Water Safety

for Cottage and Rural People

Grey and Bruce Counties

Introduction

Cottage and Rural people in Grey and Bruce Counties have four common water concerns:

- Keeping private drinking water supplies safe.
- Keeping groundwater pure by effectively managing private septic systems.
- Controlling and understanding West Nile Virus, and the need to eliminate standing water where mosquitoes breed.
- Understanding how to manage the risks of recreational water: public beaches and private hot tubs, spas and swimming pools.

The Health Protection Department of the Grey Bruce Health Unit produced this booklet in order to provide information about these concerns. An informed public will ensure the lakes, streams and groundwater of Grey and Bruce Counties remain clean and pure.

Water Sources

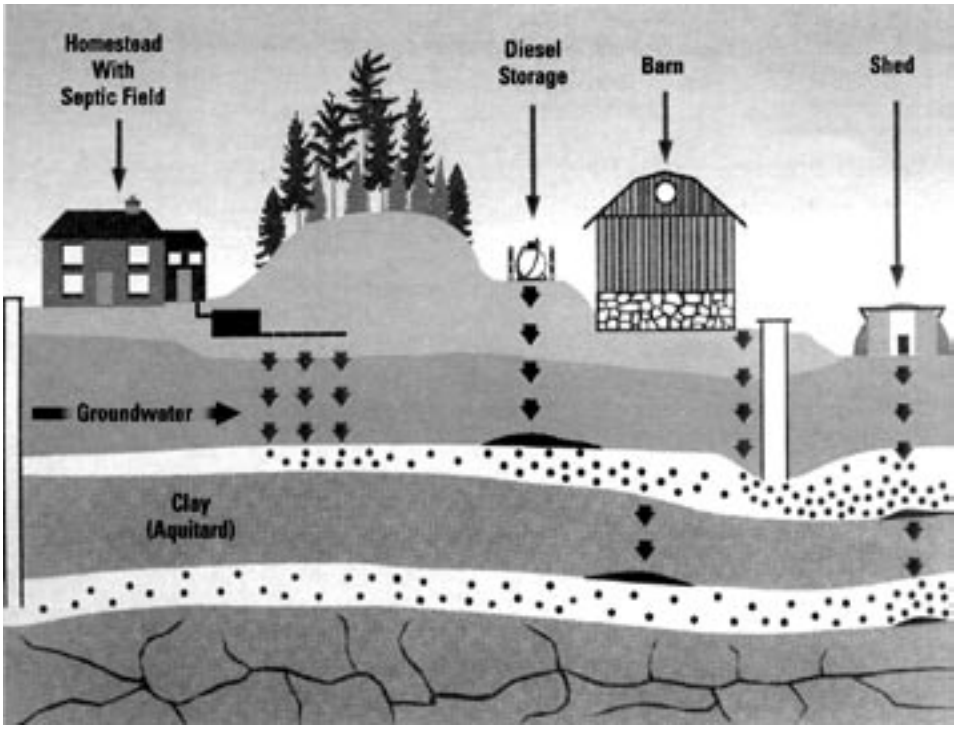
Surface Water, Springs, Ground Water

Sources of water for drinking purposes include surface water, springs and groundwater.

Surface water should not be considered a safe source of drinking water unless it has been treated first to remove or destroy disease-causing microbes. It may look and smell clean and clear but the microbes that cause illness can only be seen through a microscope. Water that may look and smell drinkable could cause serious illness.

Springs are sources of water that emerge at the ground surface. Often these springs are under pressure (artesian wells). Water emerging at the ground surface in the form of a spring may have travelled some distance just under the ground surface before it emerged. It may have picked up contamination from animal or bird faeces found in surface soil. For this reason spring water should not be considered a safe source of drinking water unless it has been treated first to remove or destroy disease-causing microbes.

Groundwater takes advantage of the soil to act as a natural filter to filter out microbes and other impurities as the water slowly seeps down through the ground. Water from a source deep in the ground is usually free of disease-causing microbes.



In aquifers, contaminants and recharge waters can follow similar pathways. This is the case for nitrates from household septic systems, livestock waste and excess fertilizer application. Some contaminants, like diesel fuel, are less dense than water and will stay mostly near the top of the aquifer. Other contaminants that are more dense than water and do not dissolve readily will tend to accumulate at the bottom of an aquifer.

How Does Groundwater Move?

Understanding how groundwater moves can help in determining possible sources of contamination. Groundwater moves (or flows) from areas of higher energy potential (higher elevation and/or pressure) to areas of lower energy potential (lower elevation and/or pressure). Within an aquifer, groundwater naturally flows in one predominant direction, i.e., mainly horizontal or vertical, up or down. Locally, this natural flow direction can be affected or changed by pumping a well.

How fast groundwater moves depends on permeability of the ground and on the slope or gradient of the groundwater surface. Groundwater moves quickly through very permeable bedrock or overburden, and slowly through clay or silt. There is a great range in groundwater velocities.

Quick water movement is about 30 centimetres (1 foot) per day, except in limestone-like topography. In some clay formations, it moves as slowly as a few centimetres a year. Groundwater drawn from a deep well may have been in the ground for many decades. In a shallow aquifer, the age of the water may be only a few weeks.

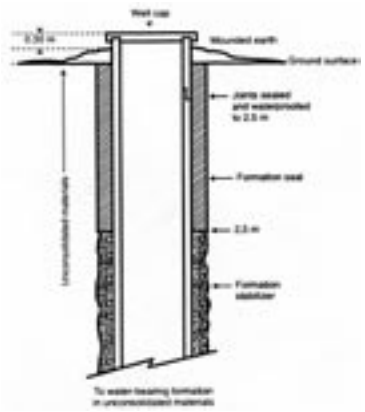
Ground Water Movement

Low Gradient:	In a shallow, sandy aquifer, where there is very little change in elevation, water moves slowly in a lateral direction from high pressure to low pressure areas.
High Gradient:	Water in hilly, sandy aquifers will move quickly from high elevation areas to areas of low elevation (or pressure). Note: the shape of the water table generally follows surface features.

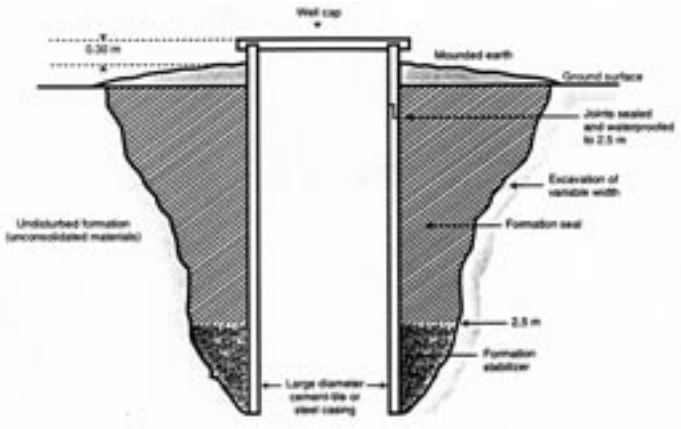
WELL TYPES

	Drilled Wells	Large-Diameter Wells		Well Points (Sand Points)
		Dug	Bored	
Description	· drilled with rotary or cable-tool water well drill · shallow or deep · small diameter casing 10 to 20 cm (4 to 8 in.) usually metal	· dug by backhoe or by hand · shallow (usually) · large-diameter casing 60 to 120 cm (24 to 48 in.) usually concrete	· constructed with boring machine · shallow or deep	· driven with water · shallow · small-diameter casing 2.5 to 5 cm (1 to 2 in.)
Advantages	· can reach deeper aquifers · can drill into bedrock · less subject to contamination, especially if deep · easier to seal · more constant temperature	· easy to construct · inexpensive initial cost · large casing provides storage · may be used in poor-yielding aquifer	· more controlled hole than dug well	· generally simple and inexpensive to install · several feet of sand cover provides a good seal and natural filtration for microorganisms
Disadvantages	· vulnerable to deep aquifer contaminants · poor natural water quality from some deep aquifers may occur, e.g., from salt · casing below surface - access pit may flood	· if shallow, water shortages are possible in dry periods · easy to seal properly, but requires large volumes of material · vulnerable to near-surface contamination · water temperature may change seasonally		· limited to permeable materials · shallow water table · limited yield and possible shortages in dry periods · vulnerable to near-surface contamination

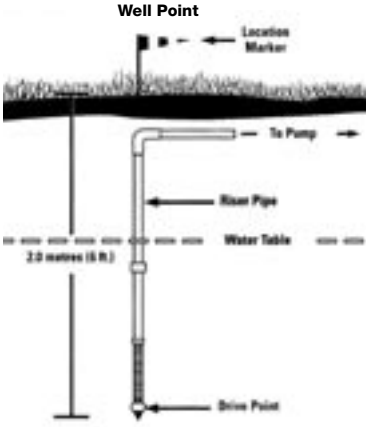
Bored Well



Dug Well



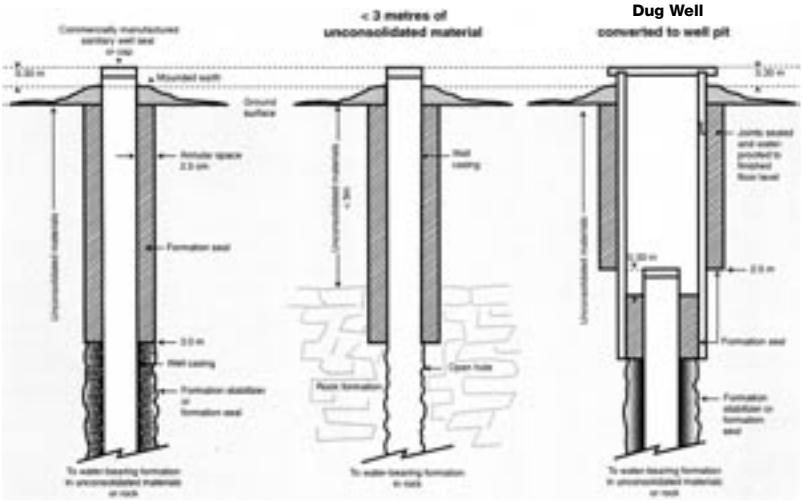
Well Point



Drilled Well

Drilled Well in Bedrock
< 3 metres of unconsolidated material

Drilled Well in Bored or Dug Well
converted to well pit



Formation seal

Can be composed of portland cement grout, concrete, bentonite, equivalent commercial slurry or clay slurry, well cuttings or overburden materials. For details on selection and placement, see O. Reg. 903

Formation stabilizer

Can be composed of clean washed sand or gravel, clean overburden materials or cuttings.

NOTE:
all dimensions are minimum construction standards

Well Construction Problems

Dug Wells

1. Ground which does not slope away from the casing allowing surface water to pool on the surface of the ground beside the casing
2. Cracks or holes in the casing
3. Improperly installed well tiles or well lids
4. Broken or chipped access covers

Drilled Wells

1. Casing tops that are below ground in access pits that are subject to flooding
2. The presence of insects such as earwigs inside the cap or breather tubes of the casing
3. Faulty seals where water lines exit through the drilled well casing
4. Improper seals at the joint between the well casing and the rock
5. Fractured bedrock in the immediate vicinity of the well can cause a path for the direct entry of contamination. (This is the case on the Bruce Peninsula, especially Tobermory.)

Cisterns

The water in cisterns usually comes from rainfall collected off the roof. It is often stored in concrete tanks (reservoirs) in the basement.

The water collected can be contaminated from many sources (especially bird droppings) and as a result **is not safe for drinking**.

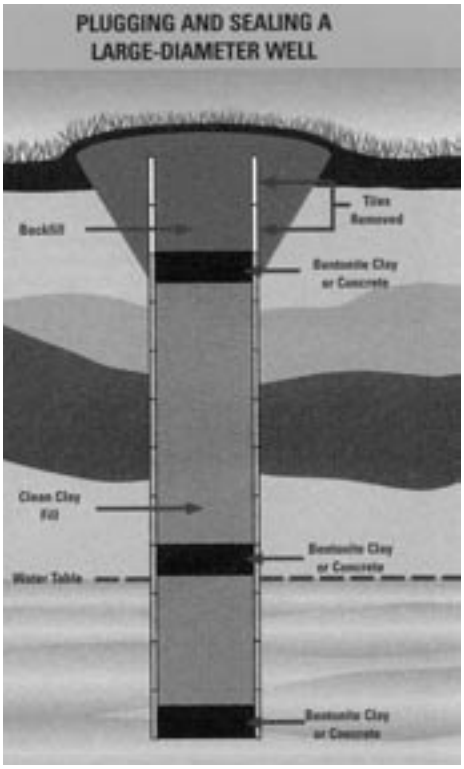
There should be no connection between the cistern supply and the main water supply for the house. Colour coding of the water pipes is recommended to ensure that a separation exists.

How to Prevent Contamination

To prevent contamination of wells the following actions should be taken:

1. Make sure that the sanitary seal or well cap is securely in place and watertight.
2. Be sure that the well cap is at least 12 inches above the ground.
3. Seal all joints, cracks and connections in the well casing. Screen the well cap and vent pipe on drilled wells where applicable.
4. Direct all surface water drainage away from the well casing.
5. Do not allow surface water to pond near the well.
6. Do not allow liquids or wastes from garbage, manure piles or sewage systems to drain towards the well casing.
7. Do not treat the area around the well with pesticides or fertilizer.
8. Do not flush oils, detergents, paints, solvents or other chemicals down the toilet.
9. Chlorinate and test the well after any repairs.
10. Check well pumps and distribution systems regularly.
11. Changes in the quantity and quality of the water should be investigated immediately.
12. Do your part in ensuring that your water source is maintained the prescribed minimum distance from sewage systems, as set out under Chapter 8 of the Ontario Building Code. Speak to a public health inspector regarding these requirements.

Plugging Abandoned Wells



The existence of abandoned wells is a problem that has been ignored for years. With increasing concern for the protection of our groundwater supplies, one of Canada's most valuable natural resources, this is a problem we can no longer afford to ignore.

Groundwater is normally protected by a natural filter of varying soils. Abandoned wells are holes in that filter that can allow contaminants such as sediment, bacteria, and chemicals to flow directly into our groundwater supply. Runoff that might enter an abandoned well may contain pesticides, fertilizers, livestock waste and other contaminants. When these contaminants enter the groundwater supply they can move with the natural groundwater flow and may show up in public or private wells used to provide drinking water. It is critical that the quality of our groundwater be protected for our current use and for future generations. Abandoned wells are also a safety hazard to humans and animals. Abandoned dug and bored wells that may have deteriorated gradually over the years are of particular concern because they may be large in diameter. A child can easily fall into a large diameter dug well or irrigation well. Some abandoned wells are an accident waiting to happen.

Ontario Regulation 903 entitled "Wells" under The Ontario Water Resources Act places the legal responsibility for plugging abandoned wells on the well owner. Section 21 states: "When a well is to be abandoned, it shall be plugged with concrete or other suitable material so as to preclude the vertical movement of water or gas in the well between aquifers or between an aquifer and the ground surface."

For the correct procedure on the plugging of abandoned wells please contact the Ministry of the Environment.

Why Should You Sample Your Well Water?

Drinking water that has harmful microorganisms in it can make you sick. These microorganisms can give you stomach cramps and/or diarrhea. The water that has these microorganisms in it is unsafe to drink. Some illnesses that can be caused by contaminated water include Salmonellosis, Typhoid Fever, Campylobacteriosis, Verotoxigenic E. coli (E. coli 0157:H7), Shigellosis, Cholera, Dysentery, Hepatitis A, Giardiasis, and Cryptosporidiosis.

Water Quality

Disease Found in Water	Cause (Organism)	Source of Organism	Symptom
Gastroenteritis	Rotavirus (virus)	Human faeces	Acute diarrhea or vomiting
	Salmonella (bacteria)	Animal or human faeces	Acute diarrhea or vomiting
	Pathogenic E. Coli (bacteria)	Human faeces	Acute diarrhea or vomiting
Typhoid	Salmonella (bacteria)	Human faeces	Inflamed intestine, enlarged spleen, high temperature
Dysentery	Shigella (bacteria)	Human faeces	Diarrhea - rarely fatal
Cholera	Vibrio cholera (bacteria)	Human faeces	Vomiting, severe diarrhea, rapid dehydration - high mortality
Hepatitis	Hepatitis A (virus)	Human faeces, shellfish grown in polluted waters	Yellowed skin, enlarged liver, abdominal pain - low mortality - lasts up to 4 months
Amoebic dysentery	Protozoan (Entamoeba)	Human faeces	Mild diarrhea
Giardiasis	Giardia (parasite)	Animal or human faeces	Diarrhea, cramps, nausea and general weakness - not fatal - lasts 1 - 4 weeks
Cryptosporidiosis	Cryptosporidium (parasite)	Animal or human faeces	Diarrhea, stomach pain - lasts an average of 5 days

The sample bottles and the water testing is a free service.

How Often Should You Sample Your Well?

If you have not sampled your well for over a year it is recommended that you begin your sampling program by taking three water samples at least one week apart. This will allow you to determine the bacteriological water quality of your well.

Monitoring the water quality of the well is important as the bacteriological quality of the water may vary especially during periods of heavy rainfall. It is recommended that you sample your well at least three times during the year. The samples should be spread out over the year. For example, one could be taken during or immediately following spring melt, one in mid summer and one in the fall.

Water Testing
Bacterial vs. Chemical

Water on the surface of the ground can easily become contaminated with disease-causing microorganisms. As a result shallow wells are more likely to have bacterial contamination. Adverse health effects from drinking water are not only associated with microorganisms. As water travels through the soil and rock it can pick up chemicals such as heavy metals, nitrates, fluoride, pesticides, petroleum products (e.g., gasoline), and radioactive metals. Some naturally-occurring substances such as iron, sulphur, sodium, and calcium can cause aesthetic problems such as hard water or unpleasant taste and odour.

The Ministry of Health and Long-Term Care and the Provincial Laboratory Branch provide free bacteriological testing for private wells. The water is tested for indicator organisms (see Bacteriological Tests) which if present in the sample means that disease-causing organisms may possibly be present.

The only chemical tests currently provided free of charge by the Provincial Laboratory Branch are for fluoride and nitrates. To arrange for testing of these chemicals please contact any office of the Grey Bruce Health Unit.

Bacteriological Tests

The provincial laboratory analyzes public water samples for two indicator organisms: Total Coliform bacteria and *Escherichia coli* (E. coli) bacteria. The results of water tests are shown in two boxes located at the bottom of the submission form. A bacterial count of Total Coliform 0 and E. coli 0 would indicate a bacteriologically safe supply.

Total Coliform

Coliform bacteria are always present in decaying vegetation and in soil. Total coliforms include coliform bacteria from vegetation and sewage if E.coli is in the well. If these bacteria are present it may mean that surface water is getting into the well or an incorrect sampling procedure was used. A bacterial count of 1 to 5 in the Total Coliform column indicates the need to resample as soon as possible. For a private residence, when at least three consecutive samples taken one to three weeks apart show results in the 1 to 5 range the supply could then be considered satisfactory if the E.coli count is “0”. Any count above 6 is considered unacceptable. Remember “0” is safe.

E. coli

E. coli bacteria are found in the faeces of people, birds and animals. To be considered safe, E.coli levels in any water intended for human consumption should be 0. The presence of E.coli in the well may be an indication of surface water entering the well, recent sewage contamination from a nearby source or an incorrect sampling procedure.

Note: *E.coli 0157:H7*, also known as Verotoxigenic E.coli (VTEC) which can cause Haemolytic Uremic Syndrome, is not the same E.coli tested for by the laboratory.

(For more information on water sample interpretation see “How to Interpret Your Results”)

Chemical Tests

The Provincial Laboratory will only conduct chemical tests for **nitrates, nitrites** and **fluoride.** A private laboratory should be contacted if other chemical tests are required.

Other chemicals that may be of health concern in drinking water include arsenic, lead, pesticides and persistent organochlorines and radionuclides such as uranium, radium and radon. Aesthetic concerns include copper, hardness, iron, sulphur and manganese. For more information on commercial laboratories accredited for Ontario Drinking Water Standards (ODWS) contact the Ministry of the Environment.

Nitrate and **nitrite** are products of the oxidation of nitrogen and are everywhere in the environment. Nitrate is more stable than nitrite. Both easily dissolve in water. Most nitrogenous material in the environment tends to convert to nitrate. Sources of nitrates in water include agricultural fertilizers, explosives used in mining and construction, animal manure, human sewage, decomposing plant and animal matter or geological formations containing soluble nitrogen compounds. Nitrates enter the water supply when a well is not adequately sealed from run-off or the ground above an aquifer is porous. Excessive nitrate consumption through contaminated drinking water or food can harm human health by changing the oxygen-carrying haemoglobin in red blood cells to methemoglobin, which doesn’t carry oxygen well. Higher levels of methemoglobin can cause cyanosis (insufficient oxygen to the blood). The condition known as methemoglobinemia (blue baby syndrome) is of particular concern for infants, especially under six months of age that are not breast-fed.

Fluoride is considered a beneficial compound in water because of its positive effect on dental health. All water contains trace amounts of fluoride. Fluoride is sometimes added to drinking water to protect children’s teeth from tooth decay. However, if the levels are too high problems may occur.

Owner’s Responsibility - *The primary legal document under which the Grey Bruce Health Unit operates is The Health Protection and Promotion Act (Chapter H.7). Section 20(a) of the Act delegates the responsibility to the owners of residential buildings to ensure that a well provides potable water to the residents of the building. Contact the Grey Bruce Health Unit for further information regarding this legal parameter.*

Testing Containers

Only sterile water sampling containers can be used for bacteriological testing. These are available at any office of the Grey Bruce Health Unit or from any provincial laboratory. The bottle contains a neutralizing chemical in a powder or pellet form. **Do not rinse the bottle out before taking the sample.**

Chemical sample bottles are different from those used for bacteriological sampling. Depending on the type of chemical being tested for, either plastic or glass bottles may be used. Some chemical tests require fixing agents to be present in the bottle. Plastic bottles suitable for chemical testing are available at health unit offices or provincial laboratories.

How to Take a Water Sample for Bacteriological Testing

Water samples can sometimes become contaminated during sampling if the correct procedure is not used. The following sampling procedure is recommended:

1. Obtain a 200 ml sample bottle from the Public Health Unit, a hospital, the government information centre or Public Health Laboratory. Keep the bottle sealed, clean and dry until ready to fill. The bottle is sterile and should not be opened until immediately prior to filling. Also, the bottle contains a neutralizing chemical in pellet or powder form. Do not rinse out the bottle before filling.
2. The sample should be taken the same day it is to be submitted for testing. Take the sample at a tap such as the kitchen sink. Do not take a sample from a hose.
3. Remove aerators and other attachments from your tap. Disinfect the discharge opening of the tap by wiping with alcohol or a sanitizer or by passing a match or lighter flame under the discharge opening.
4. Let the cold water run for two to three minutes before sampling.
5. Fill the bottle to the "fill line" directly from the tap without changing the flow rate of the water. Do not remove the cap until immediately before sampling and do not place the cap on the counter. Be careful not to touch the inside of the cap or lip of the bottle with your fingers.

Returning Your Water Samples

Water samples can be dropped off at a number of locations throughout Grey and Bruce for courier service to the provincial laboratory. The courier operates Monday to Friday. Please contact your local Health Unit office to confirm the times for courier pick-up at each location**.** Samples must be collected and dated within 24 hours. **Samples submitted to a location after courier pick-up on Friday will be discarded as they will be too old for testing on the Monday when courier service resumes.**

Bottles can be dropped off for courier service at the following locations:

1. Any office of the Grey Bruce Health Unit – Owen Sound, Durham, Walkerton and Southampton (For addresses see page 28 in this booklet).
2. Grey Bruce Health Services (Meaford Hospital)
3. Grey Bruce Health Services (Wiarton Hospital)
4. South Bruce Grey Health Services (Kincardine Hospital)
5. Hanover and District Hospital
6. South Bruce Grey Health Services (Walkerton Hospital)
7. Grey Bruce Health Services (Markdale Hospital)
8. Sauble Medical Clinic
9. Grey-Bruce Government Information Centre 1050 2nd Ave. East Owen Sound

Emergency Water Treatment

Water can be made safe to drink by using the following procedure:

1. Bring the water to a full rolling boil for at least one minute. (This treatment will kill parasites.)
   Or
   Add eight drops (1.25 ml or ¼ teaspoon) of fresh chlorinated household bleach (not lemon-scented or fabric safe) per gallon (4.5 l) of water. Mix it well and allow to stand for 15 minutes. (This treatment may not kill parasites.)

2. Refrigerate boiled or treated water until used.

How to Disinfect a Well

A well should only be disinfected after all necessary repairs have been completed and the well is ready to be made watertight and secure.

Chlorination is a process often used to disinfect wells that show bacteriological contamination. Use normal household bleach that contains sodium hypochlorite or calcium hypochlorite (Not Javex 2). Use the following procedure:

6 steps to Disinfect

1. Add bleach directly into the well. For dug wells 2.5 feet in diameter add 5 oz. of bleach for every 1 foot of water in the well. For dug wells 3.0 feet in diameter add 7 oz. of bleach for every 1 foot of water. For drilled wells that are 6 inches in diameter add 5 oz. of bleach for every 25 feet of water. Alternately refer to the tables listed below. For dug wells, the top interior section of the casing above the water line must also be disinfected. (Note – Wells that are high in iron or other minerals and have a biofilm build-up in the distribution system may require higher levels of chlorine).
2. Disconnect any household water filters or water softeners.
3. Turn on the taps in the house - both hot and cold - until you smell bleach coming out of the taps.
4. Allow the bleach to remain in the system for a minimum time of 12 hours. Twenty-four hours is recommended. The longer the contact time the better.
5. Use the outside tap and garden hose to discharge chlorinated water away from the septic system. Gradually fresh water will flow into the well to replace chlorinated water.
6. Resample the well when all bleach is removed from the system. (Wait at least two days of normal water use after there is no longer any smell of bleach in the water.)

Chlorine required for Dug Well 9m (3') Diameter

Water Depth		Household Bleach 5%	
Meters	Feet	Litres	Quarts
1.5	5	1.1	1
3.0	10	2.2	2
4.5	15	3.3	3
6.0	20	4.4	4
7.5	25	5.5	5
9.0	30	6.6	6
10.5	35	7.7	7
12.0	40	8.8	8

1 imp. gal = 4.5 litres or 160 oz.

Chlorine required for Drilled Well up to 15 cm (6") Diameter

Water Depth		Household Bleach 5%	
Meters	Feet	ml	Ounces
7.6	25	140	5
15.0	50	280	10
22.8	75	420	15
30.0	100	560	20
38.2	125	700	25
45.0	150	840	30
53.0	175	980	35
61.0	200	1,120	40

***NOTE: All conversions are approximate*

Water Treatment Devices for Bacteria

Water treatment devices for removal of bacteria can be divided into two groups:

1. Point-of-use devices - portable, plumbed-in or faucet-mounted devices are used to treat the water at a single tap or multiple taps for drinking and cooking only.
2. Point-of-entry devices - installed on the main water supply and treat all the water entering the home.

Chlorinators, iodinators and ultraviolet (UV) light devices are used when it is necessary to disinfect water that serves a whole dwelling.

Chlorine and iodine kill most disease-causing organisms and require short to moderate contact times. Chlorine and iodine treatment alone, however, may not provide adequate protection against parasites such as Giardia lamblia and Cryptosporidium. To remove these parasites it is recommended that the water be first passed through a filter with a 0.1 micrometre or smaller pore size and then chemically treated with chlorine or iodine to kill bacteria and viruses. Iodine disinfection of drinking water, however, should be reserved for emergency and occasional use. Iodine should not be used for long-term continuous disinfection because ingestion in excessive amounts may be harmful.

UV devices are effective against bacteria and viruses. They do not, however, ensure the safety of the water beyond the point of application, so that flushing of the system is recommended after periods of non-use. A pre-filter should always be employed to remove parasites and reduce turbidity, prior to the water being exposed to the UV light.

Ceramic or glass filters handle smaller amounts of water and are useful when water from just one tap is to be treated for drinking and cooking. Such filters can remove bacteria and parasites from mildly contaminated waters. However, they are not suitable for removing viruses or for treating highly contaminated water. Therefore when treating surface water it is recommended that these filters be used in conjunction with disinfection.

Distillers and ozonators are point-of-use devices suitable where electric power is available, and where there is sufficient space to install the equipment. The boiling process used in distillation will kill bacteria, viruses and parasites present in the water. Ozonators produce small quantities of ozone, a strong oxidizing agent that is effective in killing pathogens over a short period of time. The process is dependent on good mixing of ozone and water. Unlike chlorine and iodine, ozone does not protect the water after application.

Water Treatment Devices for Chemicals

Water treatment devices commonly used to reduce or remove chemicals from water include activated carbon filters, ozonation, reverse-osmosis, distillation and water softeners.

Activated carbon filters are the most common device used in households for the removal of chemicals from water. They are relatively inexpensive, widely available, and highly promoted for the removal of odour, taste and chemicals in drinking water. They are not suitable for the removal of dissolved salts (sodium). Few of the activated carbon devices currently available incorporate any means of alerting users when the filter should be replaced. Filters must be changed according to the manufacturer's instructions.

Ozone, in the past, has been used predominantly for disinfecting water supplies but is now being promoted as an oxidant of organic compounds responsible for colour, odour and taste problems in water. While coloured humic materials are partially oxidized to simpler colourless compounds, inorganics responsible for aesthetic problems (e.g., ferrous iron and hydrogen sulphide) are oxidized to insoluble products that can be removed by filtration. One problem is that ozone has a short half-life and quickly reverts back to oxygen. Thus, the oxidation of organic compounds in water is often incomplete and such compounds may remain in the water. Household units are usually equipped with post ozonation activated carbon filters to improve the removal of organic compounds.

Reverse osmosis water treatment units remove some chemicals from water by passing the water through a semi-permeable membrane. They are capable of removing particulate matter, some microorganisms and dissolved inorganic salts. The units are more effective at removing sodium than certain organic compounds such as nitrates. One problem with this device is that in most cases the device does not include any means of alerting the user to rupture of the membrane or surrounding seals. Such a break or tear could permit contaminants to enter the treated water. These units are often used in combination with carbon filters.

Distillation can be used to reduce the levels of chemicals in water. Since many chemical contaminants are volatile there is a possibility of co-distillation of these contaminants with the water. Some devices have incorporated features that prevent volatile organic compounds from being carried over with the distillate. Features include granular activated carbon filters, vents in the condenser, or fractional distillation (overheating water before it enters the boiling chamber).

Water softeners are used to reduce "hardness" in water. They may increase salt levels in the water. As a result, softened water should not be used for drinking and cooking.

Common Water Quality Problems

Problem	Possible Cause	Treatment
Health effects: • diarrhea • stomach cramps • vomiting	Bacteria, parasites and viruses	• Chlorination (filter method) • Ultra-violet systems • Chlorination (injector units) • Ceramic Filter
• Methemoglobinaemia (blue baby syndrome)	Nitrate	• Reverse-osmosis units
• High blood pressure	Sodium	• Reverse-osmosis units
• Scale build up in kettles and water heaters • Soap scum, bathtub ring	Hardness (hard water)	• Water softeners
• Red to brown slime in toilet tanks • Iron staining • Unpleasant taste or odours	Iron bacteria	• Chlorination filtration units
• Rusty black stains on fixtures, laundry	Iron and/or manganese	• Filtration • Green sand filters • Water softeners • Chlorination-filtration units
• Rotten-egg smell and taste	Hydrogen sulphide and/or sulphate reducing bacteria	• Chlorination-filtration Units • Green sand filters • Aeration
• Water has laxative effects	Sulphate	• Reverse-osmosis units
• Salty taste, corrosive	Chloride	• Reverse-osmosis units
• Gassy smell, gas bubbles escaping from water	Gases (methane)	• Aeration • Activated carbon filters
• Cloudy water	Turbidity (clay)	• Filters • Alum treatment

How To Interpret Your Laboratory Results

For Bacteria Only		
Total Coliforms	**E. Coli**	**What it Means**
0	0	Safe for drinking. Maintain regular testing (at least three per year).
1 to 5	0	May be unsafe for drinking unless boiled for treated. Resample. If this range is achieved for three samples taken one to three weeks apart, the water is considered satisfactory.
6 to greater than 80	0	May be unsafe for drinking unless boiled or treated.
1 to greater than 80	1 to greater than 80	Unsafe for drinking unless boiled or treated.
Overgrown* (O/G)		May be unsafe for drinking unless boiled or treated.

***Note - "Overgrown"** implies that background bacteria were present preventing an accurate determination of Total Coliform and E.coli. This condition can appear in new wells that have not been properly disinfected or wells that have not been used recently.*

Bottled Water

While bottled water available in Canada is generally of good quality, it is not necessarily safer or healthier than water from municipal supplies.

The sale of bottled water is not regulated in Canada. However, the Health Protection Branch checks both domestic and foreign bottled water from time to time. In addition, The Canadian Food Inspection Agency does regular testing on all bottled water distribution companies located in their district.

Municipal water supplies are checked for 100 or more substances. Only three substances must be checked in bottled water. They are bacteria content, fluoride and total dissolved solids (magnesium, iron, sodium).

Bottled water may contain naturally occurring bacteria which, under improper and/or prolonged storage conditions, could increase in numbers to levels that may be harmful to health. Refrigeration is a good way to reduce the growth of these bacteria.

Storage of bottled water may provide an opportunity for bacteria to grow, particularly if the containers were not sterile.

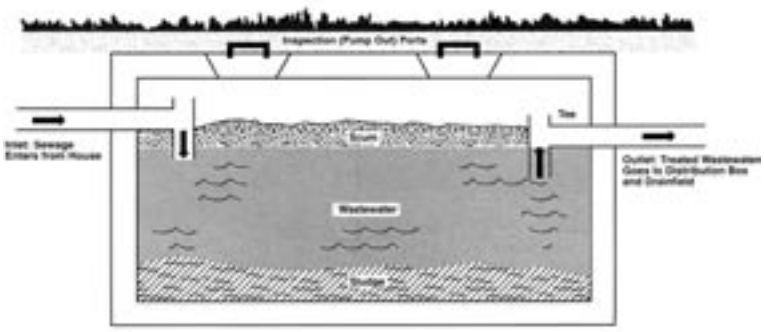
Septic Systems

How They Work

Your septic system is a private sewage treatment plant that must process all the wastewater from your house. Wastewater is piped from the house to the first stage of the system (usually a double-chambered concrete tank) which has baffles to prevent raw waste from flowing into the second stage (a system of water-permeable pipes called the tile bed). Aeration may also be added between the first and second stages.

Bacteria in the system break down sewage and wastewater. Undigested solids settle in the bottom of the tank as sludge. Lighter solids float to the top as scum. Liquid containing dissolved materials is taken from between these two layers and flows continuously and evenly into the tile bed. A final biological treatment process occurs as the wastewater works its way from the tiles through the bed itself, prior to being discharged into the water table. At every stage, aerobic (oxygen using) or anaerobic (oxygen independent) bacteria are at work, digesting the material. However, end products of the system still do contain nutrients, bacteria and chemicals.

For more information on regulations governing design of septic systems as well as their upkeep, call your local municipality or conservation authority. Ask for *Septic Smart* or the Ministry of the Environment's *Care and Feeding of your Septic Tank*.



When They Don't Work

If the tank is not pumped out regularly, the sludge and/or scum layers will be drawn into the wastewater distributed to the tile bed, eventually overloading the system. After sufficient overload time, the tile bed will no longer be capable of distributing the wastewater into the ground, causing "breakouts".

Breakouts are direct discharges of partially treated wastewater onto the ground surface. This sewage wastewater can pose a public health hazard through direct human contact or by contaminating local well water supplies.

If too much water is dumped in the tank, the tile bed will be overloaded with the same result, as well as the possibility of it backing up into your house.

If excess household chemicals, soaps and detergents are washed into the septic tank, the bacterial action may be slowed or killed, thereby increasing the risk of failure.

Overview of a new septic bed before being covered

Close-up of a distribution box

Inspection before being covered - the plastic on top helps prevent soil from filtering into and plugging the tile bed.

Managing Your Septic System

Possible signs of trouble:
- Grass over the tile bed is unusually green or spongy to walk on.
- Plumbing takes longer to drain.
- You can smell sewage in the area.
- Grey or black liquids surface in yards.
- A test of your or a neighbour's well water shows contamination.

DO THIS!

DO know where the tank is located and keep a maintenance record.

DO make sure you hire a licensed septic tank servicing company for regular inspections and make sure that they take care not to damage inlet or outlet baffles or tees during pumping.

DO get the tank pumped to remove the accumulated scum and sludge. Pumping intervals should be based on regular inspections (including measurement of scum and sludge levels in your tank).

DO plant grass over the leaching field; it will help prevent erosion and absorb excess water.

DO divert surface runoff water from roofs, patios, driveways, and other areas away from the leaching field.

DO conserve water to avoid overloading the system.

DON'T!

DON'T use your toilet as a trash can.

DON'T use more soap or detergents than you need to.

DON'T install a garbage disposal without checking whether your septic tank can handle the added volume.

DON'T poison your septic system and the groundwater by pouring harmful chemicals and cleaners such as chlorine bleach, toilet bowl cleaners, borax and drain openers down the drain.

DON'T drive over or park cars, trucks or heavy equipment on the tile bed.

DON'T plant trees or shrubbery in or near the tile bed, because the roots will grow into the lines and plug them.

DON'T pave the tile bed with concrete or asphalt.

DON'T drain your water softener backwashes into the septic tank. Use a class-2 leaching pit (dry well) or the sump hole in your basement.

DON'T add "starters" or "conditioners"- some will interfere with normal operations, others (particularly degreasers) contain cancer-causing substances that could contaminate the groundwater.

NEVER!

NEVER flush these items into the tank (they cannot be broken down by bacteria or will destroy the bacterial action):

- Loose hair
- Coffee grounds
- Dental floss
- Disposable diapers
- Kitty litter
- Cigarette butts
- Fat, grease, or oil
- Paper towels
- Sanitary napkins, tampons or condoms
- Gauze bandages

NEVER flush chemicals into the tank (they could contaminate surface and groundwater):

- Paints
- Varnishes
- Thinners
- Waste oils
- Photographic solutions
- Pesticides or herbicides

Well and Septic System Log

Type of well: ☐ Dug Well ☐ Bored Well ☐ Sand Point Well ☐ Drilled Well

Depth of Well (metres): _____

Well Water	
Date Tested	Results

Septic System	
Installation Date	
Inspection / Pumping Date	Comments

Safe Beaches

Swimming in Surface Waters

The rivers and streams of Grey and Bruce Counties are as safe for swimming as anywhere in Ontario. However, caution must be taken when swimming in any surface water. Contamination can come from:

- Commercial and industrial discharge
- Agricultural runoff from manure piles, field tile drains, livestock feedlots, livestock access to streams, milkhouse wash water, pesticides and fertilizers
- Faulty private septic systems
- Municipal sewage treatment plants with combined sewer overflows and stormwater runoffs - When rainfall is heavy and the treatment plants are at capacity, excess flows are discharged directly to lakes and rivers without proper treatment
- Heavy rainfall that contaminates surface waters with faeces from deer, birds, cats, dogs and other animals
- Flocks of geese, gulls and other waterfowl
- Winds, currents and waves that stir up the sediment at the bottom of lakes and streams (turbidity)
- Numerous bathers, particularly those with infections
- Oil and gas spills from power boats and waste from boaters

People who swim in surface waters are more likely to get sick than people who swim in chlorinated swimming pools. Swallowing water is the main way contaminants enter the body. They may also gain entry through broken skin or through the eyes, ears and nose. The most common illnesses that result are minor respiratory, skin, eye, ear, nose and throat infections as well as gastrointestinal illnesses such as diarrhea.

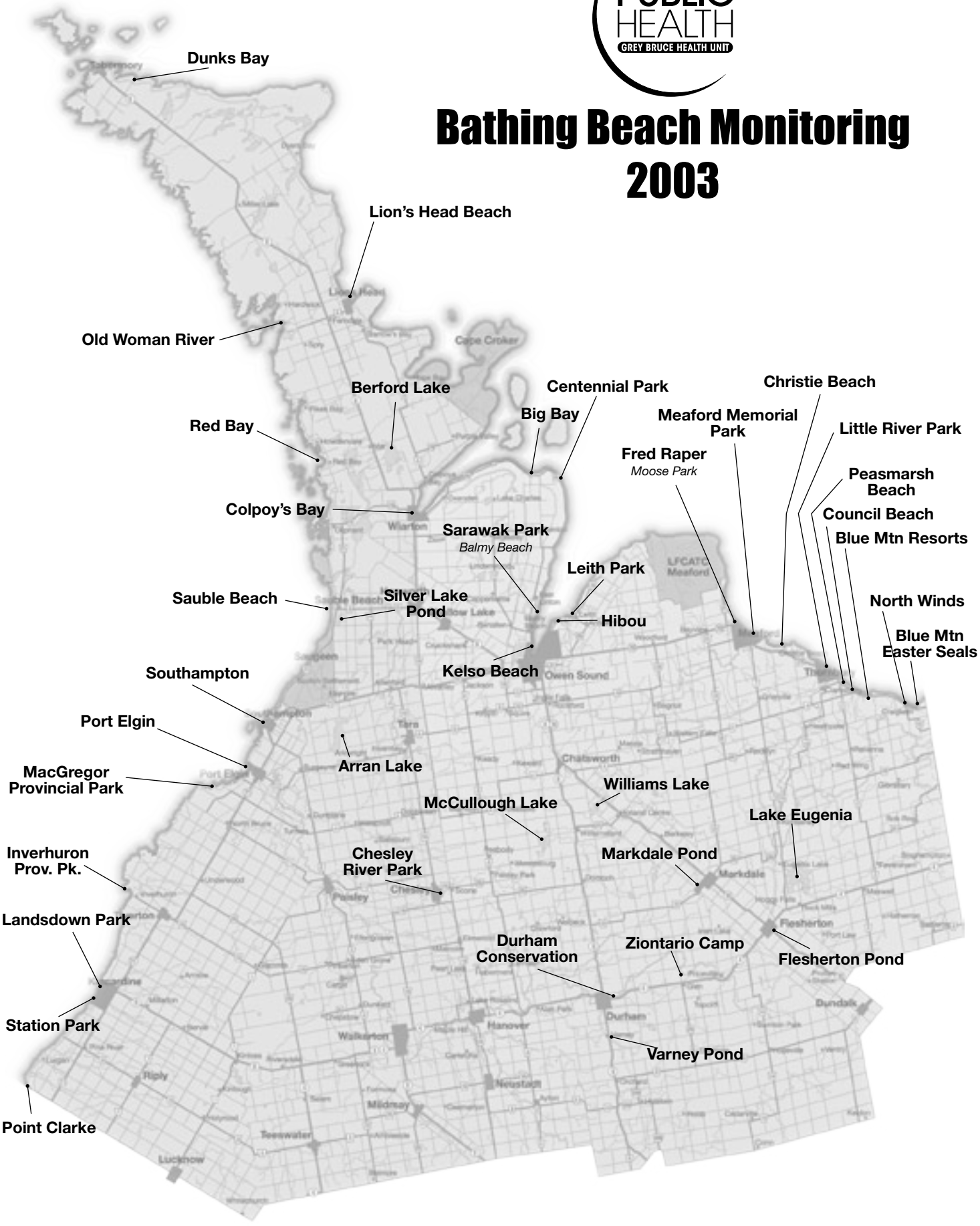
How can you prevent illnesses when swimming in surface waters? Consider these precautions:

- Be your own monitor. Water that is safe one minute may be unsafe the next.
- Do not swim following periods of heavy rainfall.
- Avoid swimming in areas close to livestock, storm culvert, field tile drains, or industrial runoff.
- If the water is not clear or has an odour, do not go swimming.
- Do not swim if you have an infection.
- Avoid putting your head under water if you are susceptible to ear, nose or throat infections.
- If you are taking your infant swimming, consider using a chlorinated swimming pool instead of surface waters.
- Avoid warm, shallow pools of water that are not replenished by a flow of fresh water. Such pools are good breeding grounds for bacteria.
- Use your best judgment when swimming at a monitored beach. Weather, environmental, animal or human factors can contaminate water shortly after routine water tests show the beach to be safe.

Be Your Own Monitor
- is the Water contaminated?

PUBLIC HEALTH
GREY BRUCE HEALTH UNIT

Bathing Beach Monitoring 2003



	Location	# of Sample	Frequency
			(During Bathing Season)
Bruce	Arran Lake (Arran)	5	1X/month
	Berford Lake (Albemarle)	5	1X/month
	Chesley River Park (Arran)	5	1X/month
	Colpoy's Bay (Wiarton)	5	1X/month
	Dunks Bay (St. Edmund's)	5	1X/month
	Inverhuron Prov. Pk. (Bruce)	5	1X/week
	Kincardine - Station Park	5	2X/month
	Kincardine - Landsdown Park	5	1X/month
	Lion's Head Beach	5	1/week
	MacGregor Provincial Park (Saugeen Sh.)	5	1X/month
	Old Woman River (Eastnor)	6	1/week
	Point Clarke (Huron Twp)	5	2X/month
	Port Elgin (Saugeen Shores)	6	2X/month
	Red Bay (Albemarle)	5	1X/month
	Sauble Beach (Amabel)	15	2X/month
	Silver Lake Pond (Amabel)	5	1X/month
	Southampton (Saugeen Shores)	5	1X/month
Grey	Big Bay (Keppel)	5	1X/month
	Blue Mtn Easter Seals (Collingwood)	5	1X/month
	Blue Mtn Resorts Beach (Collingwood)	5	1X/month
	Centennial Park (Keppel)	5	1X/month
	Christie Beach (St. Vincent)	5	1X/month
	Council Beach (Collingwood)	5	1X/month
	Durham Conservation Area - East Dam (McGowan)	5	1/week
	Durham Conservation Area - Middle Dam	5	1/week
	Flesherton Pond	5	1/week
	Hibou (Sydenham)	5	1X/month
	Kelso Beach (Owen Sound)	11	2/month
	Lake Eugenia (Artemesia)	5	1X/month
	Leith Park (Sydenham)	5	1X/month
	Little River Park (Thornbury)	5	1X/month
	Markdale Pond	5	1/week
	McCullough Lake (Sullivan)	5	1X/month
	Meaford Memorial Park (St. Vincent)	6	1X/month
	Fred Raper (Moose Park) (Meaford)	5	1X/month
	North Winds (Collingwood)	5	1X/month
	Peasmarsh Beach (Collingwood)	5	1X/month
	Sarawak Park (Balmy Beach)(Sarawak)	5	1X/month
	Varney Pond (Normanby)	5	1X/month
	Williams Lake (Holland)	5	1X/month
	Ziontario Camp (Glenelg)	5	1X/month
	41 Beaches Sampled	224 x # per month	

Responsibility for Beach Monitoring

- Public Health is responsible for monitoring beach water quality and plays a role in identifying factors that have an impact on beach water quality. Municipal authorities and the Ministries of the Environment and Natural Resources share this responsibility.
- Beaches are monitored to determine pollution levels in the water at beach sites and to prevent illness.

Routine Beach Surveillance

- Public Health is expected to identify those beaches that require routine surveillance. As a minimum, public bathing beaches are to be routinely monitored. This is done by an on-site investigation into potential factors and conditions that may have an effect on the quality of bathing beach water, for example, possible pollution sources and their potential impact on the suitability of beach water for public bathing purposes.
- Public bathing beach definition: a beach area, owned and operated by a municipality, which has a supervised aquatics program or is staffed by a lifeguard.
- Public Health may also monitor any other bathing area, except provincial parks, to which the public has access, and where the Health Unit has reason to believe that recreational use of the water may result in waterborne illness.
- Examples of infections and illness which can occur from swimming in polluted water are Conjunctivitis (eye), ear infections, nose infections, throat infections, or more serious infections such as Campylobacter, E.coli O157:H7, Shigellosis, Giardiasis (Beaver Fever), Infectious Hepatitis and gastrointestinal illnesses.
- Beaches are also monitored for safety hazards that could cause bather injury.
- Public Health is **NOT** responsible for routine monitoring of private residential beaches that are not used by and accessible to the public at large.

Sampling Frequency

- Routine beach surveillance consists of a minimum of five sets of samples per sampling site per week beginning prior to and continuing over the bathing season.
- Where historical data and pollution surveys indicate that the water quality has sampled consistently well within the limits set for recreational use, routine surveillance may be reduced to once per month or suspended for the season if a sample has been taken in the current year to verify that no change has occurred since last year.

Posting Public Bathing Beaches

- When there is evidence that bathing beach water is potentially dangerous to the health of the bathers, Public Health ensures that notices are displayed in prominent positions at the beach indicating the nature of the risk. These beaches are not closed, but are posted, advising the public that the water may be unsafe for bathing.
- Evidence for posting a beach may be based on bacteriological analysis, historical and epidemiological data, or the physical quality of the water.
- Posting of a beach occurs when the daily geometric mean of bacteriological water samples from a beach exceeds 100 *E. coli* per 100ml of water in two consecutive sets of samples. *E. coli* is used as an indicator organism for faecal bacterial contamination.
- In the absence of tests and standards for the concentration and pathogenicity of blue-green algae, any visual blue-green algae bloom will result in immediate steps by Public Health to close (not post) the beach.
- Bathing beach water may also be considered potentially hazardous when there is an outbreak in the community of an infectious disease that may be spread by such waters, and where epidemiological evidence points to the beach as a possible factor in the prevalence of the illness, or where a pollution survey indicates that the beach is susceptible to contamination.
- A beach will remain posted until surveillance of water quality demonstrates that the risk to bathers is once again within acceptable limits.

SWIMMING POOLS

WATER QUALITY AND SAFETY

Swimming Pool Chemistry

- The need to treat swimming pool water has been widely accepted for a long time. Maintaining a pool with balanced water chemistry is crucial to good pool operations and is recognized as a means of controlling communicable diseases in water.
- Balanced swimming pool water chemistry leads to clean, sparkling water. The minimum free available chlorine (FAC) residual should be maintained at 0.5 parts per million (ppm). Combined chlorine (chloramines) should not test above 0.5 ppm. If the reading is above 0.5 ppm the pool should be shocked. Chlorine with a stabilizer (used in outdoor pools) should maintain a FAC residual of 1.0 ppm. If bromine is used as a disinfectant the residual should be a minimum of 2.0 ppm. The pH range should be 7.2 to 7.8. An elevated pH reduces the effectiveness of the disinfecting capabilities of chlorine. The total alkalinity of a pool needs to be maintained at a minimum of 80 ppm with an ideal range between 80 – 120 ppm. The ideal range for calcium hardness in a pool is between 200 – 275 ppm. Cyanuric acid stabilizer (used in outdoor pools) should not exceed 60 ppm with an ideal range between 25 – 60 ppm.
- Swimming pool water must be tested daily and routinely to ensure that balanced chemistry is maintained. Chemically balanced pool water is neither corrosive or scaling. This is crucial for bather comfort and ease of pool maintenance.

Cloudy Swimming Pools

- Confronted with a cloudy pool, one is usually confused, not knowing what the problem is or where to start.
- Check the circulation and filtration system to ensure adequate water turnover and if the filter needs backwashing or possible replacement of the filter medium.
- High readings of total alkalinity, calcium hardness and pH will cause scaling on pool filtration equipment and cloudy pool water. First adjust the total alkalinity (ideal range 80 – 120 ppm) and then bring the pH into balance.
- A pH range of 7.2 – 7.8 should be carefully maintained. For most waters, the pH should be held closer to the upper limit as this will avoid eye irritation (pH of human eye is 7.5).

Safety Tips

To ensure a safe swimming pool during the summer months the following safety issues should be followed:

- Have a telephone close to the pool with emergency numbers listed.
- Ensure that pool fencing and gate are well constructed and at the proper height. Ask your municipality for proper fence height. Make sure children cannot reach the pool through a patio or garage door that opens into the backyard.
- Make sure the gate is self-closing. It should be locked when pool is not in use.
- Adult supervision is always required. Never swim alone.
- Send children to swimming and water safety lessons. Call your local Canadian Red Cross Society 1-888-890-1997, the local branch office of the Lifesaving Society (416) 490-8844, or the Family Y (519) 376-0484.
- Take a course on pool safety, first aid and lifesaving skills, such as CPR.
- Children under the age of 3 and those who cannot swim must wear a personal floatation device.
- Make sure lifesaving equipment and a first aid kit are on site.
- Do not allow roughhousing and horseplay.
- Keep deck clean and clear of objects that may create a tripping hazard.
- Make sure toys, garden furniture and tools are not near the pool fence; children can climb up on these to get into the pool.
- Allow only one person at a time on the ladder. People should face the ladder when going up or down.
- Eliminate any entrapment hazards around pool equipment, ladders and steps.
- For pool service, select a certified pool professional.

Hot Tubs/Spas
Water Quality And Safety

Health Risks

- Warm water and the presence of organic material can promote the growth of at least two harmful bacteria in a hot tub/spa environment. Pseudomonas bacteria commonly cause skin infections resulting in irritations that last for several days. Legionnaires bacteria inhaled with water droplets can cause serious respiratory illness.

Preventative Maintenance

- Maintaining proper disinfection levels in a hot tub destroys bacteria, viruses, and impurities from bathers. The cleaner the water the more disinfectant is available to kill organisms. Before entering or re-entering a hot tub remove visible dirt, and shower using warm water and soap, thoroughly rinsing off all soap before entering or re-entering a hot tub. It is very important to replace the water in the hot tub and to maintain the filter.

- A spa should have at least one handrail to provide safe entry and exit.

- Carpeting or other water retentive material should not be used in areas that become wet during spa use.

- A spa that provides steps for entry and exit should have a non-slip surface on the steps.

- A spa should be provided with means for preventing access when it is not open for use.

Water Chemistry

- Bromine and free available chlorine levels should be maintained at a minimum of 5.0 parts per million (ppm) and the pH (acidity reading) should be in the 7.2 to 7.6 range. The total alkalinity should range from 80 to 120 ppm. Calcium hardness should be maintained between 150 to 200 ppm. If the difference in the total and free available chlorine, referred to as combined chlorine or chloramines, exceeds 0.5 ppm, then shocking the hot tub to 10 to 20 ppm is appropriate. For outdoor hot tubs where a stabilizer is used, the cyanuric acid concentration should not exceed 6o mg/L.

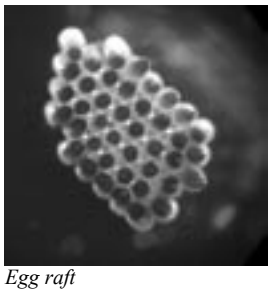
Safety

- It is important to be aware that body overheating can occur from spending extended periods of time in a hot tub. Water temperatures should not exceed 40°C (104°F) and prolonged soaking should be avoided. If possible, spas should not be used alone. Extended periods of time in a hot tub may cause fainting. If you are pregnant or have a known medical problem such as heart disease, high blood pressure, or diabetes, consult with your physician before using a hot tub/spa. Children under the age of twelve should be accompanied and supervised by a person aged sixteen years or more when using the spa. Avoid using a spa if you are taking medication that can cause drowsiness or affects blood pressure, or if you are under the influence of drugs or alcohol. Avoid using a spa if you have an open sore or rash on the skin. Also tie back long hair to prevent entrapment in spa drains. Use anti-entrapment drain cover in hot tubs and spas.

West Nile Virus

Standing water (such as ponds, bird baths, roof gutters and tire swings) makes a perfect breeding ground for mosquitoes. We all know mosquitoes are irritating when they bite but sometimes they are cause for more serious concern. Some mosquitoes are infected with West Nile Virus, a virus that in rare instances causes encephalitis in people, which is swelling and inflammation of the brain.

One of the best ways to prevent the spread of West Nile Virus is to reduce the breeding grounds of mosquitoes. We can also protect ourselves in other ways. The following information provides answers to questions about West Nile Virus: general information, transmission, prevention, risks, and control.



Egg raft

Larva

Adult

What Is West Nile Virus?

West Nile Virus (WNV) is a virus that is found in wild birds and carried by mosquitoes. It was first identified in the province of West Nile, Uganda in 1937. Since then it has been identified in Egypt, Asia, Israel, South Africa, parts of Europe and Australia. In 1999, it was present in the United States for the first time, and in the summer of 2001 was discovered in birds in southern Ontario. In 2002, it was found in three birds submitted for testing from Grey and Bruce Counties.

What Is West Nile Encephalitis?

"Encephalitis" means an inflammation of the brain and can be caused by viruses and bacteria, including viruses transmitted by mosquitoes. West Nile encephalitis is an infection of the brain caused by the West Nile virus.

How Is WNV Spread?

WNV is transmitted to humans and animals by the bite of an infected female mosquito usually of the species Culex. There are many other types of mosquitoes, but most do not carry this virus. Mosquitoes become infected after feeding on the blood of infected birds. The virus is not spread via person-to-person contact. **It cannot be spread directly from a bird to a human.** The Culex species of mosquito is common in Grey and Bruce Counties.

What Are The Symptoms Of West Nile Virus?

Most people infected by WNV have no symptoms at all or a mild illness such as fever, headache, muscle weakness, and body aches. Symptoms may appear 3 – 15 days after being bitten by an infected mosquito. Some people may experience the more severe symptoms of encephalitis. These symptoms may include rapid onset of a severe headache, high fever, stiff neck, sensitivity to light and disorientation. The elderly and those who are immunocompromised are at greatest risk of developing more severe symptoms.

Who Is At Risk Of The Virus?

People over 50 years of age have the highest risk of developing severe illness because, as we age, our bodies have a harder time fighting off disease. As with other infections, children, especially younger children, may be more susceptible to WNV infection. Children require adults to help them take precautions against mosquito bites. Persons whose immune system is compromised in some way are also more susceptible.

What Is The Treatment For West Nile Virus?

There is no specific treatment for WNV infection. Antibiotics are not effective and there is not a WNV vaccine approved for use at this time.

Do All Mosquitoes Bite Humans?

No, only adult female mosquitoes bite humans. Most mosquitoes feed on plant juices. Most female mosquitoes feed on humans, birds and other animals to get sufficient blood to develop eggs. Mosquitoes are attracted by the carbon dioxide that humans exhale.

Do All Mosquitoes Transmit West Nile Virus?

While there are many species of mosquitoes, the adult Culex pipiens mosquito (the common house mosquito) is the one most commonly associated with West Nile Virus.

Why Are Some People Bitten By Mosquitoes More Than Others?

There are many reasons. Cologne, perfumes, and scented body lotions can attract mosquitoes. Dark coloured clothing is also more attractive to mosquitoes. During evenings until early morning mosquitoes are most active and looking for a blood meal, so people outdoors during this time are more likely to be bitten. Finally, everyone's body is different, and some people produce odours that are attractive to mosquitoes.

How Can I Prevent Mosquito Bites?

The easiest form of protection is to cover up. If outdoors in the early evening when mosquitoes are most active and likely to bite, wear light coloured long-sleeved shirt and pants with fabric thick enough to prevent mosquitoes from biting. Shoes and socks are also recommended.

If I Live In An Area Where West Nile Virus Is Reported, And A Mosquito Bites Me, Am I Likely To Get Sick?

Less than 1% of mosquitoes are likely to be infected. The chances of getting bitten by an infected mosquito are very small.

Are Mosquito Repellants Effective?

If you choose to use an insect repellant, use one that contains DEET (N,N-diethyl-m-toluamide). Ensure you choose the correct DEET-containing product that is suitable for the age of the person and for the time spent outdoors. Insect repellents that contain 30% DEET will remain effective for approximately five hours, 10% DEET will provide approximately three hours of protection, while 5% DEET provides approximately two hours.

Although current labels on insect repellants containing DEET state that these products are not to be used on children under the age of two years (infants and toddlers), the Pest Management Regulatory Agency's re-evaluation on DEET, which included input from the Canadian Paediatric Society, is now recommending the following:

For children under six months of age

- Insect repellents containing DEET should not be used.

For children aged six months to two years of age

- A maximum of one application per day may be used in situations where a high risk of complications from insect bites exists.
- Only the least concentrated product (10% DEET or less) should be used.
- The product should be applied sparingly and not be applied to the face and hands.
- Prolonged use should be avoided.

For children between two and twelve years of age

- A maximum of three applications per day may be used in situations where a high risk of complications from insect bites exists.
- Only the least concentrated product (10% DEET or less) should be used.
- The product should be applied sparingly and not be applied to the face and hands.

Insect repellent can dry skin, which is a significant problem for those with dry or thin skin. Using a 10% or less DEET insect repellent with a skin moisturizer will help to reduce this problem. Reapplication of the repellent may be required if outdoors for extended periods (greater than two hours).

Are There Effective Alternatives To Insect Repellents?

The Pest Management Regulatory Agency is currently re-evaluating citronella and lavender oil. Please follow the label information regarding general use. Note: It is recommended that these products not be used on children under two years of age. The citronella oil registered in Canada to protect people against mosquito bites may last for less than one hour. The registered lavender oil provides protection for half an hour or less. Based on animal studies, citronella-based products can cause allergic reactions for some individuals.
Outdoor repellents such as citronella candles and mosquito coils are not entirely effective at protecting against mosquitoes. They must be used under proper conditions. The area needs to be protected so there is little breeze to dissipate the ingredients. Ultrasonic devices, incense, and bug zappers have not been shown to be effective in preventing mosquito bites. The purpose of these devices is to attract mosquitoes. Therefore, if you wish to use one, ensure that it is located away from the home, or deck where you and your family sit in the evening.

Where Do Mosquitoes Live?

The Culex pipiens mosquito (the common house mosquito) lays its eggs in standing water around the home. Weeds, tall grass and bushes provide an outdoor home for the adult Culex pipiens mosquito.

What Can I Do To Control Mosquito Breeding Areas?

Mosquitoes breed in standing water. To get rid of standing water:

- Containers, such as cans and unused flowerpots, should be regularly emptied of standing water.
- Roof gutters (eaves troughs) should be cleaned and unclogged.
- Drain water off pool covers.
- Wading pools should be emptied regularly.
- Turn over wheelbarrows.
- Ornamental pools should be aerated or stocked with fish.
- Empty and clean bird baths twice a week.
- Drill holes in the bottom of tire swings.
- Remove all discarded tires from your property.

To reduce areas where mosquitoes can rest during non-biting hours, keep grass cut and bushes and shrubs trimmed.

To keep mosquitoes out of your house, be sure that doors and window screens are in good repair.

Can West Nile Virus Cause Illness In Dogs or Cats?

West Nile Virus was isolated from a dead cat during the New York outbreak in 1999. Most dogs and cats infected with the virus fully recover. There is no specific treatment.

What Are Some Of The Organizations Working To Monitor And Control The Spread of WNV?

The Ontario Ministry of Health and Long-Term Care, the Grey Bruce Health Unit, and the Canadian Cooperative Wildlife Centre are all working on monitoring and controlling the spread of WNV.

Public Health Action Against West Nile Virus?

Public Health has been involved in a number of activities in Grey and Bruce Counties to prepare for West Nile Virus and minimize its impact. These activities include public education, dead crow surveillance, mosquito control, mosquito reduction and human surveillance.

Public Education

Public Health has prepared several fact sheets with more detailed information on West Nile Virus than is in this pamphlet. These include:

- West Nile Virus
- Questions and Answers
- Protect Yourself and Your Family
- West Nile Virus and Mosquitoes
- Reduce Mosquito Breeding Sites
- Report and Dispose of Dead Birds
- Schools, Summer Camps, Daycares
- West Nile Virus and Seniors
- Mosquito Traps

Information regarding West Nile Virus will also be regularly released to the public through normal media sources (newspaper, radio, TV, etc.) and displays. Staff from Public Health are also available to give presentations on West Nile Virus to interested groups or at public gatherings. To arrange for a presentation contact the Public Health Unit office in your area.

Dead Crow Surveillance

The Dead Crow Surveillance Program is being conducted by Public Health to monitor West Nile Virus (WNV) in the area. Dead crows have been the earliest warning system to indicate that WNV is present in an area. Along with all health units in Ontario, the Grey Bruce Health Unit has a system to respond to calls from the public reporting dead crows. A public health inspector will review the information and make a decision on whether a bird will be submitted for testing. Testing is carried out by the Canadian Cooperative Wildlife Centre.

When reporting a dead crow to the Public Health Unit in your area please be prepared to provide the following information:

- Name, mailing address and telephone number of caller
- The exact location of the crow (i.e., street address, postal code, cross streets, on grass, on road, on sidewalk)
- The condition of the bird (intact, hurt, fresh, mauled, feathers ruffled)
- If you witnessed the death of the bird and the behaviour of the bird immediately prior to death

Mosquito Control

During the summer of 2003 the Public Health will be operating a mosquito surveillance program. This program will consist of two main components:

1. Mosquito trapping, identification, age determination and testing
2. Mosquito larvae collection and identification

Several mosquito traps will be set out throughout Grey and Bruce Counties. These traps are designed to catch adult mosquitoes. Mosquito eggs and larvae will also be counted and/or collected from some of the testing sites. Adult mosquitoes and larvae will be identified and tested at the Public Health Unit (Owen Sound office) as well as at Brock University. Data from both components will be carefully monitored and compared to ensure there is a clear understanding of mosquito species activity. The results of the Mosquito Surveillance Control Program will be updated on the Health Unit web site on a weekly basis beginning June 2003.

Mosquito Reduction

If the mosquito surveillance data and results from WNV human case surveillance indicate the need, mosquito reduction activities in the form of larviciding (preventing mosquito larvae from developing into adults) may be considered.

Human Surveillance

A letter from the Ministry of Health and Long-Term Care has been sent to all hospitals and selected physicians throughout the province advising them of the symptoms of WNV encephalitis and the laboratory testing protocols. Additional information regarding West Nile Virus is forwarded to local physicians from the Public Health Unit as required.

Encephalitis is designated as a condition reportable to Public Health. When a report is received, WNV testing is reviewed with the reporting infection control practitioner or physician. Results of human surveillance will be updated on the Public Health web site on a weekly basis beginning June 2003.

More Information About West Nile Virus?

Health Canada

West Nile Virus Surveillance Information
www.hc-sc.gc.ca/pphb-dgspsp/wnv-vwn/

Ontario Public Health

West Nile Virus
www.health.gov.on.ca/english/public/pub/pubhealth/westnile.html

Canadian Cooperative Wildlife Health Centre

wildlife.usask.ca/english/frameWestNile.htm

Popular Science

West Nile Virus
www.popular-science.net/science/west_nile_virus.html

Where Can I Get Further Information?

Further information can be found at any Public Health office or on our web site (www.publichealthgreybruce.on.ca)

Owen Sound - Public Health

(519) 376-9420 • 1-800-263-3456
920 First Avenue West
Owen Sound, ON
N4K 4K5

Durham - Public Health

(519) 369-3318 • 1-800-394-6643
150 Mill Street
Box 417
Durham, ON
N0G 1R0

Southampton - Public Health

(519) 797-2010 • 1-800-230-7719
162 High Street
Box 213
Southampton, ON
N0H 2L0

Walkerton - Public Health

(519) 881-1920 • 1-800-821-7714
30 Park street
Box 248
Walkerton, ON
N0G 2V0

Acknowledgements & Sources

Canadian Cooperative Wildlife Centre

Canadian Institute of Public Health Inspectors

Durham Regional Health Department

Environment Canada

Grey Bruce Health Unit - Public Health Inspectors

Halton Region Health Department

Health Canada

Middlesex-London Health Unit

Ontario Ministry of Agriculture, Food and Rural Affairs

Ontario Ministry of Environment

Ontario Ministry of Health and Long-Term Care

Ontario Regulation 903 "Wells" under the Ontario Water Resources Act

Peel Region Health Unit

Printing and Design - Austin Graphics

Regional Municipality of Waterloo, Community Health Department

Risks to Health from Drinking Water
A Report on the Health of British Columbians – Provincial Health Officer's Annual Report, 2002

R.S. Tobin and W.J. Robertson, Removal of Chemicals in Drinking Water by Point-of-Use Treatment Devices and Associates Microbiological Problems. Environmental Health Review, Fall 1987, p 66.

University of Nebraska – Institute of Agriculture and Natural Resources