TOWN OF BELLINGHAM

DEPARTMENT OF PUBLIC WORKS

DRINKING WATER QUALITY AND CONSUMER INFORMATION REPORT CALENDAR YEAR 2012
(Public Water System ID# 2025000 – Telephone #508-966-5813)

This year's report is the first that utilizes the new electronic distribution method. This has allowed us to increase the font as we no longer are trying to fit all the vital information into a six page newspaper insert. We continue to produce a low tech no frills report. Although not colorful it is very complete.

Introduction

This is the annual water quality report card that we prepare and make readily available to our customers and the public. It contains important information about the quality of drinking water we distribute to our customers and other information about the water supply system. I apologize for the redundant nature of the report. Much of the text in this annual document is the same each year. Our system simply does not change that much from year to year and much of the text is required under MassDEP and Federal Safe Drinking Water Act regulations. As last year's report was in full compliance, I have not removed much and have added only a few paragraphs. The tables on the last two pages detail the results of our 2012 water quality analysis. These are fully updated and are the key elements of this report. I suggest that everyone read this report but if pressed for time, I hope you will at least scan the list of detected contaminants and possible health effects they could cause.

In July of 2011, we detected E-Coli Bacteria at one of our sources. This detection triggered a dramatic change in the way we treat our water and in the appearance and smell of water coming out of our customers' taps. Due to this detection, we now MUST disinfect all sources. The adding of disinfectant unfortunately amplifies another water quality problem, dirty water. Dirty or discolored water is caused by Iron and Manganese in our source water and pipes. In simple terms, adding a disinfectant makes the Iron and Manganese problem worse. Iron and Manganese is not harmful at current levels but are very undesirable. We have embarked on a path to resolve all our water quality issues. After our engineers (Wright Pierce) prepared a detailed study and the October 2012 Town Meeting appropriated the $15.4 Million needed to resolve the problem and comply with MassDEP requirement. Project design got underway in December and by May of 2015 we expect that we will have constructed a new filtration plant on Wrentham Road, upgraded our existing filtration plant on Hartford Ave, and installed many miles of water transmission mains so that all water we pump to our customers is filtered and disinfected.

The Town of Bellingham Department of Public Works (DPW) is committed to providing our customers with high quality drinking water that meets or surpasses state and federal standards for quality and safety. The Town has made significant investments in our pumping stations, filtration plant, and corrosion control facilities and annually performs thousands of dollars worth of water quality tests to ensure that we provide sufficient quantities of safe drinking water.

Bellingham water is safe to drink. The tasks the Bellingham DPW must perform as a public water supplier under the Federal Safe Drinking Water Act 1996 Amendments insure that to be the case. We are pleased to compile this annual report that summarizes the 2012 calendar year water quality testing, and hope it reassures our customers of the safety of our tap water.

Where does Bellingham get its drinking water?

The Town of Bellingham's drinking water supply system includes seventeen groundwater wells, nine pumping stations, three storage tanks, approximately ninety-eight miles of water main, and sixty miles of water services. Thirteen wells, which are controlled by five pumping stations, are located in the southern part of Town; they draw water from the Blackstone River basin underground aquifer (in 2015 water from these wells will be treated at the Wrentham Road Filtration Plant). Four wells, each operated by its own pumping station, are located in the northern part of Town; they draw water from the Charles River basin underground aquifer (in 2015 water from these wells will be treated at the Hartford Ave Filtration Plant). The DPW has detailed maps showing these facilities. Anyone who would like to see a map or obtain a copy should contact the DPW.

Is our water pure?

No. Pure water would be only hydrogen and oxygen, the compound H2O. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. Sources of drinking water (tap water and bottled water) include rivers, lakes, reservoirs, streams, and wells. As water travels over land or through the ground, it dissolves naturally occurring minerals and radioactive materials, and can be polluted by animal and human activity. Contaminants that might be expected in untreated water include: microbial contaminants (such as viruses and bacteria), inorganic contaminants (such as metals and salts), pesticides, herbicides, organic chemicals from industrial or petroleum use, and radioactive materials. (See the next few pages of this report for more information on contaminants we detected in our system and what may cause them.)

More information on contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (800-426-4791).

If our water is not pure, what is in it?

The answer to this question is the main purpose of this report. On the next page, you will see a table titled **Bellingham 2012 Source Water Quality Summary (THE 2012 SUMMARY)**. **THE 2012 SUMMARY** is the complete list of the contaminants detected in the samples collected at our drinking water sources and from our water distribution system in 2012. The list contains only the contaminants that were detected at levels above the "detection limit". The "detection limit" is the lowest concentration of a substance that today's laboratory technology can detect.

Below, you will find the **2012 Contaminant Test List (Contaminant List)**. The **Contaminant List** is a complete list of the 86 contaminants for which we performed drinking water sampling and analysis in 2012. If a contaminant is listed on the **Contaminant List**, but not in **THE 2012 SUMMARY**, the results were less than today's technology can detect.

THE 2012 SUMMARY also includes contaminants that we were not required to monitor for in 2012, but for which some level was detected within the last six years. If there is a four digit number noted after a contaminant that means we were not required to monitor for it in 2012. The number notes the last year we tested and detected this contaminant. **THE 2012 SUMMARY is on the last two pages of this report.**

2012 Contaminant Test List

Arsenic	Toluene	p-Chlorotoluene	Dibromoacetic Acid
Perchlorate	Xylene (total)	Bromobenzene	Iron
Coliform Bacteria	Dichloromethan	1,3-Dichloropropene	Manganese
Chlorine Residual	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	Arsenic
Nitrate	1,1,2-Trichloroethane	n-Propylbenzene	Barium
Nitrite	Chloroform	n-Butylbenzene	Cadmium
Benzene	Bromodichloromethane	Naphthalene	Chromium
Carbon Tetrachloride	Chlorodibromomethane	Hexachlorobutadiene	Fluoride
1,1-Dichloroethylene	Bromoform	1,3,5-Trimethylbenzene	Mercury
1,2-Dichloroethan	m-Dichlorobenzene	p-Isopropyltoluene	Selenium
para-Dichlorobenzene	Dibromomethan	Isopropylbenzene	Sodium
Trichloroethylene	1,1-Dichloropropane	Tert-butylbenzene	Antimony
1,1,1-Trichloroethane	1,1-Dichloroethane	Sec-butylbenzene	Beryllium
Vinyl Chloride	1,1,2,2-Tetrachloroethane	Fluorotrichloromethane	Nickel
Monochlorobenzene	1,3-Dichloropropane	Dichlorodifuoromethane	Thallium
o-Dichlorobenzene	Chloromethane	Bromochloromethane	Cyanide
trans-1,2-Dichloroethylene	Bromomethane	Methyl Tertiary Butyl Ether	Sulfate (unregulated)
cis-1,2-Dichloroethylene	1,2,3-Trichloropropane	Monocloroacetic Acid	Lead
1,2-Dichloropropane	1,1,1,2-Tetrachloroethane	Dichloroacetic Acid	Copper
Ethylbenzene	Chloroethane	Trichloroacetic Acid	Radium 226
Styrene	2,2-Dichloropropane	Monobromoacetic Acid	Radium 228
Tetrachloroethylene	o-Chlorotoluene		

There are allowable or safe levels of contaminants in water. How are these levels determined?

To ensure that tap water is safe to drink, the United States Environmental Protection Agency (USEPA) prescribes regulations and the Massachusetts Department of Environmental Protection (MassDEP) administers regulations that limit the amounts of certain contaminants allowed in water provided to public water systems customers. The USEPA sets Maximum Contamination Levels, Maximum Contamination Level Goals, Action Levels, and defines allowable testing procedures for over 100 water contaminants. Food and Drug Administration (FDA) and Massachusetts Department of Public Health regulations establish limits for contaminants in bottled water that provide the same protection for public health.

Is our water safe?

YES. As a public water supply professional who must know the rules and laws that govern all public water suppliers in the United States, I feel comfortable that drinking water is safe from any bubbler or faucet not only in Bellingham but nationwide.

In 2012, the DPW collected 949 water samples and certified labs performed tests for 86 various contaminants. We tested for Total Coliform Bacteria, Free Chlorine Residual, Trihalomethanes (THM), Haloacetic Acid (HAA5), Nitrate, Nitrite, Tetrachloroethylene (PCE), Volatile Organic Compounds (VOC), and Perchlorate, which are the primary health related contaminants.

We also tested for the Iron and Manganese which are not a health risk and are called Secondary Contaminants (SEC CON). Although Iron and Manganese do not create a health hazard they create a major aesthetic (dirty water and stained laundry) problem, which we are moving to address with town wide filtration in our not too distant future.

We will continue this routine testing and add testing required by drinking water regulations.

If my water is so safe, why doesn't it taste better?

Our tap water is safe to drink! This is a true statement in Bellingham and for all customers of public water suppliers throughout the United States. However, to meet the extensive safe drinking water quality standards, public water suppliers must add treatment chemicals.

Caustics for corrosion control, Chlorine for disinfection, and Potassium Permanganate for iron and manganese removal and filtration enhancement are chemicals added to our source water. These chemicals work very well to make tap water safe, but they can often affect the water's taste, color, and odor.

Consider the fact that the average cost for a gallon of bottled water from a store is $1.50 and the average cost for that same gallon of safe tap water is $0.004. The cleaner tasting bottled water cost 375 times more than the safe water coming from the tap.

The Chlorine (swimming pool smell) unfortunately will be with us from now on. MassDEP now requires that we disinfect throughout our system. To achieve good disinfectant residuals at the outskirts of the system, the amount we add at our sources had to be increased. Recent changes in the regulations along with and source water quality deterioration has ushered in a new era of water treatment for all groundwater sources. A public water supplier what does not have to add a disinfectant is a very rare phenomenon.

What measures are taken to insure that our water stays safe?

The EPA and MassDEP are continuously studying drinking contaminants and adding them to the required list if there is a potential health risk and if technology is available to yield reliable analytical results.

In 2002, MassDEP issued a draft of our Source Water Assessment Program (SWAP) Report. The SWAP program was established under the Federal Safe Drinking Water Act and it requires that every state: Inventory land uses within the recharge areas of all public water supply sources, assess the susceptibility of drinking water sources to be contaminated from these uses, and publicize the results to provide support for improved protection.

Some of the land uses that exist within our recharge areas include: Auto Body & Repair Shops, Salvage Yards, Photo Processors, an Old Landfill, Railroad Tracks, Hazardous Material Storage, Industries and Industrial Parks, Large Quantity Hazardous Waste Generators, and Underground Storage Tanks. There are others but these are considered the highest threat.

A copy of our report is available upon request from the DPW (508-966-5813) or online. The report notes that all of our sources have a high susceptibility of future contamination. Unfortunately, MassDEP has not had the funding to update the report and some of the information is not current; however, it still contains a wealth of information about our source waters and potential risks to its quality.

It is impossible to eliminate all threats from past and present land use, but we have established protective land use restrictions that dramatically reduce our exposure to certain contaminants. We are well equipped to prevent future land uses that could further increase our susceptibility to aquifer contamination. Our key regulations include Board of Health Floor Drain Regulations, Water Resource Protection Bylaws, and the Water Resource District Zoning Map. The Bylaws and Maps are available online at the Town's Website www.bellinghamma.org.

The Water Resources Committee was not active in 2012. Our Zone II drinking water well recharge areas extend into Medway, Franklin, Milford, and Wrentham and are all protected by bylaws except in Milford. Annually, we send a letter to the Town of Milford asking them to add our Zone II to their water protection district and some progress has been made, but to date our Zone II areas within the borders of the Town of Milford do not have bylaw or zoning protection.

Is our drinking water system at risk from a terrorist attack and prepared for a crisis?

The actual risk of a terrorist attacking a water supply system like ours is minimal, but the nationwide fear such an attack would create is great. This fact makes all water systems potential targets, as creating fear is one of the a terrorist's goals.

Our system has many sources (wells) and auxiliary power capabilities. These redundancies make it hard to knock us out completely. We have studied our system's vulnerable points and routinely discuss water system security at the Bellingham Emergency Planning Committee (BEPC) meetings. In 2012, the BEPC held a mock emergency (Ice Storm Scenario), which was a useful exercise to analyze our emergency response plan.

We have very accurate maps, computerized and paper, which show all our mains, gate valves, and hydrants. These maps get updated each time our field crews find an inaccuracy. Good maps allows us a clear picture of what is needed in case we need to isolation of any part of our system.

We also subscribed to an emergency phone call system. The "CODE RED" system can call every Bellingham phone number and deliver a specialized warning to all of our customers within five minutes. If a health hazard ever occurs, the DPW will utilize this system and every other practicable means to notify and protect our customers.

We have used the CODE RED system to warn of relatively minor water main breaks and shut downs, as well as for routine activities like calling in our long list of snow plow vendors. This MassDEP required notice was a warning but no action was needed. We hope we never have to use this system to issue a boil water order or do not drink order, but it is very comforting to know that we have the tool to help us protect the health of our customers in case of a major crisis.

Should I be concerned about the Bacteria in my tap water?

Each month we collect at least 40 tap water samples along with a raw and treated water sample at each active well. Bacterial testing requirements for public drinking water are very strict. Drinking water samples must have a count of zero Coliform Bacteria colonies. Coliform Bacteria is a very common bacteria; it is not harmful and used as an indicator. When Coliform Bacteria is detected we do additional sampling and testing. In 2012, Total Coliform Bacteria was present in 5 of 495 system samples that we collected.

We did not detect the potentially harmful E. Coli or Fecal Bacteria in any customer tap samples in 2012. Confirmation sampling indicated that there was no acute health risk at any time. All Total Coliform Bacteria samples that show a presence are automatically tested for these potentially harmful bacteria.

Under the Groundwater Rule (GWR) that went into effect in December of 2010, we routinely perform extensive raw water and source water TCB sampling. In July of 2012, we detected E-Coli Bacteria at one of our raw water sources. This is a violation of the GWR and required that we issue a public notice. We had our disinfection in place and operating; therefore, no E-Coli reached our distribution system and we did not need to issue a boil water order. We followed MassDEP's instructions for public notification as required under the GWR. MassDEP issued a Notice of Non-Compliance (NON). See the block titled "REGULATORY VIOLATIONS 2012" on Page 6 for the details about the violation and NON.

Due to this GWR violation and our occasional TCB presence at other wells, the NON requires that we chlorinate all sources to protect the public health and water supply system. We will now need to disinfect 365/24/7; therefore, the "My water smells like a swimming pool" complaints will be with us for the foreseeable future. Since activating the system wide disinfection, we have not had any system TCB issues.

If ever we determine that there is an acute health risk, we will use every means possible to immediately contact our customers. With today's technology we are well prepared to inform our customers of any problems. Our CODE RED call system is the primary resource. It routinely produces a contact rate over 85%. We would also flood electronic media (radio and TV) with the information needed to protect our customer's health.

There are a few ways that Drinking Water can become contaminated in the pipe system after being pumped from a clean source.

- Stagnation & Discoloration

Water can deteriorate in the pipes before it gets to the tap. To avoid this, we routinely perform hydrant flushing, which cleans out any water that may be stagnating in the piping system and also removes iron and manganese particles that coat the walls of water pipes. Iron and Manganese can cause severe water discoloration but are not harmful to drink. Dirty water complaints are the most common water complaint we receive; it's caused by the iron and manganese in our source water. Even with flushing, some areas of town experience chronic discoloration. Disinfection amplifies the discoloration as the chlorine reacts with iron and manganese in the water system. The water filtration project will significantly reduce or eliminate or iron and manganese problem.

- Cross Connections - Backflow

The drinking water supply system can be contaminated if water from a customer's building flows back into the water supply system. This can occur if the water main pressure drops, or if the interior plumbing from a building is not properly installed. Backflow occurs through a plumbing connection that is called a Cross-Connection. *(Definition from MDEP "Protecting Your Water" flyer - A Cross-Connection occurs whenever a potable water line is directly or indirectly linked to a piece of equipment or piping containing non-potable water.)* To avoid this possibility, the DPW administers the Cross-Connection Control Program. Under this program, commercial properties are routinely surveyed to be sure that special protective check valves are installed and maintained. The Cross-Connection Control Program and the Plumbing Code help to insure that the risk from this form of system contamination is minimized or eliminated.

Residential water customers also need to be aware of this risk and understand how to prevent backflow at their homes. A backflow event can occur at a home as well as a business and can draw contaminants into YOUR water system, placing you and your family at risk.

The potential for backflow through a cross connection seems remote but the consequences are severe. Cross connection backflow has the greatest potential for having your water contaminated to a degree that it can cause immediate illness or death. Imagine taking a drink of water that is laced with pesticides, lawn chemicals, or pool chemicals.

Some things you should do to prevent backflow at your home:

- Have all changes to your plumbing system done by a licensed plumber with plumbing inspection.
- Install and maintain hose bib vacuum breakers on all outside faucets. *(The hose bib vacuum breaker isolates your garden hose from the rest of your plumbing system. Garden hoses are the most likely source of residential backflow. A hoses left in a swimming pool, on the ground in a puddle, or connected to a lawn or garden chemical sprayer without a hose bid vacuum breaker, creates a potential for water system contamination.)*
- Do not attach any pesticide, chemical, or any other non-potable liquid applicator to your water line.
- Survey your home to make sure no hoses or pipes are connected to a potential source of contamination. *(Please contact the DPW (508-966-5813) or Plumbing Inspector (508-966-5821) if you have any questions about the plumbing at your house. We will gladly perform a survey of your plumbing free of charge.)*
- Contact us to get more information about Cross-Connections and our program to prevent them, or for a copy of the MDEP "Protecting Your Water" Flyer.

More information on ways that Drinking Water can become contaminated in the pipe system after being pumped from a clean source.

- Corrosion

Tap water can have high levels of Lead and Copper due to corrosion of internal plumbing pipes and fixtures. The regulations, known as the Lead and Copper Rule (LCR), require that we test samples from residential customer's water taps. This testing is performed to confirm our ability to control internal pipe and plumbing corrosion. The LCR is different from other USEPA regulations in that it uses an Action Level for the contaminant as opposed to a Maximum Contamination Limit. *(See the Lead and Copper Summary Note 3 below for the definition of Action Level.)* The way the LCR works is the Town must take residential first draw tap water samples from a specific list of homes that are the most likely to yield the highest Lead and Copper levels. The results are tabulated and the 90th percentile is compared with the Action Level. If the result is below the Action Level, no additional action is needed. If the result is above the Action Level, additional action is required to reduce the customer's exposure to these contaminants.

In the early 1990's, when the Lead and Copper Rule took effect, we were exceeding the Action Level. We constructed Corrosion Control Facilities to address the problem and now feed Caustic Soda (NaOH-Sodium Hydroxide) into the source water that lowers the water's acidity (raises the pH). This thereby reduces corrosion and our Lead and Copper levels.

Lead and Copper Sampling Summary - 2012

Below is a list of the worst results for Lead & Copper from the samples collected during the 2012 sampling.

Parameter	Dates Collected	90th Percentile	Action level (AL) (3)	MCLG	Number of Samples	Number of Samples Above AL	Possible Source of Contamination
Lead	June-Sept 2012	4.0 ppb	15 ppb (1)	Zero	33	None	Corrosion of household plumbing systems; Erosion of natural deposits
Copper (4)	June-Sept 2012	0.7 ppm	1.3 ppm (2)	1.3	33	2	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives

1. **ppb** is the abbreviation for parts per billion. The AL for Lead is set in this unit of measure.
2. **ppm** is the abbreviation for parts per million. Parts per million is the same as milligrams per liter (mg/L) which is the scientific unit of measure for most contaminants.
3. **AL** is the abbreviation for Action Level, which is the concentration of a contaminant that, if exceeded, triggers treatment or other requirements, which a water system must follow.
4. The source of Copper in tap water is corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives.

Possible Health Effects of Copper and Lead in Drinking Water

- Copper: Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor.
- Lead: Infants and children who drink water-containing lead in excess of the action level could experience delays in their physical or mental development and could show slight deficits in attention span and learning abilities. Adults who drink water containing lead in excess of the action level over many years could develop kidney problems or high blood pressure.

Some more important info about Lead in Drinking Water

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Bellingham DPW is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When water has been sitting for several hours, you can minimize the potential lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

REGULATORY VIOLATIONS –

We had no new violations in 2012. There remains the outstanding MassDEP Notice of Noncompliance (NON-CE-11-5D076) from the Ground Water Rule (GWR) violation that occurred in July of 2011. This NON has lead MassDEP to issue an Administrative Consent Order (ACO)(CD-12-5D005) which details what we need to do to resolve the violation of the GWR. The town wide water filtration project will address all items in the NON an and CO. We expect to have this matter resolved and returned to full compliance with all regulations by May of 2015.

The GWR incident is described below: On July 13, 2011, we received lab results indicating an E-Coli bacteria detection at the Well #12 raw water sample collected on the July 11, 2011. That is a violation of the State Drinking Water Regulations GWR (310 CMR 22.26). We followed public notification procedures related to the violation as directed by MassDEP. MassDEP approved a CODE RED non-boil water notice sent out on July 13, 2011. Approved written notices were published as general ads in the Milford Daily News and were posted on the Town's website and noted on the Cable TV government scroll channel for several weeks.

More information on contaminants in drinking water and why they may be in the water.

Microbial Contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
Pesticides and Herbicides may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming.
Organic Chemical Contaminants, including synthetic and volatile organic chemicals that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek special advice from their health care providers. EPA/Centers for Disease Control and Prevention (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the US EPA's Safe Drinking Water Hotline (800-426-4791)

If you want to know more about the Bellingham water supply system, have any other questions about the report, or would be interested in volunteering to help us with our water education programs, please call Donald DiMartino, Director of the Bellingham Department of Public Works, at 508-966-5813. The DPW office is located at 26 Blackstone Street beside the Fire Station.

THE 2012 SUMMARY

Bellingham 2012 Source Water Quality Summary

Footnotes explaining abbreviations & possible health effects of exposure to detected contaminants APPEAR ON THE NEXT PAGE

Regulated Contaminant (Unit of Measurement)	*Date(s) Collected*	*Highest Result or hra (6)*	*Range Detected*	*MCL or MRDL*	*MCLG or MRDLG*	*Violation (Y/N)*	*Possible Source(s) of Contamination*
Inorganic Contaminants							
Arsenic (ppb)(4)	May 2012	0.0062	0.0018-0.0062	10	-----	*N*	*Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes*
Barium (ppm)(3)	May & June 2012	0.06	0.01-0.06	2	2	*N*	*Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits*
Cadmium (ppb)(4)	June 2012	0.0023	Zero – 0.0023	5	5	*N*	*Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints*
Nitrate (ppm)(3)	May & June 2012	2.30	0.25-2.30	10	10	*N*	*Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits*
Radioactive Contaminants							
Gross Alpha (pCi/l)(8) (minus uranium)	2006	2.6	0.34-2.6	15	0	***N***	*Erosion of natural deposits*
Radium 226 & 228 (pCi/L)(8) (combined values)	May 2012	0.87	0.42-0.87	5	0	***N***	*Erosion of natural deposits*
Disinfectants and Disinfection By-Products							
Total Trihalomethanes (TTHMs) (ppb)(4)	2012	31.5	5.5-44.6	80	-----	***N***	*Byproduct of drinking water chlorination*
Haloacetic Acids (HAA5) (ppb)(4)	2012	12.8	0-27.8	60	-----	***N***	*Byproduct of drinking water disinfection*
Chlorine (ppm)(3) (free)	2012	0.41	0-1.77	4	4	***N***	*Water additive used to control microbes*

Bacteria	Highest % Positive in a month	Total # Positive	MCL	MCLG	Violation (Y/N)	Possible Source of Contamination
Total Coliform	4.4%	2	>5%	0	N	Naturally present in the environment

Unregulated and Secondary Contaminants

Contaminant (Unit of Measurement)	Date(s) Collected	Result or Range Detected	Average Detected	SMCL	ORSG	Possible Source
Inorganic Contaminants						
Sodium (ppm)(3)	May & June 2012	96.0	41.8	----	20	Natural sources; runoff from use as salt on roadways; by-product of treatment process
Nickel (ppm)(3)	May & June 2012	0.0069	0.001	----	0.1	Discharge from industrial processes
Sulfate (ppm)(3)	May& June 2012	11.10	8.88	250	----	Natural sources
Other Organic Contaminants – When detected at treatment plant as VOC residuals, not TTHM compliance						
Bromodichloromethane (ppb)(4)	May & June 2012	8.47	1.08	---	---	By-product of drinking water chlorination
Chloroform (ppb)(4)	May & June 2012	20.1	3.00	---	---	By-product of drinking water chlorination
Dibromodichloromethane (ppb)(4)	May & June 2012	2.52	0.30	---	---	By-product of drinking water chlorination
Secondary Contaminants						
Manganese (ppb)(4)	May, Sept, Nov 2012	160	97	50	Health Advisory of 300 ppb	Erosion of natural deposits

THE 2012 SUMMARY

Bellingham 2012 Source Water Quality Summary

Footnotes explaining abbreviations

(1) **Maximum Contamination Level (MCL):** The highest level of a contaminant in drinking water. MCLs are set as close to the MCLGs (see below) as feasible using the best available treatment technology.

(2) **Maximum Contamination Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

(3) **ppm** is the abbreviation for parts per million. Parts per million is the same as milligrams per liter (mg/L) which is the scientific unit of measure for most contaminants.

(4) **ppb** is the abbreviation for parts per billion. A part per billion is the same as micrograms per liter (ug/L) which is the scientific unit of measure for some contaminants.

(5) **UR** means Un-Regulated. Unregulated contaminants are those contaminants for which the USEPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist the USEPA in determining their occurrence in drinking water and whether future regulation is warranted.

(6) **hra** is the Highest Running Average. The highest running average is used to determine if the MCL has been exceeded. It is the average of the last four quarterly results of the approved testing site. These results are added together and divided by 4 to yield the running average.

(7) **Monthly %** is the percent of a month's system samples that indicate a presence of Total Coliform Bacteria.

(8) **pCi/L** is the abbreviation for picocuries per liter (a measure of radioactivity)

(9) **MRDL** is the abbreviation for Maximum Residual Disinfectant Level. MRDL is the highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

(10) **MRDLG** is the abbreviation for Maximum Residual Disinfectant Level Goal. MRDLG is the level of drinking water disinfectant below, which there is no known or expected risk to health. MRDLGs do not reflect the benefit of the use of disinfectants to control microbial contaminants.

(11) **ORSG** is the abbreviation for Mass Office of Research and Standards Guideline concentration of a chemical in drinking water, at or below which, adverse health effects are unlikely to occur after chronic (lifetime) exposure. If exceeded, it serves as an indicator of the potential need for further action.

Possible Health Effects for All Detected Contaminants

- Nitrate: Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
- Barium: Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
- Cadmium: Some people who drink water containing cadmium well in excess of the maximum contaminant level (MCL) for many years could experience kidney damage
- Sodium and Sulfate: are not regulated so no health effect information is included.
- Total Coliform Bacteria: Coliform are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful bacteria, may be present. If Coliform were found in more samples than allowed, this would be a warning of potential problems.
- Beta/photon emitters: Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
- Combined radium: Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
- Alpha Emitters - Gross Alpha Activity: Certain minerals are radioactive and may emit forms of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
- Chloroform: (a Trihalomethane) Some people who drink water containing chloroform at high concentrations for many years could experience liver and kidney problems and may have an increased risk of cancer.
- Trihalomethanes (*Chloroform, Bromodichloromethane, & Chlorodibromomethane*): Some people who drink water containing Trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.
- Haloacetic Acids: Some people who drink water containing Haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
- Chlorine: Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.
- Manganese US EPA has established a lifetime health advisory (HA) value of 300 ppb for manganese to protect against concerns of potential neurological effects, and a one-day and 10-day HA of 1000 ppb for acute exposure.

The Mass DEP has reduced the monitoring requirements for Synthetic Organic Compound (SOC), Inorganic (IOC), and Radionuclides for some of our sources because these sources are not at risk of contamination. The last samples collected for these contaminants were: 2002 for SOC at all sources and 2006 for Radionuclides. Those sampling results were found to meet all applicable EPA and Mass DEP standards.