



2009 Annual Drinking Water Quality Report

City of Gloucester - MASSDEP PWS ID # 3107000

Carolyn Kirk, Mayor

Michael Hale, Director of Public Works

This report is a snapshot of drinking water quality that we provided last year. Included are details about where your water comes from, what it contains, and how it compares to state and federal standards. We are committed to providing you with information because informed customers are our best allies.

I. PUBLIC WATER SYSTEM INFORMATION

Address: Department of Public Works, Office of Water Compliance, 50 Essex Avenue, Gloucester, MA 01930

Contact Person: Larry Durkin, Environmental Engineer

Telephone #: (978) 281-9792

Fax #: (978) 281-9724

Internet Address: www.ci.gloucester.ma.us

Water System Improvements

As part of our ongoing commitment to you, last year we made the following improvements to our system:

Significant upgrades to Gloucester's public water system are underway starting in 2009. The West Gloucester treatment plant filtration system was fully replaced and operational on October 10th, when the Babson treatment plant came off-line. Deficiencies at Babson treatment plant that contributed to regulatory exceedences in the distribution system of total coliform bacteria which resulted in the boil water order and total trihalomethanes (TTHMs) a disinfection by product will be corrected in 2010 along with other public water system upgrades.

A first step was water treatment optimization testing of both East Gloucester (supplying the Babson plant) and West Gloucester (supplying the West Gloucester plant) reservoirs. Phase 1 design was completed in 2009 that included upgrades of all reservoir intakes; Babson yard intake piping, drains, and basins; and Babson filtration system and sedimentation basin equipment. Phase 2 design began in 2009 subsequent to water treatment optimization testing and includes upgrades in chemical treatment processes at Babson, West Gloucester, and the Klondike water treatment plants; controls and communication at each plant, the pump stations, and water storage tanks; and replacement of transfer pumps at the Haskell Reservoir Pump Station.

Phase 1 and 2 upgrades are being performed on an emergency basis per Massachusetts Department of Environmental Protection (MassDEP) administrative consent order with penalty NE-09-5D008 and Gloucester's Public Water System Upgrade Report with construction to be complete in 2010.

Opportunities for Public Participation

Meetings of the Gloucester City Council and other committee meetings that deal with issues concerning water supply are advertised in the local newspapers and cable TV. Videos of public water system upgrades are shown on cable TV as well.

2. YOUR DRINKING WATER SOURCE

Where Does My Drinking Water Come From?

Our drinking water supply comes from six reservoirs all located in Gloucester. These reservoirs are recharged from rain runoff and snowmelt. The water supply is well protected with the City owning more than 90% of the land within the watershed area. Ninety-six percent of the land within the watershed is undeveloped.

Your water is provided by the following sources listed below:

Source Name	MassDEP Source ID#	Source Type	Location of Source
Babson Reservoir	3107000-01S	Surface Water	Russell Avenue (East Gloucester)
Goose Cove Reservoir	3107000-07S	Surface Water	Goose Cove (East Gloucester)
Dykes Reservoir	3107000-04S	Surface Water	Laurel Lane (West Gloucester)
Haskell Reservoir	3107000-02S	Surface Water	Forest Lane (West Gloucester)
Wallace Reservoir	3107000-03S	Surface Water	Magnolia Avenue (West Gloucester)
Klondike Reservoir	3107000-05S	Surface Water	Quarry Street (East Gloucester)

The Gloucester water system is interconnected with Rockport, Essex, and Manchester By-The-Sea water systems that allows for water to be transferred to and from Gloucester during emergencies. During August 2009 Gloucester received water from all three of these communities during the DEP boil water order.

Is My Water Treated?

Yes: Our water system makes every effort to provide you with safe and pure drinking water. To improve the quality of the water delivered to you, we treat it to remove several contaminants.

Water from the reservoirs is treated at the Babson, West Gloucester, and Klondike Water Treatment Plants before being pumped to the distribution system. We use a chemical coagulation process followed by sand filtration to remove small particles, organisms, sediment, algae, and bacteria. We add chlorine as a disinfectant to protect you against microbial contaminants, fluoride to improve dental health, lime to adjust the pH (potassium hydroxide at Klondike), sodium bicarbonate to reduce corrosion potential and lead and copper concentrations, and potassium permanganate to remove iron and manganese at West Gloucester.

The water quality of our system is constantly monitored by us and MassDEP to determine the effectiveness of existing water treatment and to determine if any additional treatment is required.

How Are These Sources Protected?

MassDEP has prepared a Source Water Assessment Program (SWAP) Report for the water supply source(s) serving this water system. The SWAP Report assesses the susceptibility of public water supplies. Drinking water may be threatened by many potential contaminant sources including storm runoff, road salting, animal wastes, and improper disposal of hazardous materials.

The SWAP Report notes the key issues of susceptibility in the water supply protection area for each source. The report commends our water system on taking an active role promoting source protection measures through owning or controlling over 90% of the critical watershed areas. The report also notes that the City has adopted local land use controls including a Watershed Protection Overlay District Ordinances, hazardous materials controls and inspections of industrial facilities by the Fire Department.

What is My System's Ranking?

A susceptibility ranking of high, moderate, low was assigned to this system using the information collected during the assessment by MassDEP.

Source Name	MassDEP Source ID#	Source Type	Ranking of Source
Babson Reservoir	3107000-01S	Surface Water	High
Goose Cove Reservoir	3107000-07S	Surface Water	Moderate
Dykes Reservoir	3107000-04S	Surface Water	Low
Haskell Reservoir	3107000-02S	Surface Water	Moderate
Wallace Reservoir	3107000-03S	Surface Water	Moderate
Klondike Reservoir	3107000-05S	Surface Water	Quarry Street (East Gloucester)

Where Can I See The SWAP Report?

The complete SWAP report is available at the Office of Water Compliance located at 50 Essex Avenue Gloucester - 978-281-9792 and online at <http://www.mass.gov/dep/water/drinking/3107000.pdf>

What Are the Key Issues For Our Water Supply?

The ranking of high susceptibility to contamination for the Babson Reservoir is based on the presence of railroad tracks within Zone A (400 feet of Reservoir Edge). These tracks carry only commuter trains, but there is the potential for accidental release of train engine fluids. Track maintenance is also a concern; however, the City and the railway office work cooperatively to ensure the best management practices are in place. There is also a potential for hazard in Zone C (greater than one half mile from the water edge) from the Blackburn Industrial Park. Improper use of hazardous materials could lead to reservoir contamination; however, these industries are routinely inspected by the Fire Department.

The ranking of high susceptibility for the Klondike Reservoir is not per DEP's SWAP, but rather by DEP guidelines and criteria established by the DEP. Commercial activities involving chemicals, wastes, and batteries in the vicinity of the reservoir prompted the high susceptibility rating. The SWAP recommended Best Management Practices that should be in place to ensure that chemicals and metals are handled, stored, and disposed of properly.

What Can Be Done To Improve Protection?

The SWAP report recommends:

- Review railroad right of way yearly operating plans
- Keeping prohibited activities out of the water work to minimize potential waste impact to the reservoirs

Our public water system plans to address the protection recommendations by:

- Maintaining contact with the railroad
- Stay active in the watershed and address potential waste impacts

Residents can help protect sources by:

- Practicing good septic system maintenance
- Supporting water supply protection initiatives at the next town meeting
- Taking hazardous household chemicals to hazardous materials collection days
- Contacting the water department or Board of Health to volunteer for monitoring or education outreach to schools
- Limiting pesticide and fertilizer use, etc.

3. SUBSTANCES FOUND IN TAP WATER

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals, and in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial contaminants -such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants -such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, and farming.

Pesticides and herbicides -which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants -including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants -which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the Department of Environmental Protection (MassDEP) and U.S. Environmental Protection Agency (EPA) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) and Massachusetts

Department of Public Health (DPH) regulations establish limits for contaminants in bottled water that must provide the same protection for public health. All 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. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

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 some infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control and Prevention (CDC) guidelines on lowering the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

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 Gloucester DPW Water Department is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for 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>.

4. IMPORTANT DEFINITIONS

Maximum Contaminant Level (MCL) – The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant 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.

Maximum Residual Disinfectant Level (MRDL) -- The highest level of a disinfectant (chlorine, chloramines, chlorine dioxide) allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) -- The level of a drinking water disinfectant (chlorine, chloramines, chlorine dioxide) below which there is no known or expected risk to health. MRDLG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Treatment Technique (TT) – A required process intended to reduce the level of a contaminant in drinking water.

Action Level (AL) – The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

90th Percentile – Out of every 10 homes sampled, 9 were at or below this level.

Variances and Exemptions – State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

ppm = parts per million, or milligrams per liter (mg/l)
ppb = parts per billion, or micrograms per liter (ug/l)
ppt = parts per trillion, or nanograms per liter
pCi/l = picocuries per liter (a measure of radioactivity)
NTU = Nephelometric Turbidity Units
ND = Not Detected
N/A = Not Applicable
mrem/year = millirem per year (a measure of radiation absorbed by the body)

Secondary Maximum Contaminant Level (SMCL) – These standards are developed to protect the aesthetic qualities of drinking water and are not health based.

Massachusetts Office of Research and Standards Guideline (ORSG) – This is the 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.

5. WATER QUALITY TESTING RESULTS

What Does This Data Represent?

The water quality information presented in the table(s) is from the most recent round of testing done in accordance with the regulations. All data shown was collected during the last calendar year unless otherwise noted in the table(s).

	Date(s) Collected ^a	90 TH percentile	Action Level	MCLG	# of sites sampled	# of sites above Action Level	Possible Source of Contamination
Lead (ppb)	9/2008	5	15	0	30	1	Corrosion of household plumbing systems; Erosion of natural deposits
Copper (ppm)	9/2008	0.084	1.3	1.3	30	0	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives

^a Note: Lead and Copper sampling was not required by the DEP in 2009. Sampling for lead and copper will be sampled again in 2010 per Babson Restart sampling plan and 2011 per the standard three= year interval.

	Highest % Positive in a month	Total # Positive	MCL	MCLG	Violation (Y/N)	Possible Source of Contamination
Total Coliform	44% (August) 8.9% (September)	208 of 465	>5%	0	Y	Naturally present in the environment
Fecal Coliform or <i>E.coli</i>	-----	zero	*	0	N	Human and animal fecal waste

* Compliance with the fecal coliform/*E.coli* MCL is determined upon additional repeat testing.

Turbidity	TT	Lowest Monthly % of Samples	Highest Detected Daily Value	Violation (Y/N)	Possible Source of Contamination
Daily Compliance (NTU)	1	-----	0.8	N	Soil runoff
Monthly Compliance*	At least 95%	96	0.8	N	
Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of water quality.					
*Monthly turbidity compliance is related to a specific treatment technique (TT). Our system filters the water so at least 95% of our samples each month must be below the turbidity limits specified in the regulations.					

Regulated Contaminant	Date(s) Collected	Highest Result or Highest Running Average Detected	Range Detected	MCL or MRDL	MCLG or MRDLG	Violation (Y/N)	Possible Source(s) of Contamination
Inorganic Contaminants							
Antimony (ppb)	7/1/09 11/23/09	5	<2 – 5	6	6	N	Discharge from fire retardants; ceramics; electronics; solder
Barium (ppm)	7/1/09 11/20/09	0.014	0.009 to.014	2	2	N	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Fluoride (ppm) ■	daily	1.2	0.8-1.2	4	4	N	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Nitrate (ppm)	5/28/09 6/29/09 11/18/09	0.17	0.02 - 0.17	10	10	N	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits
Perchlorate (ppb)	7/06/09 10/03/09 12/10/09	0.12	<0.05 - 0.12	2	N/A	NA	Rocket propellants, fireworks, munitions, flares, blasting agents
Radioactive Contaminants (Collected at Klondike WTP per sampling Plan)							
Gross Alpha (pCi/l) (minus uranium)	6/21/07 9/24/07 12/14/07	2.9	0.0 – 2.9	15	0		Erosion of natural deposits
GrossBeta/ photon emmitters (pCi/L) ▲	6/21/07 9/24/07 12/14/07	5.1	<0.2 – 5.1	50	0		Decay of natural and man-made deposits
Radium 226 & 228 (pCi/L) (combined values)	6/21/07 9/24/07 12/14/07	0.5	0.2 - 0.5	5	0		Erosion of natural deposits
Synthetic Organic Contaminants (2007 Sampling 2/13, 4/12, 6/7, 6/21, 9/24, 12/6, 12/13)							
Di (2-ethylhexyl) phthalate (ppb)	See above	1.7	<0.6 – 1.7	6	0	N	Discharge from rubber and chemical factories
Regulated Contaminant	Date(s) Collected	Highest Running Average	Range Detected	MCL or MRDL	MCLG or MRDLG	Violation (Y/N)	Possible Source(s) of Contamination
Disinfection By-Products							
Total Trihalomethanes (TTHMs) (ppb)	Quarterly in (2009)	89	20-326.8	80	-----	Y Q3 & Q4	Byproduct of drinking water chlorination
Haloacetic Acids (HAA5) (ppb)	Quarterly in (2009)	29.2	1.0-107.1	60	-----	N	Byproduct of drinking water disinfection

■ Fluoride also has a secondary contaminant level (SMCL) of 2 ppm.

▲ The MCL for beta particles is 4 mrem/year. EPA considers 50 pCi/L to be the level of concern for beta particles.

Unregulated contaminants are those for which there are no established drinking water standards. The purpose of unregulated contaminant monitoring is to assist regulatory agencies in determining their occurrence in drinking water and whether future regulation is warranted.

Unregulated and Secondary Contaminants	Date(s) Collected	Result or Range Detected	Average Detected	SMCL	ORSG	Possible Source
Inorganic Contaminants						
Sodium (ppm)	11/18/09, 6/29/09, 5/28/09	36, 30, 20	28.7	----	20	Natural sources; runoff from use as salt on roadways; by-product of treatment process
Sulfate (ppm)	6/29/09	9.0	9.0	250	----	Natural sources
Other Organic Contaminants - When detected at treatment plant as VOC residuals, not TTHM compliance						
Bromodichloromethane (ppb)	2/3/10 9/25/10 (2)	2.3,3.1,18	7.8	---	---	By-product of drinking water chlorination
Chloroform (ppb)	2/3/10 9/25/10 (2)	2.6, 4.4, 82	29.7	---	---	By-product of drinking water chlorination
Dibromodichloromethane (ppb)	2/3/10 9/25/10 (2)	1.2, 0.6, 1.5	1.1	---	---	By-product of drinking water chlorination
Bacteriological Contaminants						
Cryptosporidium	11/11/08	2 oocysts West Gloucester Reservoirs	---	----	----	Discharged especially where water is contaminated with sewage or animal wastes
Secondary Contaminants						
Manganese (ppm)	4/18/06	0.08		0.05*	---	Erosion of natural deposits
Aluminum (ppm)	4/18/06	0.2		0.2	---	Byproduct of treatment process
Chloride (ppm)	4/18/06	50		250	---	Runoff from road de-icing, use of inorganic fertilizers, landfill leachates, septic tank effluents, animal feeds, industrial effluents, irrigation drainage, and seawater intrusion in coastal areas
Total Dissolved Solids (TDS) (ppm)	4/18/06	150	150	500	---	Erosion of natural deposits.

* The EPA has established a lifetime health advisory (HA) value of 0.3 mg/L for manganese to protect against concerns of potential neurological effects, and a one-day and 10-day HA of 1 mg/L for acute exposure.

6. COMPLIANCE WITH DRINKING WATER REGS

Does My Drinking Water Meet Current Health Standards?

The Total Coliform bacteria MCL of <5% of samples for a month testing positive was exceeded in August and September 2009. A combination of factors resulted in a lack or low chlorine residual in the distribution system, which led to increased levels of coliform bacteria, which resulted in the DEP's issuance of a boil water order in Gloucester. No pathogenic E.coli bacteria were found during water testing before, during, or after the order. Chlorine injection booster pumps were used to infuse chlorine disinfectant and the boil order was lifted. The City is performing upgrades on the entire Public Water System including a full upgrade at the Babson Water Treatment plant, and modifications to chemical processes at the West Gloucester and Klondike Water Treatment to modernize these facilities, optimization of water treatment efficiencies, and make compliant with current and near future DEP regulations. The City will also be switching the distribution system disinfectant from free chlorine alone to chloramines. Through operational practices this will allow the City to better maintain a longer lasting disinfectant residual in the distribution system, reduce the TTHM disinfection by product levels which were exceeded in 2009,

and minimize the potential for any increase in lead concentrations. The Total Trihalomethanes (TTHMs) RAA of 80 ppm were exceeded in the third and fourth quarter of 2009. Public Water System improvements will allow the City to maintain a distribution system disinfectant, avoid boil water orders, and bring disinfection by product TTHM levels into compliance.

We are committed to providing you with the best water quality available. However some contaminants that were tested last year did not meet all applicable health standards regulated by the state and federal government. Due to contaminant violations of Total Coliforms and TTHMs during the period(s) of 2009 our system took the following corrective actions.

- We collected additional samples.
- We announced public notification by newspaper, posting notices etc.
- We disinfected and flushed the distribution system to eliminate coliform bacteria.

Our water system and MassDEP monitor and record the effectiveness of actions taken in response to contaminant violations. The health effect statement for this contaminant is listed below.

Health Effects Statements

Total Coliform: Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.

Drinking Water Violations

- Monitoring and reporting compliance data: East Gloucester reservoir water samples for July and August 2009 were not collected and analyzed for the presence or absence of bacteria. This constitutes a tier 3 violation with serving as public notice in this CCR.

We failed to complete required sampling in a timely manner, which is a monitoring and reporting violation. Because we did not take the required number of samples, we did not know whether the contaminants were present in your drinking water, and we are unable to tell you whether your health was at risk during that time.

7. EDUCATIONAL INFORMATION

Do I Need To Be Concerned About Certain Contaminants Detected In My Water?

Total Coliform Bacteria: The boil order was lifted when the sampling results confirmed no total coliforms after retesting per DEP requirements. With the boil order over, the City is not exceeding total coliform levels. Improvements at the water treatment plants and regular maintenance of the system will help eliminate the risk of reoccurrence.

Total Trihalomethanes: Some people who drink water containing trihalomethanes in excess of the MCL over many years experience problems with their liver, kidneys, or central nervous systems, and may have increased risk of getting cancer.

Cryptosporidium is a microbial parasite found in surface water throughout the U.S. Although filtration removes Cryptosporidium, the most commonly used filtration methods cannot guarantee 100% removal. Our monitoring indicates the presence of these organisms in our source water and/or finished water. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals are able to overcome the disease within a few weeks. However, immuno-compromised people have more difficulty and are at a greater risk of developing severe, life-threatening illness. Immuno-compromised individuals are encouraged to consult their doctor regarding appropriate precautions to take to prevent infection. Cryptosporidium must be ingested for it to cause disease, and may be passed through other means than drinking water.

Sodium sensitive individuals, such as those experiencing hypertension, kidney failure, or congestive heart failure, should be aware of the sodium levels where exposures are being carefully controlled.

Manganese - EPA has established a lifetime health advisory (HA) value of 0.3 ppm for manganese to protect against concerns of potential neurological effects, and a one-day and 10-day HA of 1 ppm for acute exposure. However, it is advised that for infants younger than 6 months, the lifetime HA of 0.3 ppm be used even for an acute exposure of 10 days.

8. ADDITIONAL INFORMATION

More information on the improvements to the public water system can be found on the City's web site:

<http://ci.gloucester.ma.us>

Info Statement on the Importance of a CCR:

This report contains very important information about your drinking water. Please translate it, or speak with someone who understands it.

Public Notices

East Gloucester raw reservoir samples were not analyzed in July and August 2009 for the presence or absence of bacteria. The presence of bacteria in raw water is normally assumed to be the case; however, the samples were not taken. There is no direct health effect for this oversight. This sampling largely confirms what is normally assumed, namely that there are bacteria in raw reservoir water.

□