<b>Recreational Activities</b>	<p>Can carry out recreational activities.</p> <p>Can use, maintain and repair existing recreational facilities including swimming pools, parks, playgrounds, golf courses, ball fields, tennis courts, basketball courts, trails and skating rinks.</p>	Can construct recreational facilities, except golf courses.	(Same as Activities Permitted in Zones A and B)
<b>Agriculture</b>	<p>Can conduct existing agricultural activities including the use and renovation of farm buildings, provided that (1) surface waters continue to flow away from all wellheads in all zones (2) livestock are not grazed or stabled in Zone A (3) liquid or other dry manure or pathogen source composted products are not spread or stored in Zone A (4) roads constructed for agricultural purposes are properly ditched as to direct surface water away from all wellheads within the Wellfield Protected Area.</p> <p>May store or apply packaged/processed compost products that do not contain pathogens (disease causing organisms).</p> <p>Can possess and apply fertilizer for agricultural purposes according to an approved fertilizer management strategy by a registered agrologist.</p>	Can conduct existing agricultural activities including the use and renovation of farm buildings, plus the storage and spreading of manure, provided that (1) grazing land is fenced to prevent livestock from entering in Zone A (2) fencing or some other suitable device is used to keep livestock at least 30m away from any surface water that flows from Zones B or C into Zone A (3) liquid or dry manure is stored in a clay-lined pit, a steel or concrete structure, or some other government-approved containment system (4) manure produced during agricultural operations is disposed of outside the Wellfield Protected Area if it is not spread in Zones B or C.	(Same as Activities Permitted in Zones A and B)

Permitted Activity	ZONE(S)		
	Activities Permitted in Zone A (see Section 5 of Designation Order)	Activities Permitted in Zone B (see Section 6 of Designation Order)	Activities Permitted in Zone C (see Section 7 of Designation Order)
<b>Road Construction</b>	<p>Can use and maintain existing roads, provided that they are properly ditched to direct surface water away from all wellheads within the Wellfield Protected Area.</p> <p>Can store road salt up to a maximum of 50 kg.</p>	<p>Can construct, use and maintain new or existing roads, provided that they are properly ditched to direct surface water away from all wellheads within the Wellfield Protected Area.</p>	<p>(Same as Activities Permitted in Zones A and B)</p>
<b>Residential Buildings: Existing</b>	<p>Can use, renovate, maintain or rebuild a multiple or single-family house plus associated outbuildings when it is serviced by existing sanitary sewers.</p> <p>Can use, renovate or maintain any existing multiple or single family house with an on-site septic system that meets <i>Health Act</i> standards, provided that you do not increase the house's floor area; can also repair that septic system.</p> <p>If a house with an on-site septic system is irrevocably damaged, the house can be rebuilt, provided that the new home is not closer to a production well than the original house and that the only outbuilding is a garage.</p> <p>Can build a new multiple or single</p>	<p>(Same as Activities Permitted in Zone A)</p>	<p>(Same as Activities Permitted in Zones A and B)</p>



Permitted Activity	ZONE(S)		
	Activities Permitted in Zone A (see Section 5 of Designation Order)	Activities Permitted in Zone B (see Section 6 of Designation Order)	Activities Permitted in Zone C (see Section 7 of Designation Order)
<b>Residential Buildings: New</b>	family house and outbuilding provided that it is serviced by existing sanitary sewers and that all other wastes are disposed of outside the Wellfield Protected Area.	Can build, use, renovate or maintain any existing multiple or single family house with an on-site septic system that meets <i>Health Act</i> standards, provided that you do not increase the house's floor area; can also repair the septic system.	(Same as Activities Permitted in Zones A and B)
<b>Commercial, Institutional or Industrial Buildings</b>	Can maintain or renovate existing commercial, Institutional or industrial buildings, provided that existing sanitary sewers service the buildings and that all other wastes are disposed outside the Wellfield Protected Area.	Can construct, maintain, or renovate new or existing commercial, institutional or industrial buildings, provided that sanitary sewers service the buildings and that all other wastes are disposed outside the Wellfield Protected Area.	Can construct, maintain or renovate new or existing commercial, institutional or industrial buildings, provided that (1) building is serviced by sanitary sewers or (2) building is serviced by an on-site septic system used by no more than 25 people per hectare of land that the building is serviced on, and (3) all other wastes are disposed outside the Wellfield Protected Area.



Permitted Activity	ZONE(S)		
	Activities Permitted in Zone A (see Section 5 of Designation Order)	Activities Permitted in Zone B (see Section 6 of Designation Order)	Activities Permitted in Zone C (see Section 7 of Designation Order)
Forestry	<p>Can remove dead or blown-down trees from forested areas.</p> <p>Can cut trees in forested areas for the protection against insects or disease if approved by the Minister.</p> <p>Can cut down trees and other vegetation in non-forested areas.</p>	<p>Can cut down trees in forested areas, provided that (1) no more than 1/3 of the total trees on the property are cut down within any 10-year period (2) none of the resultant openings in the forest canopy are larger than 300 square metres (3) a well distributed stand of trees and other vegetation is maintained on the property.</p> <p>Can cut down trees in forested area if the Minister approves the activity.</p>	(Same as Activities Permitted in Zones A and B)
Other	<p>Can use or store propane gas.</p> <p>Can construct and repair a natural gas pipeline.</p> <p>Can use, maintain or repair an existing well.</p>	Can drill, dig, use, maintain or repair a well.	(Same as Activities Permitted in Zones A and B)

## Chemical Storage in a Wellfield Protected Area

In a wellfield protected area, the storage of certain chemicals are not permitted or are restricted in low quantities in order to protect the drinking water supply (see Table 2).

**Table 2: Maximum Allowable Quantities of Chemicals (in Litres) Allowed per Property, According to Zone in a Wellfield Protected Area**

Chemical Name	Common uses	Zone A (Litres)	Zone B (Litres)	Zone C (Litres)
Acetone	nail polish remover	10	15	100
Benzene	petroleum, varnishes	10	15	100
Bromoform	solvent for waxes, greases, and oils	10	15	100
Ethylene glycol	Antifreeze	5	50	100
Varsol	paint stripper	10	65	500
Methyl alcohol	windshield washer fluid	5	50	100
Toluene	paint, lacquer	10	15	50
Xylenes	Petroleum	10	15	50
Phenol	Disinfectants	0	0	0
Polychlorinated biphenyls (PCBs)	industrial use	0	0	0
Chloroform	solvent for adhesives, pesticides, fats, oils and rubbers	0	0	0
Chlorodibromomethane	small scale usage in laboratories	0	0	0
Dichloroethane	synthetic resins & rubber adhesives, rug and upholstery cleaners	0	0	0
Dichloromethane	paint strippers	0	0	0
Perchloroethylene	dry cleaning, brake cleaner	0	0	0
Trichloroethane	Aerosol paint concentrates	0	0	0
Trichloroethylene	solvent to remove grease from metal parts	0	0	0
All other chemicals not listed elsewhere in the Designation Order		20	50	100

## Chemicals that are Denser than Water

Dense, non-aqueous phase liquids (DNAPLs) are chemicals that are denser (heavier) than water and cannot mix with water. Examples of DNAPLs are dry cleaning fluids, brake cleaners, and engine degreasers. Because DNAPLs are heavier than water, this enables them to migrate underground and sink to the base of an aquifer where they may be extremely difficult or even impossible to remove. These products are not permitted to be stored or used for any process or purpose associated with a commercial, institutional or industrial activity within a Wellfield Protected Area.



## **How do I know if I have some of these chemicals and what should I do if I have them?**

Check the labels. If a product is flammable, corrosive or otherwise hazardous, it may contain chemicals that could contaminate a Wellfield Protected Area. If you use these chemicals, ask your retailer about alternatives that do not have harmful chemicals in them. Check with your Regional Solid Waste Commission to find out how you can safely dispose of chemicals. Many commissions offer Household Hazardous Waste Facilities to safely dispose of chemicals.

## **Temporary Passage**

A person is allowed to pass through any zone of a Wellfield Protected Area while transporting chemicals that are prohibited in the zone, provided that: they enter and leave the zone within two hours, they are en route to a destination outside the zone, or they are making deliveries within the zone.

## **Common Questions**

### ***Am I Affected by the Wellfield Protected Area Designation Order?***

To find out whether your home or business is in a Wellfield Protected Area, and how this will affect you, contact the Department of the Environment and Local Government (DELG) or the local Service New Brunswick registry office. Your property identification number will assist in this process. This number is located on your New Brunswick Property tax form. For more detailed information on vegetation control, pesticide use, petroleum and home heating oil storage tanks, fertilizers, livestock, manure storage, construction, and other activities in the three zones, contact the Water Planning Officer at your nearest DELG Regional Office.

### ***How Will the Designation Order be Enforced?***

Most New Brunswickers will voluntarily respect the *Wellfield Protected Area Designation Order*. The Department of the Environment and Local Government will designate municipal inspectors to complement the work of provincial inspectors to conduct audits and spot inspections. If convicted of Designation Order violations, individual offenders may be fined up to \$50,000 and corporations up to \$1,000,000 for each day that the violation continues.

## For More Information

The *Wellfield Protected Area Designation Order* is for the benefit and well being of all members of the community. If you would like more information, please feel free to contact the Water Planning Officer at your nearest DELG Regional Office or:

The Sustainable Planning Branch  
New Brunswick Department of the Environment and Local Government  
P.O. Box 6000  
Fredericton, New Brunswick  
E3B 5H1

Telephone: (506) 457-4846 or 1-800-561-4036

Facsimile: (506) 457-7823

Information about the Wellfield Protection Program is also on the Web at: <http://www.gnb.ca/0009/0371/0001/index.html>

To contact your Regional Office of the Department of the Environment and Local Government, call:

**BATHURST - Region 1**  
159 Main St., Suite 202  
Bathurst, NB E3A 1A6  
Tel : 547-2092

**SAINT JOHN - Region 4**  
8 Castle Street  
Saint John, NB E2L 3B8  
Tel: 658-2558

**MIRAMICHI - Region 2**  
316 Dalton Avenue  
Miramichi, NB E1V 3N9  
Tel: 778-6032

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565 Priestman Street, Suite 301  
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**MONCTON - Region 3**  
428 Collishaw Street  
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