A close-up photograph of clear water being poured from a glass pitcher into a glass. The water is captured in mid-pour, creating a dynamic, crystalline stream. The background is softly blurred, showing more of the pitcher and glass. The overall color palette is cool, dominated by blues and whites, with some warm highlights from the background.

ANNUAL WATER QUALITY REPORT

WATER TESTING PERFORMED IN 2015

Presented By
City of Manassas

Meeting the Challenge

The City of Manassas is pleased to present our annual Water Quality Report, covering all drinking water testing performed between January 1 and December 31, 2015. We continue to be dedicated to providing our customers with the highest-quality drinking water twenty-four hours a day, every day of the year. We are proud to report that your drinking water meets or exceeds state and federal standards. We continually strive to adopt new methods for delivering the best-quality drinking water to your homes and businesses. As new challenges to drinking water safety emerge, we remain dedicated to meeting the goals of source water protection, water conservation, and community education while continuing to serve the needs of all of our water users. The City of Manassas is committed to providing our customers with information about their water supply because well-informed customers are our best allies in supporting improvements necessary to maintain the highest drinking water quality standards.

Important Health Information

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



Community Participation

You are invited to participate in our Utility Commission meetings and voice your concerns about your drinking water. The Utility Commission meets on the second Thursday of each month, beginning at 5:30 p.m. in the large conference room at the City of Manassas Public Works Building, 8500 Public Works Drive, Manassas, VA 20110. If you would like to attend or have any questions, please contact the Utilities Department at (703) 257-8351.

Substances That Could Be in Water

To ensure that tap water is safe to drink, the U.S. EPA prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. U.S. Food and Drug Administration regulations establish limits for contaminants in bottled water that must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk.

The 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, in some cases, radioactive material, and substances resulting from the presence of animals or from human activity. Substances 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, or wildlife;

Inorganic Contaminants, such as salts and metals, which can be naturally occurring or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or 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 may also come from gas stations, urban stormwater runoff, and septic systems;

Radioactive Contaminants, which can be naturally occurring or may be the result of oil and gas production and mining activities.

For more information about contaminants and potential health effects, call the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Cross-Connection and Backflow Prevention

Cross-connections are links through which contamination can flow back into the City's water system if low pressure occurs as a result of water main breaks, water main flushing, and other unusual situations. The City of Manassas has a comprehensive Cross-Connection and Backflow Program to ensure that these cross-connections are controlled through installation of backflow prevention devices. Your lawn irrigation system is an example of a location where plumbing may be improperly connected and susceptible to these conditions. Even a garden hose can present a cross connection. The City of Manassas and Virginia Department of Health regulations require the water purveyor to take measures to prevent backflow and cross connection events, and to reduce the threats to water quality and health. Please visit the City's Web site to learn more about this serious concern and how you can help. If you have any questions about the City of Manassas' Cross Connection and Backflow Program, please call (703) 257-8409.

Lead in Home Plumbing

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. We are responsible for providing high-quality drinking water, but we 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 www.epa.gov/lead.

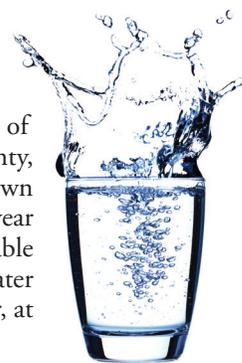
The City of Manassas has regularly been testing for lead in accordance with the EPA's Lead and Copper Rule, which was established in 1991. The lead and copper results from our last testing, completed in 2012, were well below the established action level. Since the waterworks has demonstrated optimal results, the City is now on a reduced monitoring schedule. Lead and copper testing was performed in 2015 with outstanding results. (See the Sampling Results table for more information.)

Where Does My Water Come From?

The City of Manassas is fortunate because we have two reliable water supply sources for our customers. The primary source is the City of Manassas Water Treatment Plant, which draws water from Lake Manassas, an impoundment on Broad Run in Western Prince William County. The watershed for Lake Manassas covers approximately 74.5 square miles, with the reservoir covering over 790 acres, and holding approximately 5.3 billion gallons of water at full capacity. The second source of water, if needed during peak consumption periods or emergencies, is water supplied from the Prince William County Service Authority (PWCSA). The water supplied to us from PWCSA is treated at Fairfax Water's Northern Treatment Facility, the James J. Corbalis Jr. Water Treatment Plant, which withdraws water from the Potomac River. To learn more about our watershed on the Internet, go to the U.S. EPA's Search Your Watershed Web site at www.epa.gov/surf.

Source Water Assessment

Under provisions of the Safe Drinking Water Act, states are required to develop comprehensive Source Water Assessment Programs to identify the watersheds that supply public tap water, provide an inventory of contaminants present in the watershed, and assess susceptibility to contamination in the watershed. The Virginia Department of Health (VDH) conducted a Source Water Assessment of the Lake Manassas Reservoir in 2002, and found it to be of high susceptibility to contamination using the criteria developed by the state in its approved Source Water Assessment Program. The VDH assessment report consists of maps showing the source water assessment area, an inventory of known land use activities of concern in Prince William County, and documentation of any known contamination within the five-year study period. The report is available by contacting Rebecca Abel, Water Department Compliance Officer, at (703) 257-8342.



QUESTIONS?

For more information about this report, or for any questions relating to your drinking water, please call Rebecca Abel, Water Department Compliance Officer, at (703) 257-8342.

Spring Hydrant Flushing and Chlorine Change

Every spring, from April to June, the City of Manassas performs hydrant flushing and changes the type of chlorine disinfectant used. Distribution mains deliver water to homes, businesses, and hydrants in your neighborhood. Water main flushing is the process of cleaning the interior of water distribution mains by flushing hydrants and sending a rapid flow of water through the mains. During this time, the type of chlorine used is changed from chloramine to free chlorine. Free chlorine is a more aggressive disinfectant, and this temporary change in the water treatment process prevents bacteria from developing resistances to the usual disinfection treatment process. Flushing helps ensure that fresh, high-quality drinking water is always present.

Some customers may notice a slight chlorine chemical smell similar to that of water in a swimming pool. Each individual has his or her own sensitivity level to the taste and/or odor of free chlorine. Many notice no difference.

Our number one priority is providing safe drinking water for the citizens of and visitors to Manassas. Both free chlorine and chloramines are safe and effective. The Virginia Department of Health publishes guidelines on minimum and maximum concentrations for disinfectants in drinking water. The City of Manassas maintains the water it distributes within those guidelines. The water provided by the City is safe for people and animals to drink, for cooking and bathing, watering the garden, and for all other common uses. For water that is to be used for certain special purposes such as the kidney dialysis process, in the preparation of water for fish tanks and ponds, and for businesses requiring highly processed water, precautions must be taken to remove or neutralize the chloramines and free chlorine.

The water main flushing schedule is posted on the City's website each year. Please contact us if you have any questions.

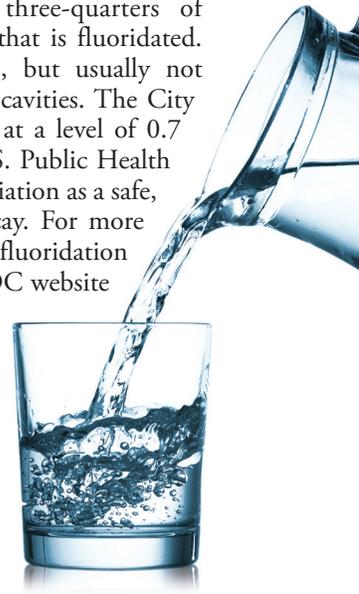
Water Treatment Process

The City of Manassas Water Treatment Plant's state-licensed operators use multiple processes to remove microbial, organic, inorganic, and particulate contaminants from our source waters during water treatment. Water treatment is the process of making pure, clean, high-quality drinking water from the source water. First, raw water from Lake Manassas enters the water treatment plant, where pre-filtration chemicals are added. These pre-filtration chemicals cause the particles contained in raw water to adhere to one another, making them heavy enough to settle out in the settling basins and be removed. After settling, water is filtered through layers of anthracite, gravel, and silicate sand. As smaller suspended particles are filtered out, clear water emerges. After filtration, chlorine is added as a disinfectant to protect against any bacteria that may still be present. Chlorination is needed to deter the growth of bacteria while the water is flowing through the pipes and into your home. We carefully monitor the amount of chlorine, adding the lowest quantity necessary to protect the safety of your water without compromising taste. Following chlorination, ammonia is added to stabilize the chlorine, pH is adjusted, ortho-phosphate is added to prevent corrosion, and fluoride is added to prevent tooth decay. After the treatment process, the water is pumped to the water distribution system via underground piping to customers in the City of Manassas, Manassas Park, and Prince William County.

Community Water Fluoridation

Fluoride has been added to public drinking water supplies in the United States since 1945, when it was added to the drinking water supply in Grand Rapids, Michigan, as a way to combat tooth decay in children. Currently, almost three-quarters of Americans receive drinking water that is fluoridated. All water contains some fluoride, but usually not enough to prevent tooth decay or cavities. The City adds fluoride to our water supply at a level of 0.7 mg/L, as recommended by the U.S. Public Health Service and American Dental Association as a safe, effective way to prevent tooth decay. For more information about drinking water fluoridation and its benefits, please visit the CDC website on drinking water fluoridation at <http://www.cdc.gov/fluoridation/index.htm>.

The safety and benefits of fluoride are well-documented. Drinking fluoridated water keeps the teeth strong and has reduced tooth decay by approximately 25 percent in children and adults.



Sampling Results

During the past year, we have taken thousands of water samples in order to determine the presence of any radioactive, biological, inorganic, volatile organic, or synthetic organic contaminants. The tables below show only those contaminants that were detected in the water. The state requires us to monitor for certain substances less often than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

REGULATED SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Chlorine (ppm)	2015	[4]	[4]	2.84	0.3–3.9	No	Water additive used to control microbes
Fluoride (ppm)	2015	4	4	0.71	0.65–0.75	No	Water additive that promotes strong teeth
Haloacetic Acids [HAAs] (ppb)	2015	60	NA	25	16–34	No	By-product of drinking water disinfection
TTHMs [Total Trihalomethanes] (ppb)	2015	80	NA	37	19–50	No	By-product of drinking water disinfection
Total Coliform Bacteria ¹ (% positive samples)	2015	5% of monthly samples are positive	0	4%	NA	No	Naturally present in the environment
Total Organic Carbon ² (removal ratio)	2015	TT	NA	1.47	1.23–1.92	No	Naturally present in the environment
Turbidity ³ (NTU)	2015	TT	NA	0.089	0.044–0.089	No	Soil runoff
Turbidity (Lowest monthly percent of samples meeting limit)	2015	TT = 95% of samples < 0.3 NTU	NA	100	NA	No	Soil runoff

Tap water samples were collected for lead and copper analyses from sample sites throughout the community.

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2015	1.3	1.3	0.123	0/30	No	Corrosion of household plumbing systems
Lead (ppb)	2015	15	0	0.51	0/30	No	Corrosion of household plumbing systems

OTHER WATER QUALITY COMPONENTS

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	DESCRIPTION
Alkalinity (ppm)	2015	38	NA	Alkalinity is a measure of the capacity of water to neutralize acids
Conductivity (µS/cm)	2015	268	NA	Conductivity or specific conductance is a measure of the water's ability to conduct an electric current. Conductivity is related to the number of ions in the water. Water with higher conductivity contains more ions
Total Hardness (ppm)	2015	54.0	NA	Total Hardness is a measure of the amount of calcium and magnesium in the water. Hard water can cause mineral buildup in plumbing. Hardness contributes to the effectiveness of soaps and detergents. The City of Manassas' water is considered slightly hard

¹ Immediate resampling confirmed Total Coliform absence in the distribution system.

² Total Organic Carbon (TOC) has no health effects; however, it provides a medium for the formation of disinfection by-products (DBPs). These by products include trihalomethanes (THMs) and haloacetic acids (HAAs). Compliance with the treatment technique (TT) reduces the formation of these DBPs. Quarterly running annual average (QRAA) refers to the monthly ratio of actual TOC removal versus required TOC removal between source and treated waters. QRAA must be greater than or equal to 1 to be in compliance.

³ Turbidity is a measure of the cloudiness of the water. It is monitored because it is a good indicator of the effectiveness of the filtration system. Turbidity levels are measured during the treatment process after the water has been filtered, but before disinfection. The turbidity level of filtered water must be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, and must at no time exceed 1 NTU.

Definitions

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

µS/cm (microsiemens per centimeter): A unit expressing the amount of electrical conductivity of a solution.

LRAA (Locational Running Annual Average): The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters. Amount Detected values for TTHMs and HAAs are reported as LRAAs.

MCL (Maximum Contaminant Level): 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.

MCLG (Maximum Contaminant Level Goal): 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.

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

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

NA: Not applicable

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

removal ratio: A ratio between the percentage of a substance actually removed to the percentage of the substance required to be removed.

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