WESTERN VIRGINIA
WATER AUTHORITY

2013 Water Quality Report

We're pleased to let you know...

This water quality report, supplied annually to our water customers, contains information for customers in the City of Roanoke, Roanoke County and Franklin County about the source of your water, what it contains and how it compares to the standards set by regulatory agencies based on data collected during calendar year 2012. The Water Division of the Western Virginia Water Authority vigilantly safeguards your water supplies and is proud to report that in 2012, the Water Authority was in full compliance with all state and federal monitoring and reporting requirements without a single violation.

Do you want to learn more about what goes on behind the faucet?

Give us a call to schedule a tour of one of treatment facilities, schedule a free SOL-correlated classroom presentation or arrange for a civic presentation to your civic or community group. We'd love to meet with you!

Our history....

In July 2004, the Public Utility Departments of the City of Roanoke and Roanoke County merged to form the Western Virginia Water Authority, a new public body independent of local government. In November 2009, Franklin County joined the Water Authority, offering a larger regional approach to meeting our communities' water and wastewater needs.

The Authority is governed by a Board of Directors whose meetings are open to the public. Board members meet on the 3rd Thursday of every month with the exception of August and December.

Our Executive Directors, are (L) **Mike McEvoy**, Executive Director Wastewater Services and (R) **Gary Robertson, P.E.,** Executive Director Water Operations.

What's Inside....

WESTERN VIRGINIA WATER AUTHORITY

Our customer service representatives are available Monday-Friday from 8am to 5pm to assist you in person, on the phone, by FAX or at online. Information is also available on our website www.westernvawater.org.

601 S. Jefferson Street
Suite 200
Roanoke, VA 24011

phone: 853.5700
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info@westernvawater.org

Gold Award for Exceptional Utility Performance

Platinum Excellence in Management Recognition Award

U.S. Centers for Disease Control and Prevention (CDC) Water Fluoridation Quality Award - Crystal Springs WTP 2011

Your Drinking Water

As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and can pick up substances resulting from the presence of animals or from human activity. Water from surface sources is treated to make it drinkable while groundwater may or may not have any treatment.

Contaminants in source water may be naturally occurring substances, or may come from:

- 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, 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 byproducts 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.

The following are other resources for drinking water safety information:

Virginia Department of Health:
540.463.7136 (Roanoke area system)
434.836.8416 (Franklin County water systems)

Centers for Disease Control and Prevention:
1.800.311.3435,
404.639.3311 or
404.639.3312 (TTY)

Roanoke Environmental Health Department:
540.857.7663

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water 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.

All drinking water, including bottled drinking 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 can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

Cryptosporidium & Giardia

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 *Cryptosporidium* and *Giardia* and has not detected either organism.

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).

Water Discoloration

Changes in water pressure in water systems, such as when water mains break or technicians flush hydrants, can occasionally cause drinking water to be discolored. The discoloration is caused by sediments in pipes mixing with clear water. The sediments occur naturally from the oxidation of iron in pipes. While discolored water is ordinarily safe to drink, it is best to flush any discolored water from pipes by turning on all cold-water faucets in your home or business. Avoid turning on hot-water faucets so the discolored water is not drawn into water heaters.

One cause of water pressure change is from the use or flushing of fire hydrants. If you notice evidence of a water main break or leaking fire hydrants, please call 853.5700.

Lead & Copper

Copper is a nutritionally essential element, but at high levels, copper can cause gastrointestinal difficulties such as nausea and diarrhea. 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 Western Virginia Water 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 15 to 30 seconds or until it becomes cold or reaches a steady temperature 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.

Roanoke Area Water Systems

The Water Authority is fortunate to operate and manage several water sources in the Roanoke Valley. This diversity of surface and groundwater sources, rather than a sole source, provides greater operational flexibility and reliability in the event of a drought or other emergency.

Using water from these sources, the Water Authority treats and delivers 20-million gallons of drinking water per day to more than 58,000 customer accounts (155,000 residents in the City of Roanoke and Roanoke County, as well as customers in Franklin County, the Town of Vinton, the City of Salem and Botetourt County). The Water Authority also maintains 51 drinking water storage tanks, 39 pump stations and over 1,500-miles of water main.

Carvins Cove Reservoir and Treatment Facility

Carvins Cove Reservoir is situated within Carvins Cove Natural Reserve, a 12,672-acre watershed near Hollins University in Botetourt County. The land in the reserve above the 1,200-foot contour is owned and managed by the City of Roanoke. The land below this elevation, and the reservoir, are owned and operated by the Western Virginia Water Authority. In addition to receiving water from the watershed, the reservoir is fed from two underground tunnels that carry overflow from Tinker and Catawba Creeks. This surface water source covers 630 acres and stores 6.5-billion gallons of water at full pond.

Carvins Cove Water Treatment Facility has the capacity to treat 28-million gallons of water from the reservoir every day. The water is first oxygenated and treated with chlorine dioxide to oxidize dissolved organic matter, iron and manganese. Water is aerated to remove unwanted dissolved gases and to oxidize dissolved metals, which reduces any unpleasant tastes and odors. Flash mixing of chemicals is the next step, where ferric sulfate is added to coagulate suspended particles. Water then flows into settling basins where the particles clump together, become heavy and settle to the bottom of the basins. The water is next filtered through gravel, sand and carbon and disinfected with chlorine. Fluoride is added to promote strong teeth, and orthophosphate is added to control corrosion in pipes.

A large part of the northeastern and northwestern parts of the city, and the majority of the southeastern part of the city, to Reserve Avenue, are served by Carvins Cove. Portions of northern and northeastern Roanoke County are also served by the Carvins Cove water source.

Carvins Cove Natural Reserve

Carvins Cove Natural Reserve, the second largest municipal park in the United States, offers outdoor recreation opportunities, including boating, fishing, hiking and nature viewing. Visitors to the Natural Reserve are charged $2 per person for daily use or annual passes are available for $20. Payment drop boxes are located at the Bennett Springs and Timberview parking lots, or passes can be purchased from the Security Office on Reservoir Road. For more information, call the Natural Reserve at 540-563-9170.

Spring Hollow Reservoir and Treatment Facility

The water source for this system comes from the Roanoke River and is pumped into the Spring Hollow Reservoir, a 3.2-billion gallon side-stream storage reservoir. Water is withdrawn from the reservoir, oxygenated and treated with chlorine dioxide to oxidize dissolved organic matter, iron and manganese. Treatment at the Spring Hollow Treatment Facility includes clarification, filtration, chlorine disinfection and fluoridation.

The Spring Hollow Water Treatment Facility currently has the capacity to treat 18-million gallons of water a day and can be expanded to 36-million gallons a day. Treated water is stored in a two-million gallon storage tank then pumped through the north and south transmission lines to the distribution system. The current usage averages 4.15-million gallons a day. During an emergency, standby wells may be used to supplement the source water. Spring Hollow supplies water to various neighborhoods in Roanoke County and Franklin County through the southern distribution lines and in the City of Roanoke and Roanoke County along I-81 through the northern distribution lines.

Crystal Spring

Crystal Spring flows at the base of Mill Mountain in the southern part of the city. This groundwater source provides an average flow of 4-million gallons of water a day. The water is filtered in the Crystal Spring Microfiltration Treatment Facility which filters out all particles larger than 0.2 micron. One micron is one thousandth of a millimeter. Filtered water is treated with chlorine and fluoride and pumped to water customers from the Crystal Spring Pumping Station. Crystal Spring serves portions of southwest Roanoke County and the southwestern part of the city. With the capacity to filter five-million gallons of water a day, Crystal Spring Treatment Facility is the largest microfiltration plant in western Virginia.

Visitors to Crystal Spring Park are invited to tour the historic **Crystal Spring Pump Station and the Snow Steam Pump.** Located across the parking lot from the Treatment Facility, the History Museum of Western Virginia opens the pump station for free guided tours each Saturday (12noon-4pm) and Sunday (1pm - 4pm) between May and September.

Falling Creek and Beaverdam Creek Reservoirs

Falling Creek Reservoir is a surface water source located in Bedford County east of Vinton. It covers 21 acres and stores 85-million gallons of water at full pond. It is fed by Beaverdam Creek Reservoir, which covers 69 acres and stores 435-million gallons of water at full pond.

The treatment process of this water source is similar to that of Spring Hollow Treatment Facility; treatment capacity is 1.5-million gallons a day. Falling Creek Water Treatment Facility serves King Street northeast to Route 460 and along Route 24 to 13th Street.

Martin Creek System

Seven wells supply this groundwater source, which is disinfected with chlorine prior to distribution. Water is distributed throughout the community by two storage tanks and distribution piping consisting of 8-inch, 6-inch and 4-inch pipe. The total source/pump capacity is equal to 76,000 gallons per day. Current usage is approximately 18,200 gallons per day. This system supplies water to the Forest Edge and Carriage Hills areas.

Delaney Court System

One well supplies this groundwater source, which is disinfected with chlorine prior to distribution. Water is distributed throughout the community by a storage tank, a booster pump station and distribution piping consisting of 8-inch and 12-inch pipe. The total source/pump capacity is equal to 43,200 gallons per day. Current usage is approximately 6,000 gallons per day. This system supplies water to the Delaney Court subdivision.

Country Hills System

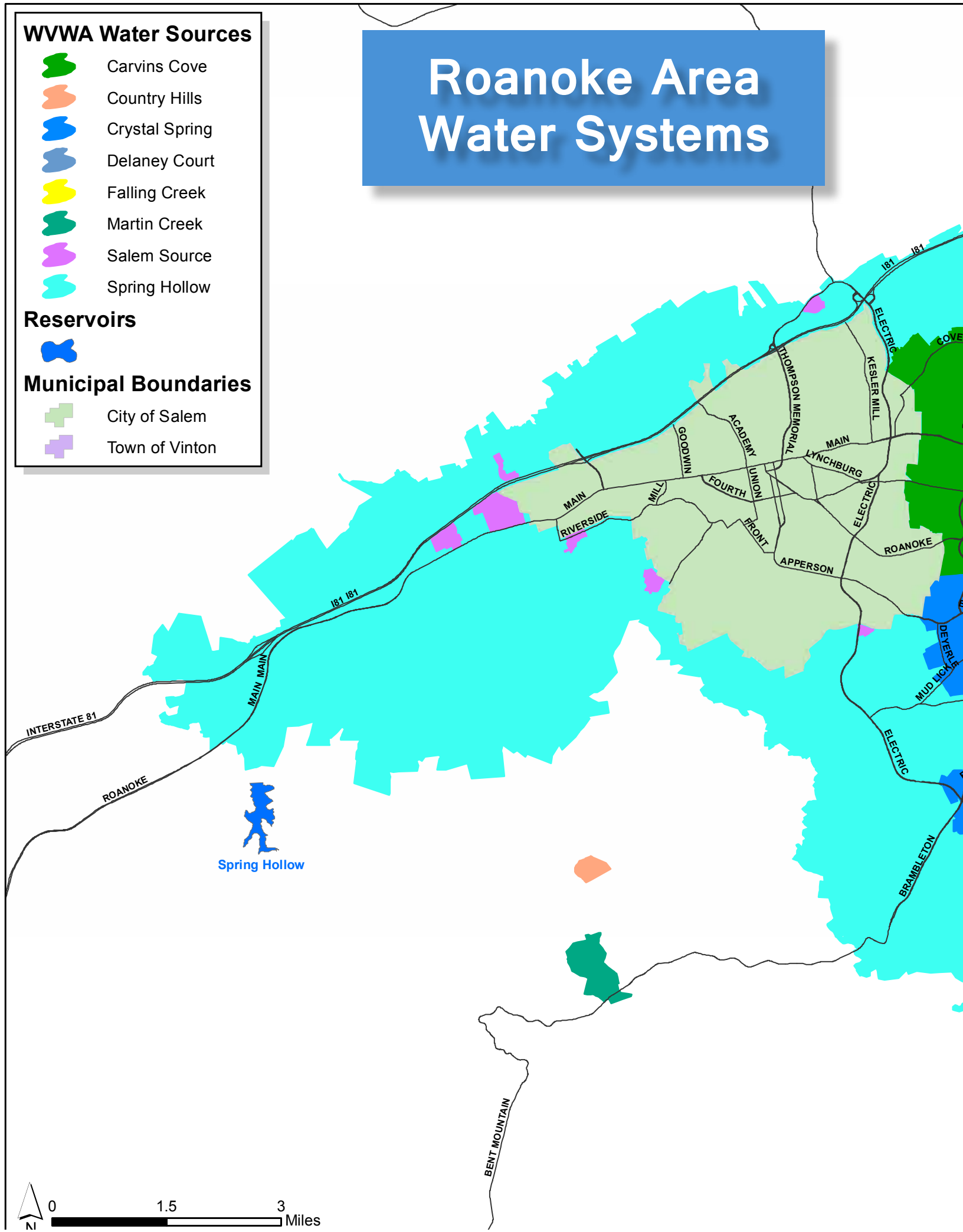
Groundwater obtained from one well is the source for this system. Chlorine is used to disinfect the water prior to distribution. Water is distributed throughout the community by a storage tank and distribution piping consisting of 6-inch, 4-inch and 2-inch pipe. The total source/pump capacity is equal to 43,200 gallons per day. Usage in 2012 was approximately 1,070 gallons per day.

Salem Source

The Water Authority contracts with the City of Salem to purchase water to supply Robin Hood Park and along West Main Street in Roanoke County.

U.S. Route 220 - Franklin County

Customers who live along the U.S. Route 220 corridor in Franklin County receive water from the Spring Hollow Water Treatment Facility. In 2010, the 65,000 foot U.S. Route 220 water line was put into service, offering customers quality water service and fire protection.


WVWA Water Sources
Carvins Cove
Country Hills
Crystal Spring
Delaney Court
Falling Creek
Martin Creek
Salem Source
Spring Hollow
Reservoirs
Municipal Boundaries
City of Salem
Town of Vinton
Roanoke Area Water Systems
I81
ELECTRIC
COVE
THOMPSON MEMORIAL
KESLER MILL
GOODWIN
ACADEMY
MAIN
LYNCHBURG
FOURTH
UNION
MILL
MAIN
RIVERSIDE
FRONT
ELECTRIC
ROANOKE
APPERSON
I81 I81
MAIN MAIN
INTERSTATE 81
ROANOKE
DEYERLE
MUD LICK
ELECTRIC
BRAMBLETON
Spring Hollow
BENT MOUNTAIN
N
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1.5
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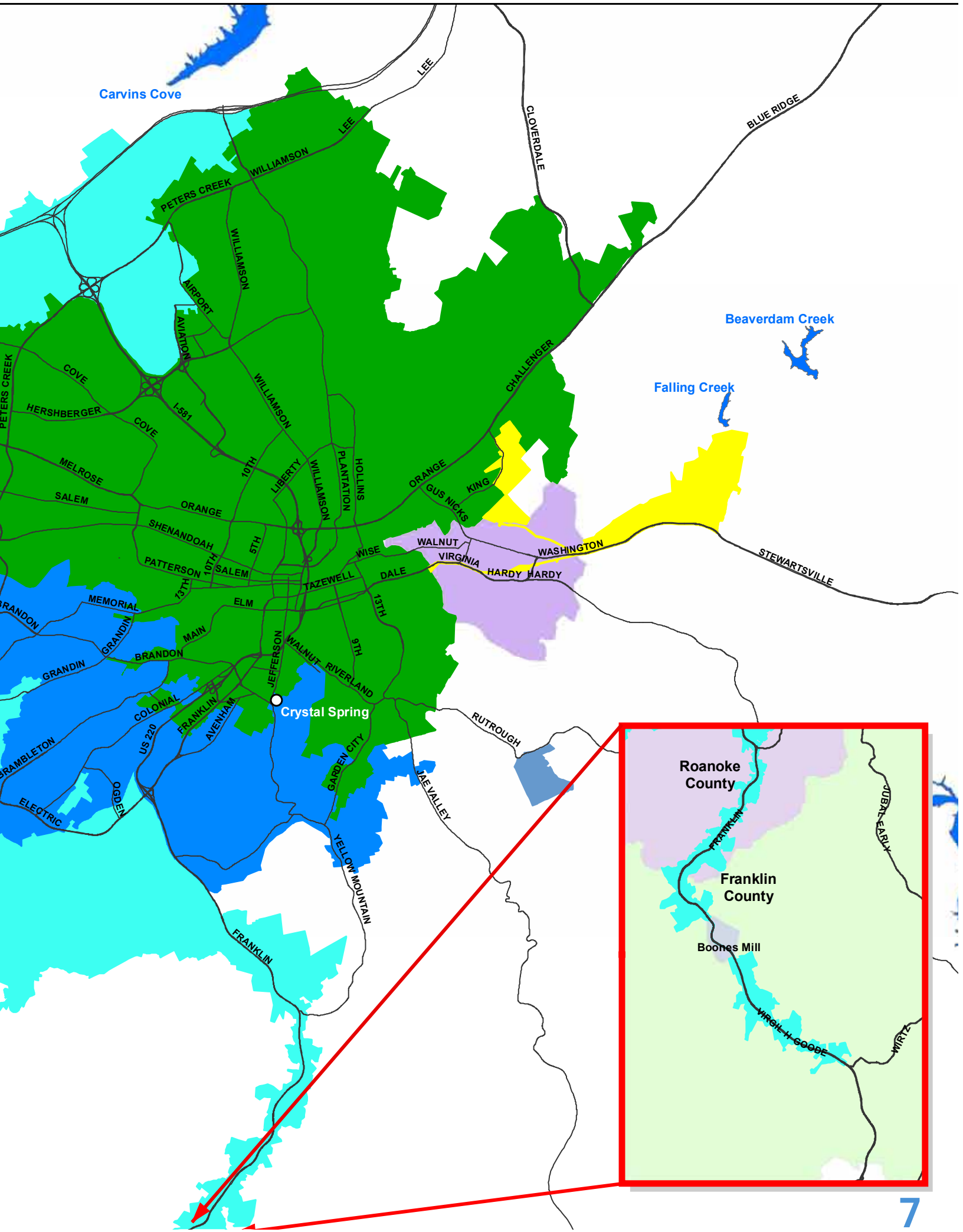
Carvins Cove
LEE
CLOVERDALE
BLUE RIDGE
WILLIAMSON
PETERS CREEK
AIRPORT
AVIATION
COVE
HERSHBERGER
I-581
MELROSE
SALEM
ORANGE
SHENANDOAH
PATTERSON
10TH
5TH
13TH
LIBERTY
PLANTATION
HOLLINS
CHALLENGER
Beaverdam Creek
Falling Creek
GUS NICKS
KING
WALNUT
VIRGINIA
WASHINGTON
HARDY
WISE
DALE
TAZEWELL
STEWARTSVILLE
MEMORIAL
ELM
MAIN
GRANDIN
BRANDON
JEFFERSON
9TH
RIVERLAND
Crystal Spring
COLONIAL
FRANKLIN
AVENHAM
US 220
OGDEN
ELECTRIC
GARDEN CITY
RUTROUGH
JAE VALLEY
YELLOW MOUNTAIN
Roanoke County
Franklin County
Boones Mill
JUBAL EARLY
VIRGIL H. GOODE
WIRTZ

Roanoke Area Water Systems

Substance	Units	Ideal Goals (EPA's MCLG)	Highest Level Allowed (EPA's MCL)	Violation	Most Recent Data Presented as (Range) Average Carvins Cove	Falling Creek	Crystal Spring	Spring Hollow	City of Salem	Country Hills (most recent data)
Chlorate	ppm		0.8	no	(0 - 71) 35	N/A	N/A	(0 - 96) 13		N/A
Chlorine	ppm		4-MDRL	no	(1.1 - 1.3) 1.23	(1.1 - 1.3) 1.25	(1 - 1.1) 1.03	(1.2 - 1.3) 1.30	(0.94 -1.56)	(0.09 - 1.0) 0.55
Chlorite	ppm		0.8	no	(0 - 0.14) 0.05	N/A	N/A	(0 - 0.45) 0.7		N/A
Fluoride	ppm	4	4	no	(0.62 - 0.80) 0.69	(0.66 - 0.77) 0.71	(0.60 - 0.70) 0.66	(0.65 - 0.73) 0.70	(0.66 - 0.94)	0.42
Total Organic Carbon	ppm	TT	N/A	no	(1.63 - 1.98) 1.77	(1.25 - 1.82) 1.43	N/A	(0.97 - 1.26) 1.20	(0.54 - 1.28)	N/A
Total Nitrate & Nitrite (as N)	ppm	10	10	no	0.023	0.023	0.64	0.29	0.31	0 - 74
Barium	ppm	2	2	no	0.05	0.02	0.03	0.3	0.04	0.002
TTHM'S	ppb	0	80	no	(1 - 106) 31				(8 - 41)	
HAA5's	ppb	0	60	no	(0 - 91) 29				(21 -69)	
pH	pH units		6.5 - 8.5	no	(7.3 - 8.0) 7.8	(7.2 - 8.8) 7.5	(7.6 - 8.0) 7.8	(7.4 - 7.7) 7.6	(7.23 - 8.10)	7.11
Turbidity	NTU	TT	0.3	no	(0.09 - 0.2) 0.12	(0.1 - 0.35) 0.19	(0.04 - 0.08) 0.05	(0.06 - 0.12) 0.09	(0.018 - 0.178)	0.04
Total Coliforms	MPN/ 100 mL or P/A	0	Presence of coliform bacteria in >5% of monthly samples	no	4 - no samples exceeded MCL	0	1 - no samples exceeded MCL	1 - no samples exceeded MCL	3	1 - no samples exceeded MCL
Fecal Coliforms	MPN/ 100 mL or P/A	0	A routine and a repeat sample are total coliform positive, and one is also fecal coliform or E. coli positive.	no	0	0	0	0	0	0
Most Recent Monitoring Period										
Gross Alpha	pCi/L	0	15	no	-0.78	< 0.5	ND	< 0.9	1.1	0.3
Gross Beta	pCi/L	0	50	no	1.5	1.8	1.3	2.4	2.0	2.1
Radium 226/228	pCi/L	0	5	no	0.03/0.79	< 0.6	ND	< 0.6	0.8	0.8
Lead	ppb	0 ppb	AL = 15	no	0 samples exceeded AL/ 90th percentile 4.3 ppb				0 samples exceeded AL	
Copper	ppm	1.3 ppm	AL = 1.3	no	0 samples exceeded AL / 90th percentile 0.608 ppm				0 samples exceeded AL	
Other Parameters (Not Regulated)										
Iron	ppm	unregulated	0.3	n/a	(0.01 - 0.019) 0.015	(ND - 0.055) 0.015	ND	ND	< 0.05	ND
Manganese	ppm	unregulated	0.05	n/a	(0.0004 - 0.012) 0.01	(0.010-0.015) 0.011	ND	0.0002	0.0457	ND
Zinc	ppm	unregulated	5	n/a	ND	0.132	0.003	0.002	< 0.005	0.023
Alkalinity	ppm	unregulated		n/a	(36 - 53) 46	(15 - 24) 17	122	(124 - 129) 126	(112 - 195)	74
Hardness	ppm	unregulated		n/a	(50 - 58) 54	(13 - 19) 15	(137 - 154) 139	(156 - 162) 157	(141 - 244)	114
Orthophosphate as P	ppm	unregulated		n/a	(0.30 - 0.34) 0.32	(0.18 - 0.27) 0.25	ND	ND	< 0.05	ND
Conductivity	µmhos/cm	unregulated		n/a	106	90	227	257		243
Sodium	ppm	unregulated		n/a	6.78	17	3.36	5.33	5.50	7.22
Corrosivity		unregulated	< -2.0 highly aggressive > 0.0 non aggressive	n/a	-0.91	-0.49	-0.11	-0.21		-0.82

The Water Authority has tested for volatile organics (VOC's), pesticides and synthetic organic compounds (SOCs), all of which met with current state and federal standards for drinking water. Total Xylene has a primary maximum contaminate level (PMCL) of 10,000 ppb. Total Xylene was detected in Country Hills with a level of 0.48 ppb and at Delany Court with a level of 0.24 ppb. Ethylbenzene has a PCML level of 700 ppb. Ethylbenzene was detected in Country HIlls with a level of 1.29 ppb and at Delany Court with a level of 0.63 ppb. All regulated substances must be tested annually, except for lead and copper and SOCs, which must be tested every three years, and radiologicals, which must be tested every six to nine years. The THMs/HAA5s were derived from running annual averages. Many other primary contaminants have been analyzed but were not present or were below the maximum contaminant level. If you have a question about one of our tests that is not reported in this chart, please contact us at 853.5700.

Wells in service 2012 - Garden City, LaBellevue No. 7, Longridge No. 2, North Lakes, Muse Spring, Starkey 1A, Arlington Hills, Cresthill, Farmingdale, Wyndale and Hampden Hills.

This table summarizes water-testing results from 2012 for both regulated and nonregulated substances. The Western Virginia Water Authority constantly monitors its water supplies for various contaminants to meet all regulatory requirements.

Delaney Court (most recent data)	Martin Creek (most recent data)	Wells (most recent data)	Source of Substance
N/A	N/A		By-product of drinking water chlorine dioxide
(0.30 - 0.98) 0.73	(0.33 - 1.71) 0.84		Required Disinfectant added during treatment process to eliminate bacteria
N/A	N/A		By-product of drinking water chlorine dioxide
0.59	(0.21 - 2.92) 0.8	(0.08 - 0.87) 0.44	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from aluminum and fertilizer factories
N/A	N/A		
1.59	(0 - 0.96) 0.32	(0 - 1.06) 0.42	Run-off from fertilizer use; leaching from septic tanks, sewage; Erosion of natural deposits
0.001	0.01	0.08	discharge form drilling wastes; discharge from metal refineries; Erosion of natural deposits
3.3	6.8		By-product of drinking water chlorination
ND	1.3		By-product of drinking water chlorination
7.13	(6.86 - 7.74) 7.3	(6.8 - 8.0) 7.6	Acidity or basicity of water
0.072	(0.04 - 2.06) 0.62	(0.06 - 5.13) 1.5	Soil run-off
0	0		Naturally present in the environment
0	0		Human and animal waste
0.2	(0.30 - 3.3) 1.74	(0 - 7.4) 2.03	Erosion of natural deposits
2	(0.90 - 3.3) 2.48	(0.9 -6.3) 3.16	Decay of natural and man-made deposits
0.9	0.6/0.84	(0.24 - 1.4) 0.68/0.89	Erosion of natural deposits
0 samples exceeded AL 90th percentile = 5ppb	0 samples exceeded AL 90th percentile = 6.2 ppb		Natural\industrial deposits, plumbing solder, brass alloy in faucets
0 samples exceeded AL 90th percentile = 0.414ppm	0 samples exceeded AL 90th percentile = 0.141 ppm		Natural\industrial deposits, plumbing, wood preservatives
0.0134	(0.081 - 0.12) 0.10	(0.001 - 0.96) 0.20	Naturally occurring in the environment
0.0008	(0.001 - 0.096) 0.02	(0.004 - 0.046) 0.014	Naturally occurring in the environment
0.0078	(0.029 - 1.06) 0.26	(0.004 - 0.405) 0.11	Naturally occurring in the environment
102	(0.058 - 206) 143	(70 - 206) 132	Measurement of naturally occurring carbonates
96	(128 - 325) 214	(80 - 258) 165	Measurement of naturally occurring hardness metals
ND	(0.05 - 0.05) 0.05	ND	Corrosion inhibitor added during treatment process
230	(284 - 769) 513	(182 - 1000) 399	Physical property of water
8.23	(12 - 38) 18.85	(2.3 - 12.6) 5.89	Naturally occurring in the environment
-0.77	(-2.78 - 0.4) -0.606	(-0.78 - 0.99) 0.22	Physical property of water that occurs when water reacts with metal

Water Hardness

As water naturally flows over rocks and through the soil, it picks up minerals. The more calcium and magnesium present, the harder your water. While water hardness is not a safety issue, you may notice increased mineral build-up or soap residue with harder water.

Hardness can be expressed as PPM - parts per million or GPG - grains per gallon.

PPM	GPG	Rating
0 -75	0 - 4.3	Soft
76 - 150	4.4 - 8.7	Moderately Hard
151 - 300	8.8 - 17.5	Hard
over 300	17.6 +	Very Hard

Definitions

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

HAA5s: Haloacetic acids.

Maximum Contaminant Level (MCL):
The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG 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 Disinfection Level (MRDL):
The highest level of a disinfection allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

mg/L: Milligrams per liter (for example, one minute in two years).

MPN: Most probable number.

ND: Analyte was not detected or was below the method detection limit of the laboratory's instrumentation.

NTUs: Nephelometric Turbidity Units; a measure of turbidity.

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

ppm: One part per million (for example, one minute in two years).

ppb: One part per billion (for example, one minute in 2,000 years).

TTHMs: Total Trihalomethanes

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

µg/L: Micrograms per liter (for example, one minute in 2,000 years).

µmhos/cm: Micromhos per centimeter; a measure of conductivity.

Source Water Assessment

for the Roanoke area water systems

The Western Virginia Water Authority has completed a source water assessment of Crystal Spring, Falling Creek and Carvins Cove water supplies. The assessment is a requirement of the Virginia Department of Health's (VDH) Source Water Assessment Program (SWAP) in accordance with the 1996 Amendments of the Safe Drinking Water Act. Based on the land use activities and potential sources of contamination in the assessment areas, the source water assessments determined that the Authority's water sources are susceptible to contamination. This designation does not mean that the source water has been impacted or that it will be impacted. It does mean that if there is a release of pollutants in the assessment area, the source water could be impacted.

The VDH completed a source water assessment of Spring Hollow Reservoir's water source, the Roanoke River. This source water assessment determined that the Roanoke River may be susceptible to contamination because it is surface water exposed to a wide array of contaminants at varying concentrations. Also, changing hydrologic, hydraulic and atmospheric conditions promote migration of contaminants from land use activities of concern into the Roanoke River. The assessment also determined that the Water Authority's wells might be susceptible to contamination because they are located in areas that promote migration of contaminants from land use activities of concern. More specific information may be obtained by contacting the Western Virginia Water Authority's Water Division at 540.853.5700.

Using Water Wisely

Check for toilet leaks: Leaky toilets, pipes, hoses and faucets can account for almost 14% of home water use, and this water is not even used! Fix leaks immediately; to check for silent toilet tank leaks, place a few drops of food coloring, Kool-Aid or soda in the tank of the toilet, and do not flush the toilet. Wait at least 15-30 minutes (waiting overnight is even better). If the color you put in the tank appears in the bowl, the toilet is leaking.

Fix leaky faucets: A small leak can add up to gallons of wasted water. Use the drip calculator on the Conserve/Educate page at wwww.westernvawater.org to calculate how much water your drip is actually using. Repair leaks as soon as possible to reduce water loss.

Shorten your showers: Shortening your shower from 15 minutes to five minutes can save up to 50-gallons of water. If you take a tub bath, only fill the tub one-third full to conserve water.

Don't water in the heat of the day: Water your garden or lawn before 10 am or after 7 pm when temperatures are cooler to minimize evaporation. This will also allow the water to seep down to the plant's roots, creating more drought resistant plants.

Keep a pitcher of cold water in your fridge: Instead of running the faucet until the water gets cold, keep a pitcher of water in your fridge for a refreshing drink on a hot day.

Turn off the water when you brush your teeth: This simple change in habit can save you up to 2-gallons a day in wasted water.

Important information on backflow prevention and identifying cross-connections.

Protect Your Drinking Water

A plumbing cross-connection is an actual or potential connection between the public water supply and any source of contamination or pollutant. Through this connection, contaminated substances could **backflow** into the public system and your drinking water supply without proper plumbing precautions.

Water travelling through the Authority's distribution system is pressurized. If the water system loses pressure, such as during a water main break, maintenance of the system or flowing of a fire hydrant, the flow of the water may be reversed. If a customer has made a cross-connection with hazardous substances or even non potable water, these substances can backflow into the public water system and create a risk to public health.

Working together to protect your drinking water supply. The Western Virginia Water Authority *and* all our customers share the responsibility to help safeguard the public water supply. We are working closely with the Virginia Department of Health and our customers to identify potential backflow issues so your drinking water maintains the highest possible quality.

Help us by Taking this Simple Survey On-Line

We're asking all our customers to help us identify potential locations where a backflow can occur on their property by completing a simple survey on-line

www.westernvawater.org
(see Backflow Prevention Survey in the bottom right corner)

Potential Cross-Connection Sources Where Backflow Can Occur Please check all that apply	Do you have this on your property?		
	Yes	No	Maybe
Outside Spigots			
outside spigots without a vacuum breaker			
Wells & Irrigation Systems not Protected by a Backflow Device (Connected to Public Water)			
private well, spring or cistern			
lawn irrigation/sprinkler system - supplied by a pond/lake			
lawn irrigation/sprinkler system - supplied by public water			
water storage tank			
Pools, Ponds & Hot Tubs not Protected by a Backflow Device (Connected to Public Water)			
hot tub			
swimming pool			
fish pond			
Internal Plumbing Not Protected by a Backflow Device (Connected to Public Water)			
fire protection sprinkler system			
solar heating system			
water softener			
water filtration system			
darkroom/photo development			
Anything Else? Are there any other items or treatment units connected to the water system on your property?			

Steps to Protect Your Drinking Water

Help us **identify potential locations** in our service area where backflow can occur. Mail the attached short survey or complete it online.

If necessary, contact the Water Authority to **schedule a free assessment** with our staff to assist you in finding and removing any potential cross-connection sources.

Remove any cross-connections you find or install backflow prevention devices (available at hardware stores) where needed. A Water Authority representative is available to assist you with this process if needed.

If you have a backflow prevention device installed by a certified plumber, have it tested annually or after any repairs.

Questions about backflow prevention?
email us at backflow@westernvawater.org
call us at 853.5700

Franklin County Water Systems

Westlake Area Public Water System

Customers who live in the Westlake Commercial District, the Chestnut Creek, Waterfront, Boardwalk and Windmere Point communities and along Scruggs Road are served by the Westlake Area Public Water System. The Authority has a successful working relationship with the Bedford County Public Service Authority (BCPSA) to provide treated drinking water from the Highpoint Water Treatment Plant (pictured below) to the Westlake area. The Authority is working with the BCPSA to expand the treatment plant to provide for future growth in the service area.

This membrane filtration facility treats water from Smith Mountain Lake. The Authority's share of the plant's capacity is 400,000 gallons per day (GPD). The finished water in the distribution system is re-chlorinated at The Boardwalk and at the Waterfront Section 2-9 subdivisions for continuous chlorination.

U.S. Route 220 Corridor

Public water along the U.S. 220 corridor in Franklin County is treated at the Spring Hollow Water Treatment Facility. See the Roanoke Area Water System section of this book, page 5, for more information.

Boxwood Green Water System

Customers who live in the Boxwood Green community get their drinking water from groundwater wells (Wells No. 3, 4 and 5). Greensand filters are used to remove iron, manganese and radium from the drinking water. According to results of the chemical analyses for Metals based on a sample collected on August 15, 2012, the sodium in the treated water is 20.4 mg/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.

A source water assessment of the Boxwood Green Water System was conducted in 2003 by the Virginia Department of Health. Wells No. 3, No. 4 and No. 5 were determined to be of high susceptibility to contamination using the criteria developed by the state in its approved Source Water Assessment Program. The 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 five years. The report is available by contacting the Authority at the phone number or address provided in the drinking water quality report.

Contentment Island Water System

Customers who live in the Contentment Island community get their drinking water from groundwater wells (Wells 1, 2 and 3). Treatment of the water is provided by feeding chlorine for continuous disinfection of the water and soda ash for pH adjustment of the water.

According to results of the chemical analyses for Metals based on a sample collected on May 4, 2011 the sodium in the treated water is 21.8 mg/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. This elevated level of sodium could be caused by the soda ash being added to the water for pH adjustment.

A source water assessment for Contentment Island is planned. After the assessment is conducted, we will provide you with information about potential sources of contamination and ways to reduce or eliminate them.

Water's Edge Water System

Customers who live in the Water's Edge community get their drinking water from four groundwater wells (Well No. 3, 4, 11 and 12) that are located throughout the Water's Edge subdivision. Wells 4 and 11 go to the treatment plant where three greensand filters are used to remove iron, manganese and radium from the drinking water. In 2012, the Authority added an orthophosphate feed system for corrosion control and a sodium hydroxide feed system for pH adjustment both at the treatment plant and Well 12. Well 12 is also disinfected with chlorine. No treatment is added to Well No. 3.

A source water assessment of the Water's Edge Water System was conducted in 2002 by the Virginia Department of Health. Wells No. 3, No. 4 were determined to be of high susceptibility to contamination using the criteria developed by the state in its approved Source Water Assessment Program. The 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 five years. The report is available by contacting the Authority at the phone number or address provided in the drinking water quality report.

According to results of the chemical analyses for Metals based on a sample collected on July 23, 2009 for entry point EP001 (Wells No. 4 and 11), the sodium in the treated water is 26.4 mg/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. This elevated level of sodium could be caused by the soda ash being added to the water for pH adjustment.

Smith Mountain Lake Area Water Systems

Water Main

WVWA Water Sources
- Boxwood Green
- Contentment Island
- Waters Edge
- Westlake

Smith Mountain Lake

Westlake Water System

WTP High Point Waterworks Facility

Bedford County

Franklin County

Boxwood Green

Contentment Island

Water's Edge

Pittsylvania County

MONETA

BOOKER T WASHINGTON

LAKEWOOD FOREST

BROOKS MILL

SCRUGGS

WINDLASS

BURNT CHIMNEY

SCRUGGS

DUDLEY AMOS

BOARDWALK

WINDMERE

0 0.5 1 Miles

N

Franklin County Water Systems

					Most Recent Data Presented as (Range) Average		
Substance	**Units**	**Ideal Goals (EPA's MCLG)**	**Highest Level Allowed (EPA's MCL)**	**Violation**	**Boxwood Green**	**Water's Edge**	**Contentment Island**
Chlorine	ppm		4-MDRL	no	(0.25 - 1.48) 1.01	(0.21 - 1.06) 0.57	(0.27 - 0.72) 0.54
Fluoride	ppm	4	4	no	0.14	(ND - 0.13) 0.06	0.22
Total Nitrate & Nitrite (as N)	ppm	10	10	no	ND	(0 - 0.51)	0.19
Barium	ppm	2	2	no	0.02	(0.03 - 0.06) 0.06	0.03
Chromium	ppb	100	100	no	ND	(ND - 2.7) 2.7	ND
TTHMs	ppb	0	80	no	0	ND	2
HAA5s	ppb	0	60	no	0	4.1	ND
pH	pH units		6.5 - 8.5	no	7.5	7.5	6.8
Turbidity	NTU	TT	0.3	no	0.32	0.04	1.76
Total Coliforms	MPN/ 100 mL or P/A	0	Presence of coliform bacteria in >5% of monthly samples	no	0	0	2
Fecal Coliforms	MPN/ 100 mL or P/A	0	A routine and a repeat sample are total coliform positive, and one is also fecal coliform or E. coli positive.	no	0	0	0
Most Recent Monitoring Period							
Gross Alpha	pCi/L	0	15	no		(ND - 10.8) 1.5	0.9
Gross Beta	pCi/L	0	50	no		6.9	4.7
Radium 226/228	pCi/L	0	5	no	1.1	(ND - 1.7) 1.7	1.0
Lead	ppb	0 ppb	AL = 15	no	0 exceeded the AL 90th percentile 12 ppb	0 exceeded the AL 90th percentile 6.05 ppb	0 exceeded the AL 90th percentile 3 ppb
Copper	ppm	1.3 ppm	AL = 1.3	no	0 exceeded the AL 90th percentile 0.42 ppm	0 exceeded the AL 90th percentile 0.56 ppm	0 exceeded the AL 90th percentile 0.3 ppm
Other Parameters (Not Regulated)							
Iron	ppm	unregulated	0.3	n/a	0.099	(0 - 0.021)	0.032
Manganese	ppm	unregulated	0.05	n/a	0.004	(0 - 0.005)	0.041
Zinc	ppm	unregulated	5	n/a	0.042	(0.004 - 0.225)	0.37
Alkalinity	ppm	unregulated		n/a	76	(37 - 138)	85
Hardness	ppm	unregulated		n/a	44	(48 - 189)	46
Conductivity	µmhos/cm	unregulated		n/a	185	(85 - 322)	162
Sodium	ppm	unregulated		n/a	20.4	(5.76 - 36.5)	21.8
Corrosivity		unregulated	Based on the Langelier index, 0 is neutral <-2.0 highly aggressive >0.0 non aggressive	n/a	-0.91	(-2.97 - 0.29)	-0.85

Most of the results in the table are from testing done in 2012. However, the state allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our results, though representative, are more than one year old.

The U.S. Environmental Protection Agency sets MCLs at very stringent levels. In developing the standards EPA assumes that the average adult drinks 2 liters of water each day throughout a 70-year life span. EPA generally sets MCLs at levels that will result in no adverse health effects for some contaminants or a one-in-ten-thousand to one-in-one-million chance of having the described health effect for other contaminants.

Contaminants in your drinking water are routinely monitored according to federal and state regulations. This table shows the results of this monitoring for the period of January 1st through December 31st, 2012. The table lists only those contaminants that had some level of detection. Many other contaminants have been analyzed but were not present or were below the detection limits of the lab equipment. Please call us if you have additional questions 853.5700.

Westlake Area Public Water	Bedford County PSA Source for Westlake Area Public Water	Source of Substance
(0.06 - 1.22) 0.44	0.75	Required disinfectant added during treatment process to eliminate bacteria
	0.08	Erosion of natural deposits; water additive which promotes strong teeth; discharge from aluminum and fertilizer factories
	0.14	Run-off from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
	0.03	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
		Discharge from steel and pulp mills; erosion of natural deposits
(54 - 105) 78	58	By-product of drinking water chlorination
(21 - 39) 29	46	By-product of drinking water chlorination
	(7.1 - 8.3) 7.5	Acidity or basicity of water
	0.021	Soil run-off
		Naturally present in the environment
		Human and animal waste
	0.1	Erosion of natural deposits
		Decay of natural and man-made deposits
	0.8	Erosion of natural deposits
0 exceeded the AL 90th percentile 1.5 ppb	5 (90th percentile) Of 12 samples, none were above the AL (2.2 - 5.1)	Natural\industrial deposits, plumbing solder, brass alloy in faucets
0 exceeded the AL 90th percentile 0.38 ppm	1.1 (90th percentile) Of 12 samples, one was above the AL (0.05 - 1.4)	Natural\industrial deposits, plumbing, wood preservatives
		Naturally occurring in the environment
		Naturally occurring in the environment
		Naturally occurring in the environment
		Measurement of naturally occurring carbonates
	(46 - 162) 84	Measurement of naturally occurring hardness metals
		Physical property of water
		Naturally occurring in the environment
		Physical property of water that occurs when water reacts with metal

Water Hardness

As water naturally flows over rocks and through the soil, it picks up minerals. The more calcium and magnesium present, the harder your water. While water hardness is not a safety issue, you may notice increased mineral build-up or soap residue with harder water. Hardness can be expressed as PPM - parts per million or GPG - grains per gallon.

PPM	GPG	Rating
0 -75	0 - 4.3	Soft
76 - 150	4.4 - 8.7	Moderately Hard
151 - 300	8.8 - 17.5	Hard
over 300	17.6 +	Very Hard

Definitions

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

HAA5s: Haloacetic acids.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG 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 Disinfection Level (MRDL): The highest level of a disinfection allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfection Level Goal (MRDLG): The level of 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.

mg/L: Milligrams per liter (for example, one minute in two years).

MPN: Most probable number.

ND: lab analysis indicates that the contaminant is not detectable, based on the limits of the analytical equipment used.

NTUs: Nephelometric Turbidity Units; a measure the cloudiness of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

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

Parts per million (ppm): One part per million (for example, one minute in two years or one penny in $10,000).

Parts per billion (ppb): One part per billion (for example, one minute in 2,000 years or one penny in $10,000,000,000).

RAA: Running Annual Average based on four quarters of analysis results.

TTHMs: Total Trihalomethanes

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

µg/L: Micrograms per liter (for example, one minute in 2,000 years).

µmhos/cm: Micromhos per centimeter; a measure of conductivity.

WESTERN VIRGINIA
WATER AUTHORITY

601 S. Jefferson Street, Suite 200
Roanoke, VA 24011

This report on your water quality includes information about the water that the Authority treats for our customers in the City of Roanoke, Roanoke County and Franklin County.

If you are interested in a free presentation for your school or civic group about your water and the treatment of your drinking water, please give us a call at 853.5700. This past year, over 10,000 students participated in Water Authority outreach programs.

Photo: Carvins Cove Natural Reserve and Carvins Cove Reservoir, one of the Authority's drinking water sources.