



Bedford Regional Water Authority



A goose guarding its nest at the Stoney Creek Reservoir.

Annual Report & Consumer Confidence Report 2018

Providing Quality Service to Everyone

www.brwa.com



A Note From the Executive Director, Brian Key



If I had to choose a single word to describe last year for the Authority, I think it would be BUSY. We have been busy working on a number of projects to benefit our customers and to help our community. We began pulling together all the parts and people necessary to startup a capital improvement crew to begin the linear replacement of failing water and sewer lines. We completed a strategic planning process, with input from key stakeholders in the community; the drafted plan outlined a number of opportunities for improvement to provide better service and to communicate more openly with our customers, government leaders, and elected officials. We had a challenging year with the strange weather, which dropped more rain than we are used to having to deal with; this lead to flooding at some of our sewer lift stations in Town, and it lead to high organics in Smith Mountain lake, due to the run-off from the land in the Roanoke River Drainage Basin. We worked through a system transfer for the Cedar Rock sewer system, where we took ownership on January 1, 2019; we also began the evaluation of another ownership transfer for a water and sewer system near Smith Mountain Lake. We completed an upgrade of our disinfection system at the wastewater treatment plant in the Town of Bedford, removing all of the gas chlorine equipment from the site thereby making our community a much place to work and live. We stayed BUSY all year striving to ‘provide quality service to everyone’; when looking over this report, I hope that you will see some of the hard work that we performed for you!



Who We Are

The Bedford Regional Water Authority exists to provide its customers with high quality water and wastewater services at rates that are reasonable and just. The Authority shall anticipate the needs of the greater community by continually maintaining responsive, reliable service and through systematic expansion whenever economically possible.

Currently the Authority has 75 employees and operates 24 hours a day, 7 days a week, 365 days a year to provide customers with high quality water and wastewater services. Authority staff are constantly being trained on new technologies, safety issues, customer service protocol, and other related items to assist in achieving the organization’s goal of providing the highest quality water and the best customer service possible.



What to Expect From This Report

This report combines the Consumer Confidence Report with the Annual Report of the Authority for 2018. The desire with this report is not only to dispense the information required by law, but to also give customers a comprehensive look at what makes up the Authority.

The Consumer Confidence Reporting section of this document for calendar year 2018 is designed to inform customers about their drinking water quality. The goal is to provide customers with a safe and dependable supply of drinking water, and the Authority wants customers to understand the efforts made daily to protect the water supply. The quality of the drinking water must meet state and federal requirements administered by the Virginia Department of Health. The presence of a particular constituent does not mean that the water is unsafe to drink; however, if something is detected above the maximum level, the Public Water Systems (“PWS”) must discuss the potential health effects and actions taken to correct the problem.

In the following pages you will learn:

- An overview of the customer population of the Authority
- Information about the quality of your drinking water
- Information about the Board of Directors
- Who to contact with questions
- And much more!





Overview of Facilities

- 7 Water Treatment Plants
- 2 Water Intake Stations & 1 Reservoir
- 2 Water Booster Stations
- 12 Water Storage Tanks
- 3 Wastewater Treatment Plants
- 22 Sewer Lift Stations
- 2 Administrative Office Buildings



The Environment and Bedford Water

It is a well known fact that there is only so much water on this planet, and that we keep recycling it year after year. This means it is essential to care for our water and treat it so no harm comes to this valuable resource, the people who need it, or the natural ecosystems that surround us. The Authority recognizes the importance of this essential resource, and we are passionate about treating water in a safe way for both people and the environment. Below is a partial listing of how we play a part in keeping a clean, thriving environment and a healthy community.

- The water we distribute to our customers goes through a filtration and treatment system and a disinfection process that makes the water safe and ready to drink.
- The water that we collect, treat, and put back into streams is actually cleaner than the water currently in the streams. This ensures the safety for the stream and all its organisms after it enters back into current.
- The Authority recognizes the importance of protecting our communities, not only through clean water and eco-friendly processes, but by also providing water to fire hydrants for emergencies as they arise.



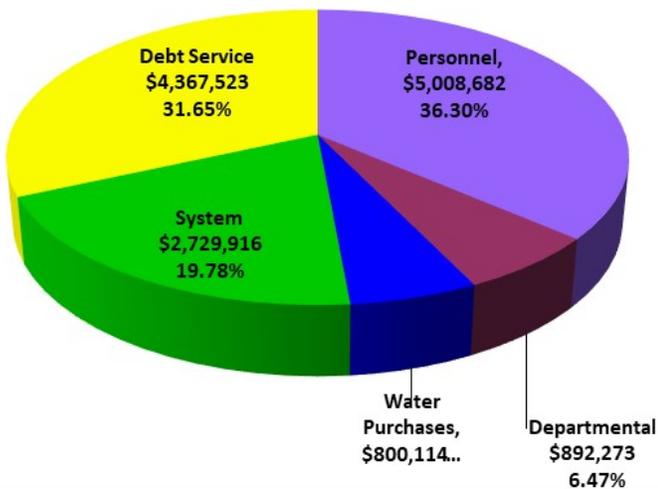


Financial Review

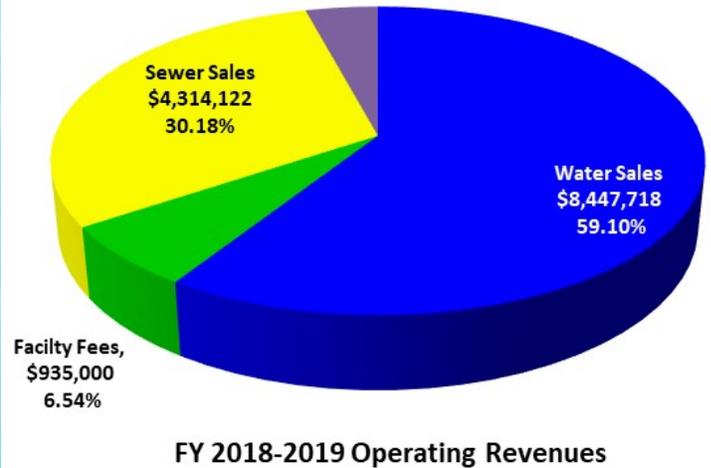
For the fiscal year ended June 30, 2018, the Authority experienced an increase in operating revenues of \$198,653, compared to an increase of \$1,203,720 from the previous year. Operating expenses increased by \$176,558 compared to decrease of \$431,189 from the previous year. Factors that contributed to the revenue increase were increased customers and year five of the rate equalization process. Developer dedications totaled \$701,869 for FY 2018, compared to \$687,961 in the previous year. Water system expenses decreased as a result of less expensive treatment costs when using the Smith Mountain Lake Water Treatment Facility, and also a decrease in the cost of purchased water from the City of Lynchburg. Expenditure increases included adding more employees and changing from bimonthly to monthly billing for the Authority's customers.

The FY 2018-2019 budget included the fifth year of the rate equalization process following consolidation; the rates used in this budget were determined through a study that was prepared by Draper Aden Associates in the spring of 2014. In January 2018, customers were transitioned from bimonthly billing to monthly billing. By reading meters every month, our customer service team is now able to more quickly identify customer leaks.

FY 2018-2019 Operating Expenses



Other Revenue
\$597,135
4.18%



Certificate of Achievement for Excellence in Financial Reporting

The Authority's comprehensive annual financial report (CAFR) for the year ended June 30, 2017, was awarded the Certificate of Achievement for Excellence in Financial Reporting by the Government Finance Officers Association of the United States and Canada (GFOA). This is the fourth year that the BRWA has earned this certificate of achievement.

In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized comprehensive annual financial report. This report must satisfy both generally accepted accounting principles and applicable legal requirements.

A Certificate of Achievement is valid for a period of one year only. We believe that our current comprehensive annual financial report continues to meet the Certificate of Achievement Program's requirements and we have submitted it to the GFOA to determine its eligibility for another certificate.



The Authority proudly displays all of its GFOA awards.



Meet the Board of Directors

The Authority board hires the Executive Director, who is responsible for managing the Authority. The Authority is composed of managers and staff specializing in Administration, Customer Service, Engineering, Finance, Human Resources, Information Systems, Maintenance, Water Operations, and Wastewater Operations.

The times and location of regularly scheduled board meetings are the third Tuesday of every month at 7:00 PM in the Bedford Regional Water Authority Board Meeting Room located at 1723 Falling Creek Road in Bedford.



Mr. Michael Moldenhauer

Term Expires
December 2019



Mr. Tom Segroves

Term Expires:
December 2022



Mr. Elmer Hodge

Term Expires:
December 2020



Mr. Walter Siehien

Term Expires:
December 2022



Mr. Robert Flynn

Term Expires:
December 2019



Mr. Carl Wells

Term Expires:
December 2020



Ms. Cynthia Gunnoe

Term Expires:
December 2020



Contact Us

Hours of Operation:

8:30 a.m. to 5:00 p.m.

Monday through Friday

Customer Service

540-586-7679, Extension 4

customerservice@brwa.com

- Water bills
- Rates and connection fees
- Signing up for service
- Disconnecting well service
- Reporting a leak or pressure problem during operating hours

Administration

540-586-7679, Extension 7

admin@brwa.com

- Board of Directors information
- Board and Committee meeting information

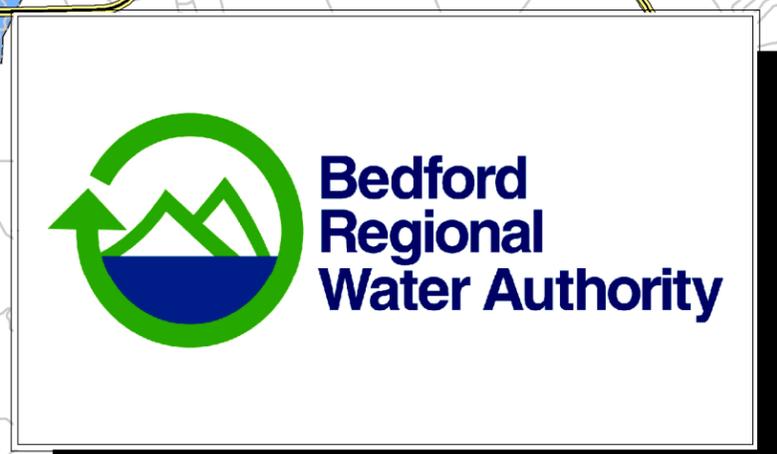
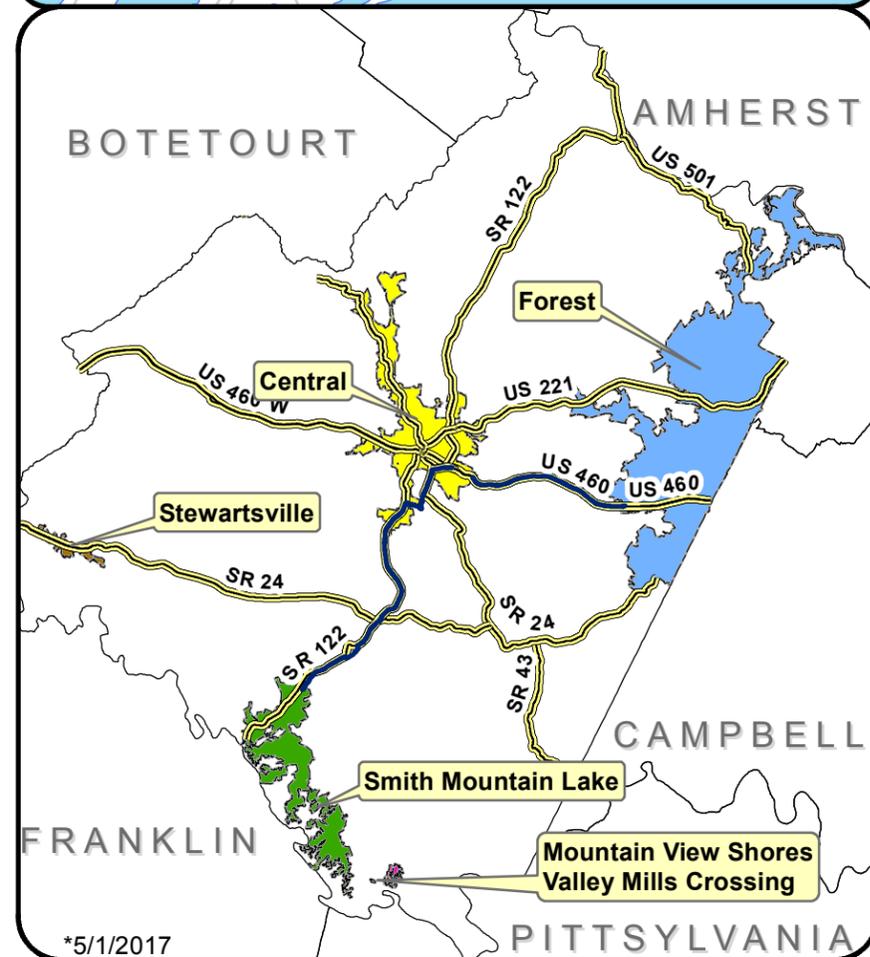
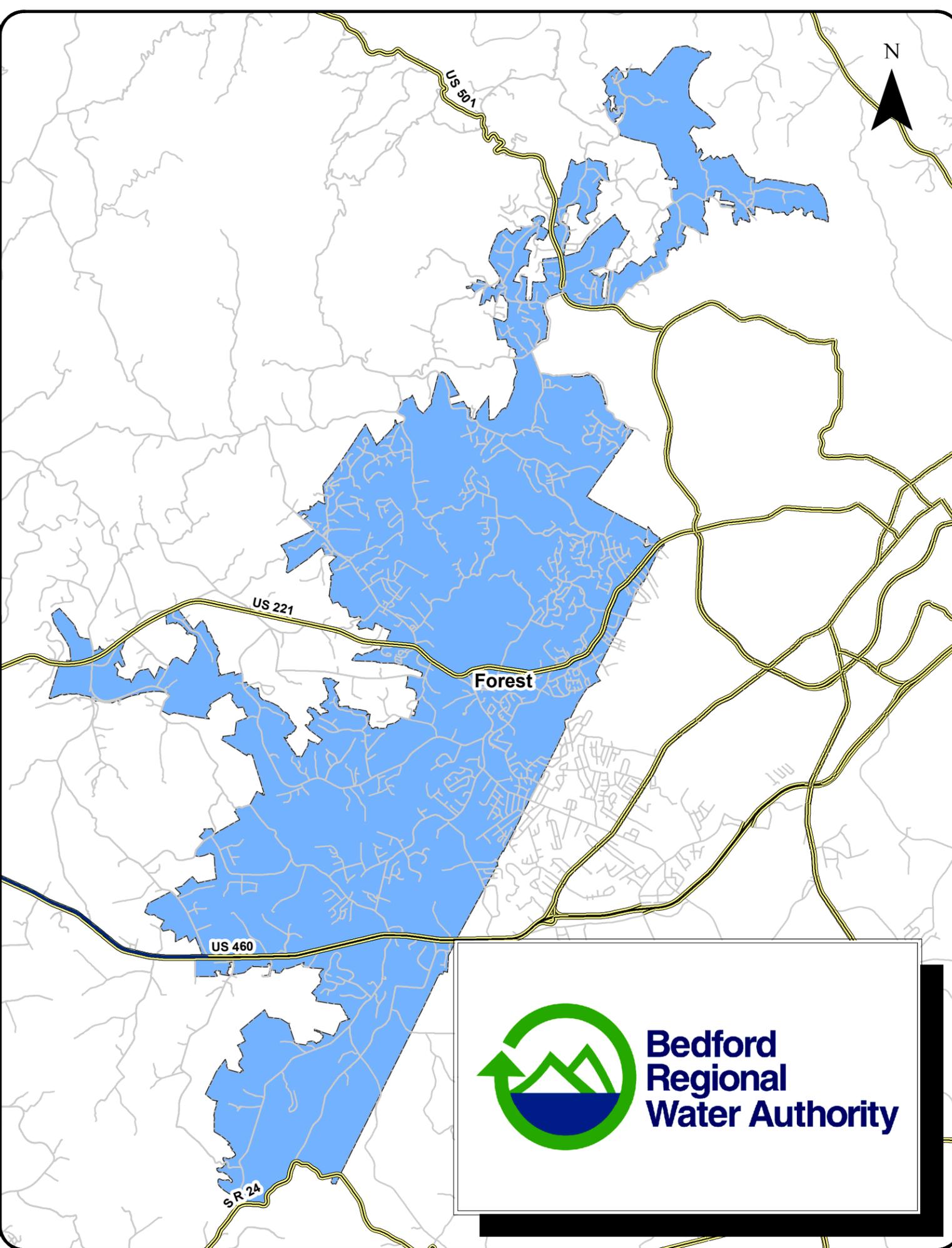
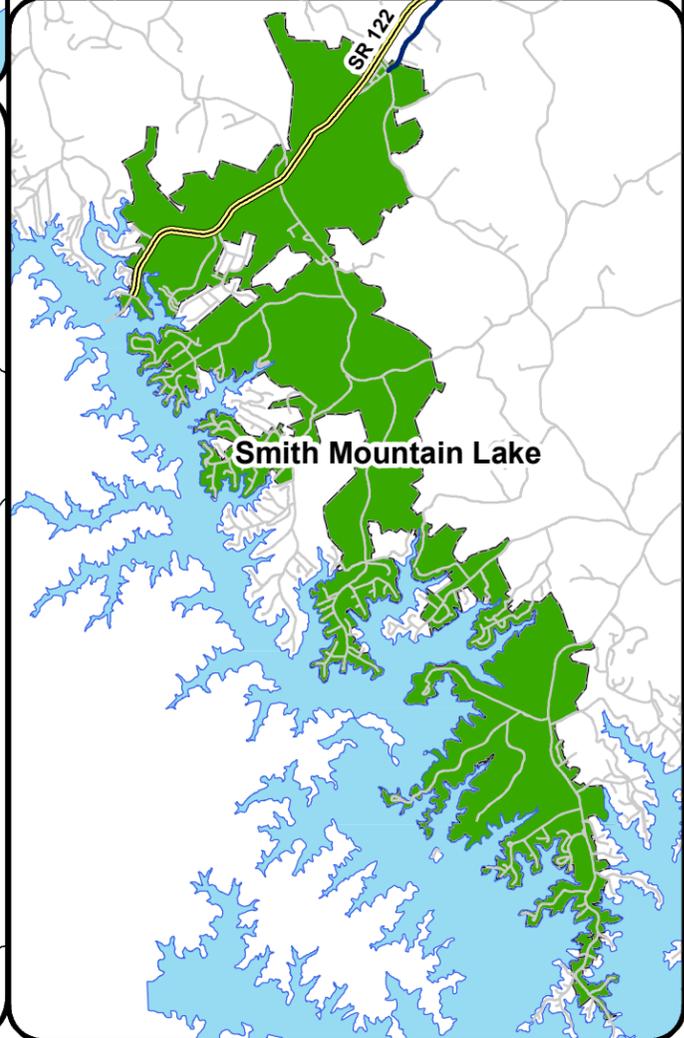
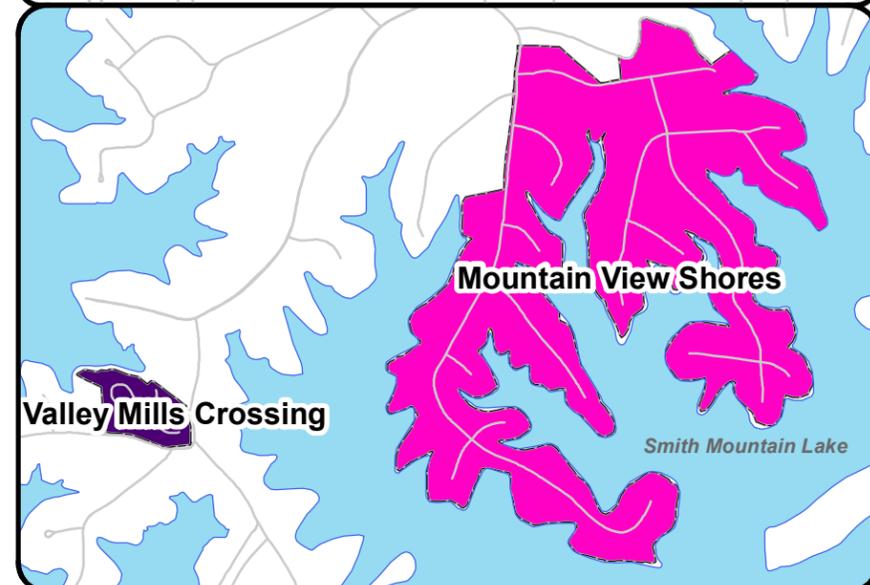
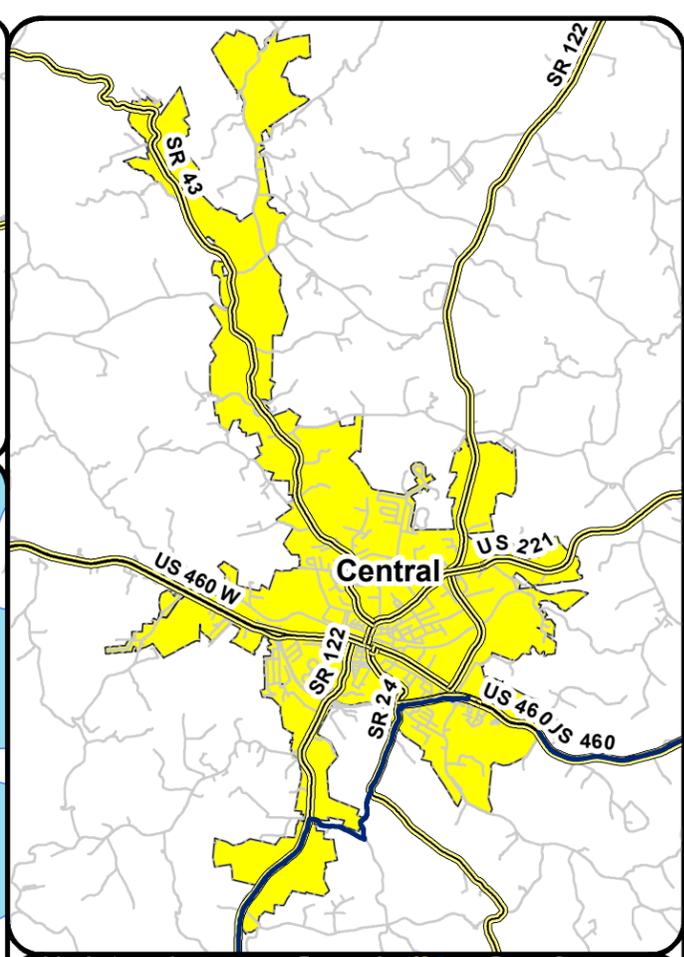
Emergency (Outside of operating hours)

540-586-7679, Extension 9

- Water outages
- Reporting a leak
- Sewer service disruptions

Website: www.brwa.com

If you have questions about this report or need any additional information about any aspect of your drinking water or want to participate in decisions that may affect the quality of your drinking water, please contact the Bedford Regional Water Authority at (540)-586-7679. Any other questions you may have concerning your water quality may be addressed via email at customerservice@brwa.com.





Vulnerable Populations

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 advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).



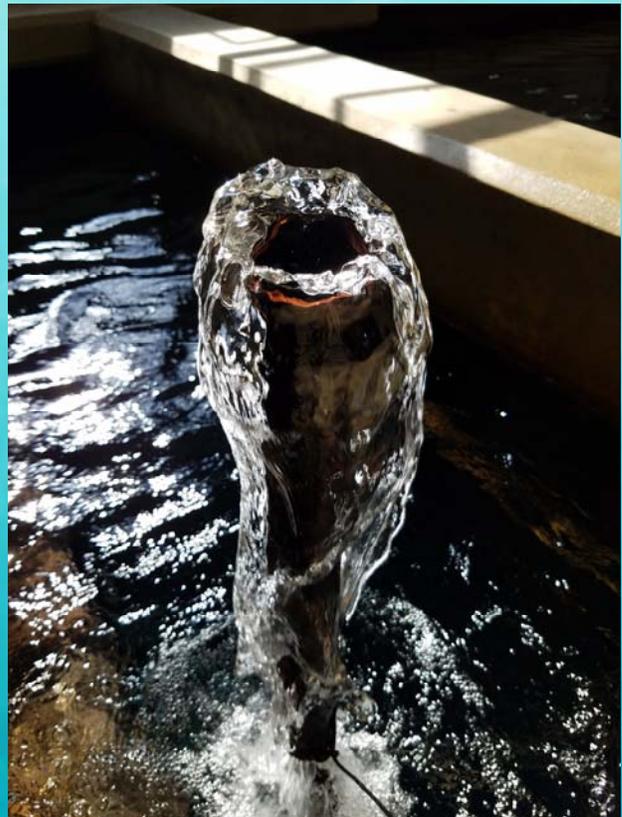
Important Information About Lead and Copper

Lead (ppb) & Copper (ppm): 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 Authority 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 two minutes before using the 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>.



Did You Know that in FY 2017-2018 the Authority...

- Had 13,812 water customers
- Had 4,742 sewer customers
- Employed 67 employees
- Produced 1,207,069,000 gallons of water
- Treated 538,400,000 gallons of wastewater
- Added 456 water connections
- Added 232 sewer connections
- Read 122,864 meters
- Installed or changed out 795 meters
- Processed 106,787 payment transactions
- Had 385 miles of water lines
- Had 145 miles of sewer lines





Sources of Your Drinking Water

The sources of drinking water (both tap 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 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 storm water 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 storm water runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban storm water 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, EPA prescribes regulations which limit the amount of certain contaminants in water and provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.



Stoney Creek Reservoir in the spring.

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 Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

A source water assessment was conducted for Mountain View Shores, Forest Central Water System, Smith Mountain Lake Central Water System, Valley Mills Crossing, and the Town of Bedford in 2002 by the Virginia Department of Health. The wells and reservoirs were determined to be of high susceptibility to contamination using the criteria developed by the state in its approved Source Water Assessment Program.

Each Source Water Assessment report consists of maps showing the source water assessment area, an inventory of known land use activities of concern, and documentation of any known contamination within the last 5 years. The reports are available by contacting the Authority at the phone number or address given elsewhere in this drinking water quality report.

Mountain View Shores

The water in this subdivision is provided from a groundwater source accessed by three wells. Water from the three wells is filtered using greensand pressure filters and treated with chlorine, soda ash, permanganate, and a blended phosphate product before entering the distribution system.

Forest Central Water System

The Authority purchases some water for the Forest, New London, and Boonsboro areas from the City of Lynchburg. The primary source of water is the 125-acre Pedlar Reservoir (surface water source), located on approximately 500 acres; this water is transmitted to Lynchburg in a 21-mile pipeline from the mountain location in Amherst. When additional water is needed, it is withdrawn from the James River. The City treats the water at



Sources of Your Drinking Water, Continued



two water treatment plants: the College Hill Filtration Plant and the Abert Filtration Plant. The Authority also provides water from the Smith Mountain Lake Water Treatment Facility to its Forest customers.

Smith Mountain Lake Central Water System

The source for the Lakes service area is Smith Mountain Lake (picture on left), a reservoir maintained by American Electric Power for generation of hydroelectric power. In calendar year 2017, over 50% of the water was primarily treated at the Smith Mountain Lake Water Treatment Facility. This facility is one of the few membrane filtration plants in the state designed to treat surface water in accordance with the Safe Drinking Water Act

and all other Virginia Department of Health guidelines. The filtration process requires no chemical addition and instead uses water being pressurized through filtration membranes, with chlorine being added after filtration for disinfection in the distribution system to meet requirements set by the regulatory agencies. This system also provides water to customers in the Town of Bedford and Forest Central.

Valley Mills Crossing

Valley Mills Crossing is a small subdivision at Smith Mountain Lake. The source of this drinking water is groundwater provided by one well; the water is treated with chlorine before entering the distribution system.

The Town of Bedford

The primary water source for the Central Service Area is the Stoney Creek Reservoir (picture on right) located near the Peaks of Otter in Bedford County (pictured below); it is a surface water source. The water from the reservoir is fed through a combination of 10" and 12" waterlines to the Central Water Treatment Plant on Turkey Mountain where it is treated using a conventional sand filtration system. The Authority has a few supplemental sources that can also provide water to the Central Water Treatment Plant; they include the Big Otter river intake and five drilled wells near the river intake on the Big Otter river. The Authority also supplies customers in the Town with water from the Smith Mountain Lake Water Treatment Facility.



Stewartsville

The Authority purchases the water for Stewartsville from the Western Virginia Water Authority ("WVWA"). The primary source of the drinking water is provided by 21-acre Falling Creek Reservoir, a surface water source located in Bedford County east of Vinton. The treatment process is a conventional sand filter, with a capacity of 1.5 million gallons a day. WVWA can also supply water to the Authority for Stewartsville from their Crystal Springs, Carvins Cove, and Spring Hollow water supplies.





Definitions

Contaminants in your drinking water are routinely monitored according to federal and state regulations. In the following tables and elsewhere in this report you will find many terms and abbreviations you might not be familiar with. The following definitions are provided to help you better understand these terms:

BDL: Below detection level.

Level 1 Assessment: a study of the waterworks to identify potential problems and determine, if possible, why total coliform bacteria have been found in our waterworks.

Level 2 Assessment: a very detailed study of the waterworks to identify potential problems and determine, if possible, why an E. coli PMCL violation has occurred and why total coliform bacteria have been found in our waterworks on multiple occasions.

Non-detects (ND): Lab analysis indicates that the contaminant is not detectable, based on the limits of the analytical equipment used.

Parts per million (ppm) or Milligrams per liter (mg/l): One part per million corresponds to one minute in two years or one penny in \$10,000.

Parts per billion (ppb) or Micrograms per liter (mg/l): One part per billion corresponds to one minute in 2,000 years, or one penny in \$10,000,000.

Picocuries per liter (pCi/L): Picocuries per liter is a measure of the radioactivity in water.

Nephelometric Turbidity Unit (NTU): Nephelometric turbidity unit is a measure of the cloudiness of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

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

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

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 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.

Variations and exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

Maximum Residual Disinfectant Level Goal (MRDLG): The maximum level of a disinfectant added for water treatment, 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.

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

Secondary Maximum Contaminant Level (SMCL): The highest level recommended for a contaminant in drinking water, based on aesthetic considerations.

Running Annual Average (RAA)—Running annual average based on 4 quarters of analysis results.

Total Trihalomethanes (TTHM): 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 systems, and may have an increased risk of getting cancer.

Haloacetic Acids (HAA5): The five haloacetic acid constituents are monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, and dibromoacetic acid. The MCL for HAA5 is 0.060 mg/L. This MCL is based on the sum of the concentrations of the five constituents. There is no MCLG for HAA5 as a group; however, two of the five constituents, dichloroacetic acid and trichloroacetic acid, have individual MCLGs of zero and 0.3 mg/L, respectively.





Water Quality Results: Forest Central Water System (PWSID # 5019052) (1 of 2)

Constituents (Unit of measure)	Violation	Level Found (range)	AL	MCLG	MCL	Date of Sample	Likely Source of Contamination
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The following data was collected by the Bedford Regional Water Authority

In 2014, the Authority participated in the third Unregulated Contaminant Monitoring Rule (UCMR3) monitoring. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. The purpose for these contaminants is to help USEPA decide whether the contaminants should have a standard. As such, there is no MCLG or MCL established for the following unregulated contaminants.

Unregulated Contaminants							
Vanadium , ppb	n/a	0.3 Range 0.02-0.6	—	n/a	n/a	February— August 2015 at entry point and distri-	Naturally present in the environment
Strontium, ppb	n/a	20 Range 17-27	—	n/a	n/a	February— August 2015 at entry point and distri-	Naturally present in the environment
Chromium-6, ppb	n/a	0.16 Range 0.03-0.5	—	n/a	n/a	February— August 2015 at entry point and distri-	Naturally present in the environment
Chlorate, ppb	n/a	420 Range 290-640	—	n/a	n/a	February— August 2015 at entry point and distri-	Naturally present in the environment



Sunrise at the intake at Smith Mountain Lake.



Water Quality Results: Forest Central Water System (PWSID # 5019052 (2 of 2))

The following data was collected by the City of Lynchburg.

Constituents/ Unit of Measure	V i o l a t i o	Level Detected		AL	MCLG	MCL	MDRL	Likely Source of Contamination
		Water from Abert Filtration Plant	Water from College Hill Filtration Plant					
Inorganic Contaminants								
Chlorine, ppm	No	Range 0.01-2.00 Highest Average 1.50		—	—	—	4	Water additive to control microbes
Nitrate + Nitrite (as Nitrogen), ppm	No	0.09	0.09	—	10	10	—	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits
Fluoride, ppm	No	Average: 0.70 Range: 0.53-0.88	Average: 0.67 Range: 0.38-0.87	—	4	4	—	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Lead, ppb	No	90 th percentile value = 2 0 above action limit		15	0	—	—	Corrosion of household plumbing systems, erosion of natural deposits
Copper, ppm	No	90 th percentile value = 0.027 0 above action limit		1.3	1.3	—	—	Corrosion of household plumbing systems, erosion of natural deposits
Barium, ppm	No	Abert 0.037	CH 0.041	—	2	2	—	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Microbiological Contaminants								
Turbidity, NTU	No	0.19 (highest level) 100% <0.3	0.12 (highest level) 100% <0.3	—	n/a	TT	—	Soil runoff
No single sample can be greater than 1 NTU. At least 95% of the samples taken every month must be less than 0.3 NTU								
Volatile Organic Contaminants								
Trihalomethanes (TTHM), ppb	No	18-73 (range) 52(highest average)		—	n/a	80	—	By-product of drinking water disinfection
Haloacetic Acids (HAA5), ppb	No	18-64 (range) 42 (highest average)		—	n/a	60	—	By-product of drinking water disinfection
Radioactive Contaminants								
Radium-228, pCi/L (data from 2015)	No	0.6	ND	—	0	5	—	Erosion of natural deposits
Disinfection By-Product Precursors								
Total Organic Carbon (ppm) (TOC) Treated, water ppm	No	Highest Average: 1.30 Range: 0.73-1.68	Highest Average: 1.43 Range: 0.77-1.97	—	n/a	TT	—	Naturally present in the environment



Water Quality Results: Combined Systems—Central Water, Forest Central, Smith Mountain Lake Water Treatment Facility (PWSID# 5019052)

Contaminant Unit of Measurement	Violation Y/N	Level Detected/Range	Sample Date	AL	MCLG	MCL	Likely Source of Contamination
Inorganic Contaminants							
Lead, ppb	No	90 th percentile value – 3 of 60 samples collected one exceeded the action level	January-June 2018	15	0		Corrosion of household plumbing systems; erosion of natural deposits
Copper, ppm	No	90 th percentile value -0.23 of 60 samples collected none exceeded the action level	January – June 2018	1.3	1.3		Corrosion of household plumbing systems; erosion of natural deposits
Disinfection Byproducts							
Chlorine, ppm	No	Average 0.72 Range 0.02-1.5	Monthly		MRDLG= 4	MRDL=4.0	Chlorine is added to insure that water is disinfected
Trihalomethanes (TTHM), ppb	Yes	Highest quarterly average 64 Range–34-64	4th Quarter 2018		NA	80	By- product of drinking water chlorination
Haloacetic Acids (HAA5), ppb	Yes	Highest quarterly average 64 Range–36-64	4th Quarter 2018		NA	60	By-product of drinking water chlorination

Fluoride: Central Water ceased fluoride addition in January 2017 by resolution 2017-01-01 from the Board of Directors of the Authority.

Violations: The Authority received Notices of Violations during the 4th quarter 2018 in the Town of Bedford Service and Forest Central Service Area for exceeding the PMCL for Total Haloacetic Acids. Some people who drink water containing HAA5 in excess of the MCL over many years may have an increased risk of getting cancer. The Authority started feeding the Town of Bedford Service Area with water from Smith Mountain Lake Water Treatment Facility beginning in the summer 2017 to help reduce HAA5 concentrations throughout the distribution area.



Water operator Walkie Taylor at our Central Water Treatment Plant.



Water Quality Results: Mountain View Shores (PWSID #5019685)

Contaminant (unit of measure)	MCLG	MCL	Level Found	Range	Violation	Date of Sample	Typical Source of Contamination
Lead and Copper							
Copper, ppm	1.3	AL = 1.3	0.76 (90th percentile)	Range: 0.02- 0.93 Of ten samples collected none were above AL	Yes	January-June 2015	Corrosion of household plumbing systems; erosion of natural deposits
Lead, ppb	0	AL = 15	1.0 90th percentile	Range 0.3-0.9 Of ten samples collected none were above AL	No	January-June 2015	Corrosion of household plumbing systems; erosion of natural deposits
Inorganic Contaminants							
Fluoride, ppm	4	4	0.09	n/a	No	July 2016	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and alumi- num factories
Barium, ppm	2	2	0.017	n/a	No	July 2016	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Nitrite-/Nitrate, ppm	10	10	ND	n/a	No	February 2018	Runoff from fertilizer use, leaching from septic tanks, sewerage; erosion of natural deposits
Radioactive Contaminants							
Alpha emitters, pCi/L	0	15	0.14	n/a	No	February 2018	Erosion of natural deposits
Combined Radium, pCi/L	0	5	1.9	n/a	No	February 2018	Erosion of natural deposits
Disinfection By-Products, Precursors, and Residuals							
Trihalomethanes (TTHM), ppb	ppb	80	6.2	n/a	No	October 2016	By-product of drinking water disinfection.
Haloacetic Acids (HAA5), ppb	0	60	2.0	n/a	No	October 2016	By-product of drinking water disinfection.
Chlorine, ppm	MRDLG=4	MRDL-4	1.0	0.6-1.7	No	Monthly 2018	Water additive used to control microbes
Unregulated Contaminants							
Hardness, ppm	n/a	n/a	51	30-118	No	Monthly	Measurement of naturally occurring hardness metals
pH, (pH units)	n/a	6.5-8.5	7.2	7.1-8.4	No	Daily	Acidity or basicity of water
A sample collected in July 2016 indicated the sodium in the treated water is 61mg/L. This is above the EPA recommended optimal level of less than 20 mg/L for sodium in drinking water, which is established for those individuals on a "strict" sodium intake diet.							



Water Quality Results: Smith Mountain Lake Central Water System (PWSID #5019400)

Contaminant (Unit of Measure)	MCLG	MCL	Level Found	Range	Violation	Date of Sample	Typical Source of
Microbiological Contaminants							
Turbidity (NTU)	n/a	TT	0.14 100% < 0.5	0.03-.237	No	Continuously monitored	Soil runoff
Radioactive Contaminants							
Gross Alpha	0	15 pCi/L	0.28	n/a	No	July 2015	Erosion of Natural Deposits
Combined Radium	0	5 pCi/L	0.58	n/a	No	July 2015	Erosion of Natural Deposits
Inorganic Contaminants							
Nitrate, ppm	10	10	0.09	n/a	No	Sept. 2018	Runoff from fertilizer use, leaching from septic tanks, sewerage; erosion of natural deposits
Barium, ppm	2	2	0.03	n/a	No	Sept. 2018	Discharge of drilling waste; Discharge from metal refineries; Erosion of natural deposits
Unregulated Contaminants							
pH (pH units)	n/a	SMCL 6.5-8.5, as shown on the Hill-	7.6 Average	6.4-8.7	No	Daily	Acidity or basicity of water
Hardness, ppm	n/a	n/a	89 average	60-129	No	Daily	Measurement of naturally occurring hardness metals
Iron, ppm	n/a	SMCL 0.3	0.01	0-.03	No	Daily	Rusty color, sediment, metallic taste, reddish or orange staining.
Alkalinity, ppm	n/a	n/a	82	64-82	No	Daily	
Manganese, ppm	n/a	SMCL 0.05	0.006	0-.021	No	Daily	Black to brown color, black staining, bitter metallic taste





Water Quality Results: Stewartsville Consecutive (PWSID #5019795) (1 of 2)

The following data was collected by the Western Virginia Water Authority.

Substance	Units	Ideal Goals (EPA's MCLG)	Highest Level Allowed (EPA's MCL)	Carvins Cove Level (range) average	Crystal Spring Level (range) average	Spring Hollow Level (range) average	Falling Creek Level (range) average
Regulated Substances							
Barium	ppm	2	2	0.0572	0.038	0.0342	0.0161
Fluoride	ppm	4	4	(0.065 - 0.7) 0.52	(0.55 - 0.72) 0.64	(0.32 - 0.85) 0.68	(0.4 - 0.6) 0.47
Total Nitrate & Nitrite (as N)	ppm	10	10	ND	0.712	0.281	ND
Total Organic Carbon	ppm	TT	N/A	(1.73 - 2.57) 2.06	N/A	(1.17 - 1.83) 1.43	(1.13 - 2.07) 1.51
Turbidity	NTU	TT	0.3	(0.13 - 0.27) 0.19	(0.01 - 0.03) 0.02	(0.06 - 0.15) 0.09	(0.1 - 0.16) 0.12
Radioactive Contaminants							
Gross Alpha	pCi/L	0	15	0.7	1.1	0.24	< 0.5
Gross Beta	pCi/L	0	50	1.7	1.8	2.4	1.8
Radium 228	pCi/L	0	5	< 0.35	0.8	0.36	< 0.6
Combined Radium	pCi/L	0	5	(0.7)	(1.9)	(0.6)	(< 0.6)
Lead and Copper Testing							
Lead	ppb	0 ppb	AL = 15	1 of 51 samples exceeded AL 90th percentile = 2.7 ppb			
Copper	ppm	1.3 ppm	AL = 1.3	0 of 51 samples exceeded AL 90th percentile = 0.46 ppm			
Disinfectants and Disinfection By-Products							
Chlorate	ppm		0.8	(0.033 - 0.22) 0.076	N/A	(ND - 0.48) 0.068	N/A
Chlorine	ppm		4	(1.0 - 1.3) 1.1	(1.0 - 1.1) 1.1	(1.1 - 1.2) 1.1	(1.4 - 1.6) 1.5
Chlorite	ppm		0.8	(ND - 0.110) 0.021	N/A	(ND - 0.097) 0.021	N/A
HAAs	ppb	0	60		(ND - 61) site range	(5 - 47) LRAA range	
TTHMs	ppb	0	80		(8.4 - 52) site range	(16 - 63) LRAA range	
Unregulated and Secondary Substances							
Alkalinity	ppm	unregulated		(30 - 42) 38	130	(124 - 140) 135	(18 - 18) 18
Conductivity	µmhos/cm	unregulated		154	331	338	63.8
Hardness (Total)	ppm	unregulated		(37 - 56) 47	(120 - 171) 142	(148 - 160) 155	(17 - 17) 17
Iron	ppm		0.3	(0.012 - 0.033) 0.024	ND	ND	(0.008 - 0.016) 0.011
Manganese	ppm		0.05	(0.004 - 0.008) 0.006	0.0002	0.00039	(0.005 - 0.015) 0.010
Orthophosphate as P	ppm	unregulated		(0.04 - 0.28) 0.25	ND	(ND - 0.21) 0.16	(0.16 - 0.2) 0.17
pH	pH units		6.5 - 8.5	(7.2 - 7.8) 7.6	(7.5 - 7.8) 7.7	(7.5 - 7.8) 7.6	(7.5 - 7.6) 7.5
Sodium	ppm	unregulated		4.51	3.96	5.27	9.84
Zinc	ppm		5	ND	ND	ND	0.00252

Cryptosporidium and *Giardia* are microscopic organisms that can cause fever, diarrhea and other gastrointestinal symptoms when ingested. The organisms come from animal and human wastes and are eliminated through water filtration and disinfection. Even though the presence of these organisms is not regulated by the state or federal government, the Water Authority has tested for these organisms. *Giardia*, 0.2 cyst per 1 liter, was detected in the raw (untreated) water at Falling Creek in March 2016 and 8 cyst per 1 liter in June 2017. *Cryptosporidium* was detected in the raw (untreated) water at Carvins Cove (0.1 cyst per 1 liter in January 2016 and 0.1 cyst per 1 liter in February 2016).

Water from the Carvins Cove source tested positive for the presence of total coliform in eight tests in calendar year 2018. There were no detections of *E. coli* bacteria.



The boat ramp near the intake at Smith Mountain Lake.



Water Quality Results: Stewartville Consecutive (PWSID #5019795) (2 of 2)

The following data was collected by the Western Virginia Water Authority.

UCMR4

Parameter	Units	Carvins Cove	Spring Hollow	Crystal Spring	Garden city 2	LaBellevue 7	Longridge 2	Muse	N. Lakes	Starkey 1	Starkey 2	Starkey 3
Germanium	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Manganese	ug/L	1.6 -2.48	ND	ND	ND	ND	11.1	ND	4.66	41.1	47.3	ND
alpha-Hexachlorocyclohexane	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethipin	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethoprop	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Oxyfluorfen	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Profenofos	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tebuconazole	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Permethrin, cis & trans	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tribufos	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butylated hydroxyanisole	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Toluidine	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Quinoline	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1-Butanol	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methoxyethanol	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Propen-1-ol	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloroacetic acid	ug/L	ND-1.22										
Bromodichloroacetic acid	ug/L	ND-2.19										
Chlorodibromoacetic acid	ug/L	ND-0.318										
Dibromoacetic acid	ug/L	ND										
Dichloroacetic acid	ug/L	1.33-27.1										
Monobromoacetic acid	ug/L	ND										
Monochloroacetic acid	ug/L	ND-2.58										
Tribromoacetic acid	ug/L	ND										
Trichloroacetic acid	ug/L	0.811-31.9										
Bromide (Raw)	ug/L	ND	ND-33.6	ND								
TOC (Raw)	ug/L	2690 -3050	1320-1380	ND								

Constituents (Unit of measure)	Violation	Level Found (range)	MCLG	MCL	Date of Sampling	Typical Source of Contamination
The following data was collected by the Bedford Regional Water Authority.						
Disinfection By-Products Precursors and Residuals						
Haloacetic Acids (HAA5), ppb	No	highest compliance average:4	n/a	60	Quarterly 2018	By-product of drinking water chlorination disinfection
Trihalomethanes (TTHM), ppb	No	highest compliance average:71 Range: 29-59	n/a	80	Quarterly 2018	By-product of drinking water chlorination disinfection
Chlorine, ppm	No	.08 average Range: 0.1-.054	MRDLG =4	MRDL=4	Monthly	Water additive used to control microbes
Lead and Copper						
Lead, ppb	No	90th percentile value = 0.9 Of five samples collected none exceeded the AL Range- 0.4-1 ppb	0	AL=15	August 20017	Corrosion of household plumbing systems; erosion of natural deposits
Copper, ppm	No	90th percentile value = 0.04 Of five samples collected none exceeded AL	1.3	AL=1.3	August 2017	Corrosion of household plumbing systems; erosion of natural deposits



Water Quality Results: Valley Mills Crossing (PWSID #5019875)

Contaminant (unit of measure)	MCLG	MCL	Level Found	Range	Violation	Date of Sample	Typical Source of Contamination
Lead and Copper							
Copper, ppm	1.3	AL=1.3	1.3 (90th percentile)	Range: 0.0672- 2.05 of six samples collect- ed one exceed- ed the AL	No	June- September 2017	Corrosion of household plumbing systems; erosion of natural deposits
Lead, ppb	0	AL=15	13 (90th percen- tile)	Range: 1.1- 16.8 of six samples collected one exceeded the AL	No	June- September 2017	Corrosion of household plumbing systems; erosion of natural deposits
Inorganic Contaminants							
Nitrate, ppm	10	10	0.45	—	No	October 2018	Runoff from fertilizer use, leaching from septic tanks, sewerage; erosion of natural deposits
Barium, ppm	2	2	0.36	n/a	No	April 2018	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Antimony, ppb	6	6	0.2	n/a	No	April 2018	Discharge from petroleum refineries; fire retardants; ceramics electronics; solder
Fluoride, ppm	4	4	0.05	n/a	No	August 2016	Erosion of natural deposits; water additive that pro- motes strong teeth; discharge from fertilizer and alu- minum factories.
Radioactive Contaminants							
Alpha emitters, pCi/L	0	15	.18	n/a	No	April 2017	Erosion of natural deposits
Combined radium, pCi/L	0	5	1.4	n/a	No	April 2017	Erosion of natural deposits
Disinfection By-Products, Precursors, and Residuals							
Trihalomethanes (TTHM), ppb	NA	80	2.0	n/a	No	August 2016	By-product of drinking water disinfection
Haloacetic Acids (HAA5), ppb	NA	60	5.08	n/a	No	August 2016	By-product of drinking water disinfection
Chlorine, pm	MRDLG=4	MRDL=4	0.6	0.36-1.0	No	Monthly 2018	Water additive used to control microbes
Volatile Organic Contaminants							
Xylene, ppm	10	10	ND	n/a	No	October 2018	Discharge from petroleum factories ;Discharge from chemical factories
Ethylbenzene	700	700	ND	n/a	No	October 2018	Discharge from petroleum refineries
Toluene	1	1	ND	n/a	No	October 2018	Discharge from petroleum factories
Unregulated Contaminants							
pH (pH Units)	n/a	6.5-8.5 SMCL	6..7 average	6.3—7.1	No	Daily 2018	Acidity or basicity of water
Hardness, ppm	n/a	n/a	57 0average	37-65 Range	No	Monthly 2018	Measurement of naturally occurring hardness metals



Water Quality Results: Town Central PWSID#5019052 (Page 1 of 2)

TEST RESULTS

Contaminant / unit of measurement	Violation Y/N	Level Detect- ed/Range	Sample Date	MCL G	MCL	Likely Source of Contamination
Microbiological Contaminants (ND)						
Turbidity / NTU	No	0.26 (highest level)100 % < 0.3	Daily	n/a	Max TT 0.3 in 95 % of monthly samples	Soil runoff
Inorganic Contaminants						
Nitrate – Nitrite, ppm	No	0.19	2018	10	10	Runoff from fertilizer use, leaching from septic tanks, sewerage; erosion of natural deposits
Barium, ppm	No	0.01	2018	2	2	Discharge of drilling waste. Discharge from metal refineries; Erosion of natural deposits
Radioactive Contaminants						
Gross Alpha, pCi/L	No	0.60	March 2014	0	15	Erosion of natural deposits
Combined Radium, pCi/L	No	0.97	March 2014	0	5	Erosion of natural deposits
Total Organic Carbon (TOC), Removal ratio	No	Ave. Ratio: 1.00 Range: 0.64-1.57	Monthly	n/a	TT- TOC Removal Ratio greater than or equal to 1	Naturally present in the source water

Central Water ceased fluoride addition in January 2017 by resolution 2017-01-01 from the Board of Directors of the Authority

Physical and Mineral Characteristics for calendar year 2018:

In addition to the required analysis that is mainly completed by independent labs we also conduct over 4,000 individual operational tests on your water during the year. The following constituents analyzed in your water on a daily basis are indicators of the appearance, taste and mineral content of the drinking water delivered to your tap.

Constituent (w/unit of measurement)	Frequency	Annual Average
pH, standard units	Every 4 hours	7.3
Alkalinity, ppm	Every 4 hours	18
Total Hardness, ppm	Once per day	25
Calcium Hardness, ppm	Once per day	25
CO ₂ , ppm	Once per day	5
Iron, ppm	Once per day	0.01
Manganese, ppm	Once per day	0.01
Temperature, Celsius	Every 4 hours	14
Free Chlorine, ppm	Continuous monitor in addition to every 4 hours	1.5



Employees Randy Carter (left) and Denny Craighead (right) taking and testing samples.



Bedford Regional Water Authority

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