

Research on The Bottled Water Debate

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Where does our tap water come from?

(Source, Region of Waterloo

<http://www.region.waterloo.on.ca/web/region.nsf/8ef02c0fded0c82a85256e590071a3ce/33818F93F2F55D328525734800627080?OpenDocument>)

- 20% of drinking water in the Grand River watershed comes from surface water (surface water refers to water from lakes, rivers and streams) – in this case from the Grand River.
- 80% of our drinking water comes from ground water.
- In Waterloo region the ground water is usually found less than 100 metres from the surface.
- There are 14 ground water treatment plants and 126 wells in the Regional Municipality of Waterloo.
- In the townships the water supply comes only from ground water.
- Waterloo region water is considered hard water because of a higher than average presence of naturally occurring minerals in the water sources. This may affect the taste and smell of the water in the region.
- Ground water exists almost everywhere underground in spaces between particles of rock and soil or in crevices and cracks in rock. The ground water collects in aquifers which are underground formations of permeable rock or loose materials (sand, gravel) which can provide useful quantities of water when tapped by a well. (source Environment Canada <http://www.ec.gc.ca/inre-nwri/default.asp?lang=En&n=0841672A&xsl=articlesservices,viewfull&po=7A09AC66>)
- The Great Lakes hold 20 per cent of the world's fresh water, providing drinking water to 45 million people.

What is the Grand River Watershed?

(Source <http://www.grandriver.ca/>)

- The Grand River flows 300 hundred kilometers from the highlands of Dufferin County to Dunville on Lake Erie.
- The Grand River Conservation Authority (GRCA) manages water and other natural resources on behalf of 38 municipalities in the area.
- The GRCA complies with the Environmental Protection Act for Ontario and the Clean Water Act with regard to protecting quality of source water (groundwater and surface water).

- There are many ongoing studies of water quality in the region such as the Aldercreek and Strasbourg Creek watershed studies. These studies and others look at water quality and sustainability issues.
- The types of contaminants under inspection are:
 - a) Industrial contaminants including spills, landfill leaching, leaky storage containers and poor disposal methods.
 - b) Agricultural contaminants including nitrates, bacterial contaminants, fertilizer and manure treatments
- In the GRCA region grants are provided to farmers and property owners to take action to improve the quality of water in priority surface and groundwater areas. The grants are to:
 - a) Improve handling and storage areas including chemical, fertilizer and fuel storage.
 - b) Reduce livestock access to surface water.
 - c) Reduce field erosion.
 - d) Encourage strip cropping, nutrient management plans and fragile agricultural land retirement
 - f) Help with septic system inspections and upgrades.
 - g) Help restoring wetlands.
 - h) Planting trees as wind breaks and to absorb run-off.
- The GRCA has provided millions of dollars in such grants.

How safe is our drinking water?

- Water quality is a provincial responsibility, including ground and surface water.
- Through Health Canada, the federal government provides a set of guidelines for drinking water quality that identifies possible contaminants and safe consumption levels. These guidelines are revised regularly based on evolving identification of new contaminants. (source Health Canada http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/revise-revisees-eng.php#tbl1)
- There are several provincial acts that govern drinking water.

(Source Minister of Environment
http://www.ontario.ca/ONT/portal51/drinkingwater/General?docId=STEL01_046858&breadcrumbLevel=1&lang=en)

(Source Canadian Environmental Law Association (<http://www.cela.ca/publications/tapwater-trial-overview-ontarios-drinking-water-regime>))

 1. Ontario Water Resource Act
 - This act contains regulations to protect and conserve the water resources used for municipal supplies of drinking water.
 - It prohibits discharging of substances that affect water quality.
 - In conjunction with other laws it is used to control the extraction of water resources for commercial use.

2. The Ontario Clean Water Act of 2006

- This act is concerned with safe-guarding of the private sources of drinking water across the province.
- It spells out how to identify and take action against practices that threaten the source of drinking water.

3. The Safe Drinking Water Act of 2002

- This act was created as a result of the inquiry into the Walkerton tragedy
- It specifies the standards for drinking water quality, treatment and distribution.
- It identifies the responsibilities, accreditation, quality monitoring and reporting of owners and operators of drinking water systems.
- It specifies the allowable levels of various microbiological, chemical and radiological elements in potable water in accordance with federal guidelines.

4. The Environmental Protection Act

- This is the main pollution control statute that prohibits contaminant discharge into the natural environment.
- The most commonly use disinfectant in our tap water is chlorine.
- Chlorine persists throughout the treatment and distribution of water all the way to the tap.
- It can be removed at the point of use by carbon filters.
- There is more scientific information available about the affects of chlorine and the organic by-products produced by its use in drinking water than any other form of disinfectant.
- The most important group of by-products of chlorine use are trihalomethanes (THMs), including chloroform. Lab tests have shown that mice with high levels of THMs are at risk of cancer. (source, Health Canada http://www.hc-sc.gc.ca/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/environ/chlor-eng.pdf)
- The Safe Drinking Water Act and the Federal Guidelines on Drinking Water Quality set out maximum allowed levels of THMs. The current total THM limit is 0.1mg/liter (source Health Canada http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/revised-revisees-eng.php#tbl1)
- The Region of Waterloo maintains an online archive of all water quality reports produced in accordance with the Safe Drinking Water Act. <http://www.region.waterloo.on.ca/web/region.nsf/c56e308f49bfeb7885256abc0071ec9a/0dff011f5aa7db2085256c130069922e!OpenDocument>

- Water testing in Waterloo Region is conducted in the region's own water testing labs. In 2006, laboratory operations included processing over 52,000 samples and performing over 205,000 tests in the lab as well as processing over 21,000 samples and carrying out 34,000 analytical tests in the field by field services staff
- Total chlorine residue on 2008 regional reports ranged between 0 and 190 mg/litre, depending on the sample.
- Sodium levels in the region range between 10 and 200 mg/liter. The source of sodium is water source contamination from de-icing of roads.
- Bromate (a by-product of ozone use) levels at the Mannheim Treatment plant were sampled monthly and values ranged between .003 and .062 mg/litre in the 2008 Water Quality Report.
- THM (trihalomethanes) levels for the City of Kitchener Distribution System were 18 micrograms/litre (18 ug/litre) in the 2008 Water Quality Report. (Source http://www.kitchenerutilities.ca/pdf/water_quality_report.pdf)
- There have been several reported instances in Waterloo Region of groundwater contamination leeching from industrial sites including:
 - a) The former Hubbard Bros. drying plant in Cambridge (Source The Record July 2007 <http://news.therecord.com/article/220951>).
 - b) The Northstar Industries site in Cambridge where trichloroethylene has been found to exceed provincial limits. (Source Region of Waterloo Public Health report [http://www.region.waterloo.on.ca/web/region.nsf/8ef02c0fded0c82a85256e590071a3ce/3ABE244AF3D6D4EB852570F400748AB0/\\$file/PH-06-003.pdf?openelement](http://www.region.waterloo.on.ca/web/region.nsf/8ef02c0fded0c82a85256e590071a3ce/3ABE244AF3D6D4EB852570F400748AB0/$file/PH-06-003.pdf?openelement)).
 In both cases there is no evidence of drinking water contamination.
- More than 50,000 tonnes of salt (sodium chloride) are spread on our roads every year and slowly seep into the groundwater.
- In the Region of Waterloo, 13 of our municipal drinking water wells have concentrations of chloride that don't meet provincial **taste** standards. (Source <http://www.region.waterloo.on.ca/WEB/Region.nsf/DocID/5D4A59F912186B6185256F580059F09A?OpenDocument>)
- Last year, five public schools in the Region had to turn off water fountains due to an increase in the level of lead. (Source, University of Waterloo Engineering Society Newsletter September 2008 http://iwarrrior.uwaterloo.ca/?module=displaystory&story_id=3836&format=html)
- Ozone treatment is an alternative to chlorine without the disadvantage of THMs. However there is less known about possible bromate-based by-products. (source <http://www.water-research.net/ozone.htm>)

- Ozone does not remain in the water so is not effective against contamination throughout the distribution system.

How safe is bottled water?

- Bottled water is considered to be a food product and is regulated under the Food and Drugs Act and Regulations. (source <http://www.inspection.gc.ca/english/fssa/concen/specif/bottwate.shtml>)
- The regulations include requirements for microbiological quality, composition, packaging and labeling.
- Most of the regulations under the Food and Drugs Act have not been updated since 1973.
- The regulations do not contain specific, detailed parameters for chemical and radiological contaminants. (source Health Canada http://www.hc-sc.gc.ca/fn-an/consultation/init/bottle_water-eau_embouteillee_01-eng.php)
- According to the Canadian Bottled Water Association, the guidelines followed by its industry members exceed those of the federal and provincial governments. (source Canadian Bottled Water Association http://www.macleans.ca/article.jsp?content=20070514_105163_105163)
- More than 25 per cent of bottled water originates from the municipal tap systems. (source, Macleans Magazine Green Report May 2007 http://www.macleans.ca/article.jsp?content=20070514_105163_105163)
- Unless the bottled water is sterilized, the level of bacteria re-growth increases to maximum levels after six weeks of un-refrigerated shelf life. (source Health Canada http://www.hc-sc.gc.ca/fn-an/securit/facts-faits/faqs_bottle_water-eau_embouteillee-eng.php#A3)
- Bottlers are vulnerable to ground water contamination that may seep into their sources from surrounding areas. (source Agriculture Canada review of The Canadian Bottled Water Industry Paper <http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1171644581795&lang=eng>)
- In 2006 The Office of the Auditor General presented a petition to Health Canada alleging that current regulations for the safety of bottled water permit lead in bottled water at a level 20 times higher than drinking water. They also permit arsenic in bottled water at a level 10 times higher than drinking water (source, Office of the Auditor General http://www.oag-bvg.gc.ca/internet/English/pet_187_e_28923.html)
- The EPA (the U.S. Environmental Protection Agency), in a document entitled "[Bottled Water Basics](#)," says: "Drinking water (both bottled and tap) can reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk."

- It is estimated that Canadian bottling plants receive government inspections once, on average, every 3 years (source, The Polaris Institute <http://www.insidethebottle.org/files/health%20impacts%20fact%20sheet.pdf>) (source CBC News Article <http://www.cbc.ca/news/background/consumers/bottled-water.html>)
- There have been 29 recalls of 49 bottled water products since 2000 by the Canadian Food Inspection Agency, 5 of which have been made public and were recalled due to bacterial or chemical contaminants. (source, The Polaris Institute <http://www.insidethebottle.org/files/health%20impacts%20fact%20sheet.pdf>)

How safe are plastic bottles?

- Polyethylene terephthalate (recycling symbol '1' on the bottom of the bottle) or PET, has become the plastic packaging of choice for many food products, particularly beverages like bottled water and carbonated soft drinks.
- According to the Canadian Plastics Industry Association, the PET bottles sold in Canada are designed for single use because of economic and cultural reasons, not because of any safety concerns regarding PET. (Source <http://www.cpia.ca/newsroom/details.php?ID=1713>)
- Water bottles, usually made of polyethylene terephthalate (PET), can only be used once because they are difficult to sanitize. (Source Hamilton Spectator <http://www.thespec.com/News/Local/article/496410>)
- Tests to determine the levels of compounds that have the potential to transfer from the plastic into food are conducted using conditions that simulate the actual use of the material. These tests have found that the migration of any components of PET plastics under laboratory conditions is well below applicable safety levels. (Source The American Chemistry Council Plastics Division http://www.plasticsinfo.org/s_plasticsinfo/sec_generic.asp?CID=657&DID=2605)
- PET itself is biologically inert if ingested, is dermally safe during handling and is not a hazard if inhaled. No evidence of toxicity has been detected in feeding studies using animals. Negative results from Ames tests and studies into unscheduled DNA synthesis indicate that PET is not genotoxic. Similar studies conducted with monomers and typical PET intermediates also indicate that these materials are essentially nontoxic and pose no threats to human health. . . . It is important to stress that the chemistry of compounds that are used to manufacture PET shows no evidence of oestrogenic activity. There is a significant body of evidence that demonstrates that the use of PET is not a concern and is perfectly safe in this respect. (Source The American Chemistry Council Plastics Division http://www.plasticsinfo.org/s_plasticsinfo/sec_generic.asp?CID=657&DID=2605)
- Most health concerns surrounding plastic bottles refer to the use of bisphenol A which is not used in PET bottles. (Source, USNews <http://health.usnews.com/usnews/health/articles/070726/26petplastic.htm>)

- According to William Shotyk, a geochemistry professor at the University of Heidelberg, antimony, a potentially toxic trace element leaches out of PET bottles (the type of plastic bottle used for water) over time. Whether there can be a health effect for consumers is not clear. (Source U.S. National Library of Medicine archive of published studies http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=17396641&ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum) (Alternate Source, The London Free Press newspaper article <http://www.lfpress.com/cgi-bin/publish.cgi?p=120232&x=articles&s=restos>)

Who manufactures bottled water in Canada?

- The brand name Dasani (owned by Coca-Cola), is filtered municipal tap water bottled from Brampton and Calgary.
- The brand name Aquafina (owned by Pepsi), also comes from filtered tap water. (source CBC news, August 2008 <http://www.cbc.ca/news/background/consumers/bottled-water.html>)
- Nestle is the largest bottled water company in the world and features 72 brands of bottled water including Perrier, Pure Life and Poland Spring.
- Another relatively unknown bottled water company in Canada is Aquafarms. They are a private label bottler. Some of their customer brands include President's Choice Natural Spring Water, Wal-Mart, Sam's Club, Life brand, Shopper's Drug Mart, Ice River Springs, Canadian Essence and Canadian Mountain Springs.

What is the corporate image of these companies?

- The Polaris Institute has produced a corporate profile of Nestle (source <http://www.polarisinstitute.org/files/Nestle%20October%20update.pdf>) that includes the following information:
 - In the 1970's there was a world-wide boycott of Nestle as a result of their practice of marketing infant formula in the third world.
 - Nestle has also been known to strong arm labour unions.
 - In the United States and Brazil, Nestle has been linked to un-ethical extraction of ecologically fragile water sources.
 - Robert Tracy Thomas, President of Nestlé Foodservices Canada sits on the advisory board at Guelph University's School of Hospitality and Tourism Management.
 - Heather Munroe-Blum, the Principal and Vice Chancellor of McGill University, sits on the Board of Directors at Nestlé Canada Inc.
 - Nestlé employs a double standard in the use of Genetically Engineered food in its products. The company does not use GE food in its products in countries where GE foods require labels, but continues to use them in places where legislation concerning labeling has yet to be passed.
 - A 2002 study quoted by the US State Department's country report on human rights for Cote d'Ivoire, found that between 5,000 and 10,000 children were trafficked to or within the country to work full or part time in the cocoa sector. Nestle buys most of its cocoa from the Ivory Coast.
 - The Independent Commission of Experts Switzerland (ICE), known as the Bergier Commission, found that a number of Swiss firms, including Nestlé, had subsidiaries in Germany that were directly involved in the German war effort including the employment of forced labourers and prisoners.

- It is estimated that in 2003 Nestlé Waters withdrew a total of 7,050,254,807 liters for its bottled water production in the US alone.
- The Polaris Institute has produced a corporate profile of Aquafarms. (Source http://www.polarisinstitute.org/files/iceriversprings.aquafarms93exposed_0.pdf)
 - In the Spring of 2006, the Ontario government gave the bottled water company Aquafarms permission to take 11.9 billion litres of water over ten years for their operations in Feversham, Ontario.
 - At its operations in British Columbia the company pays nothing for the right to take millions of litres of water a day from the ground.
 - In Ontario, the company paid only \$3,000 for its latest 10-year permit to take millions of litres a day of this precious resource.
 - To maintain the weak regulation of our water resources, Aquafarms – like its bigger multinational competitors – pays lobbyists to put pressure on government to maintain their nearly free access to water.
- In a December 2008 Reuters article, several environmental groups have challenged a Nestle claim that its bottled water has numerous ecological benefits. (Source <http://www.reuters.com/article/environmentNews/idUSTRE4B06UJ20081201>)
- In a June 2008 article from Natural News, the author describes the devastating effects of a poorly constructed water extraction agreement between the town of McCloud, California and Nestle that guarantees priority of water supply to Nestle, even in the event of a drought. (Source, Natural News Article <http://www.naturalnews.com/023413.html>)
- In the southern state of Kerala in India, Coca Cola has drained so much of the aquifer that the wells have run dry. Coca Cola, of course, claims that the 250,000 gallons of water it's pulled per day has had nothing to do with it. (Source, Natural News Article <http://www.naturalnews.com/023412.html>)
- According to a news article from the Atlantic Journal-Constitution dated February 2009, a Coca-Cola Co. subsidiary has agreed to pay \$7.59 million to a California city for alleged wastewater violations. According to the city of American Canyon, AMCAN Beverages, owned by Atlanta-based Coca-Cola, was supposed to treat wastewater at its plant before discharging it into the city's treatment system. However, city tests in 2007 showed high concentrations of contaminants. (Source Polaris Institute <http://www.insidethebottle.org/us-coke-subsiary-pay-7-6m-water-violations>)

What are the social/political issues related to bottled water?

- According to Maude Barlow and the Council of Canadians, water is essential to life - no one should be able to control it or expropriate it for profit. Private water companies exploit a public right and

detract from the government's responsibility to provide safe drinking water. (Source, The Council of Canadians <http://www.canadians.org/water/issues/right/index.html>)

- Bottled water is more costly than tap water. Environment Canada says 1,000 litres of tap water costs \$1.26, while the same amount of bottled water costs \$1,500. (Source Environment Canada, What is a fair price? http://www.ec.gc.ca/water/en/manage/use/e_price.htm)
- The Great Lakes Annex agreement, signed in December 2005 by Ontario, Quebec and eight U.S. states, will allow diversions through permissive exceptions, not guaranteeing a strong role for the government of Canada to preserve and protect its water supply. (Source, the Council of Canadians – Canada needs a National Water Policy Statement <http://www.canadians.org/water/issues/policy/index.html>)
- Despite recycling capabilities in Canada, a 2004 study published by the plastics industry showed that more than 65% of plastic water bottles were not recycled, a large amount considering the fact that Canadians consumed over 1 million litres of bottled water in 2006. (Source, The Guelph Mercury January 2009 <http://news.guelphmercury.com/Opinions/article/429537>) (Source, Solid Waste Organization online copy of study <http://www.solidwastemag.com/PostedDocuments/PDFs/OctNov04/PlasticBottle.pdf>)
- The manufacturers of bottled water from non-municipal sources are not charged for the actual cost of water removal, despite the fact that the provincial government is responsible for protecting the sources of drinking water in the province. (April 2008 Eco-justice article on renewal of Nestle permit for Aberfoyle <http://www.ecojustice.ca/media-centre/press-clips/ontario-renews-nestle-permit-to-extract-groundwater-for-sale>)
- The sale of public water to international corporations has been supported by the World Bank and The International Monetary Fund (IMF) in their efforts to conclude third world loans. (Source, June 2008 Natural News Article <http://www.naturalnews.com/023412.html>)
- Bottled water is a \$50-billion industry worldwide. (CBC News article, March 2008 http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/20080315/OTT_bottled_water_080315?s_name=&no_ads=)

What are the environmental issues with bottled water?

- A carbon footprint is defined as the total amount of greenhouse gases produced to directly and indirectly support human activities, usually expressed in equivalent tons of carbon dioxide (CO₂).
- The carbon footprint of plastic (LDPE or PET, polyethylene) is about 6 kg CO₂ per kg of plastic. (Source www.timeforchange.org)
- It takes 162g of oil and seven litres of water (including power plant cooling water) just to manufacture a one-litre bottle, creating over 100g of greenhouse gas emissions (10 balloons full of

CO₂) per empty bottle. (Source Polaris Institute http://www.polarisinstitute.org/its_just_water_right_wrong_bottled_water_is_set_to_be_the_latest_battleground_in_the_eco_war)

- To make the 29 billion plastic bottles used annually in the US, the world's biggest consumer of bottled water requires more than 17 million barrels of oil a year, enough to fuel more than a million cars for a year. (Source Polaris Institute http://www.polarisinstitute.org/its_just_water_right_wrong_bottled_water_is_set_to_be_the_latest_battleground_in_the_eco_war)
- 650 million water bottles are still being thrown into Ontario landfills every year despite most municipalities having the ability to recycle the bottles. Only 35% of bottles are actually recycled. (Source Toronto Sun, January 2009 <http://www.torontosun.com/news/canada/2009/01/25/8139291-sun.html>)
- Plastic products contribute 7% by weight and 30% by volume to municipal solid waste. (*Recycling Council of Ontario*)
- The energy savings per metric ton of finished plastic bottles is enough to fill a 20-gallon gas tank every week for ten years. (Source http://74.125.95.132/search?q=cache:44FlvV2nHIQJ:www.wastefreelunch.com/images/documents/1Waste_Related_Quick_Facts.doc+reuse+efficiency+recycled+pet+bottles&hl=en&ct=clnk&cd=6&gl=ca)
- Much of the recycled plastic from Waterloo Region is being sold and shipped to China. The cost and environmental impact of shipping the plastic that far is huge. (Source, The Record Article August 2005 <http://news.therecord.com/article/233153>)
- Recycling old plastic products uses 20%-40% less energy than manufacturing it from new. (Source www.greenstudentu.com)

What is World Water Day?

(Source <http://www.unwater.org/worldwaterday/flashindex.html>)

- International World Water Day is an initiative of the United Nations Conference on Environment and Development.
- It is held on March 22nd.
- In 2009, the theme for World Water Day is "Shared Water - Shared Opportunities". Special focus will be placed on trans-boundary waters. Nurturing the opportunities for cooperation in trans-boundary water management can help build mutual respect, understanding and trust among countries and promote peace, security and sustainable economic growth.
- According to the official website of World Water Day, the world's 263 trans-boundary lake and river basins include the territory of 145 countries and cover nearly half of the Earth's land surface. Great reservoirs of freshwater also move silently below our borders in underground aquifers.