2017 Water Quality Results

We met or surpassed all water quality requirements.

Our drinking water was tested more than 20,000 times for over 150 substances and parameters.

Water Characteristics

These parameters below affect aesthetics, such as taste, odor, hardness, etc. The EPA has established secondary standards for some of these parameters, which are recommended guidelines.

Parameter	2017 Average	Highest Level Recommended by EPA
Chloride	16 ppm	250 ppm
Color	2 PCU	15 PCU
Iron	<0.10 ppm	0.3 ppm
Manganese	<0.05 ppm	0.05 ppm
Total Dissolved Solids (TDS)	102 ppm	500 ppm
Sodium	11 ppm	No Standard
Alkalinity	29 ppm	
Conductivity	186 umhos/cm	
Hardness	56 ppm (3.27 gpg)	
Ortho-phosphate	1.1 ppm	
Silica	6.0 ppm	
Temperature	69.8˚F (21˚C)	

Abbreviations:
ppm: Parts per million **PCU:** Platinum Cobalt Units **gpg:** Grains per gallon **umhos/cm:** Micromohs/cm

Definitions

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.

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

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

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

Maximum Residual Disinfectant Level Goal (MRDLG)
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 contamination.

Message from the EPA

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as persons with HIV/AIDS or other immune system disorders, persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, some elderly and some infants can be particularly at risk from infections.

These people should seek advice from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

2017 Water Quality Report

We met or surpassed all water quality requirements.

Our water is clean, safe, enjoyable, and affordable.

Our mission is to support public health and protect the environment.

Our vision is to achieve excellence and exceed customer expectations.

	Constituent	Maximum Contaminant Level (MCL) set by EPA	Maximum Contaminant Level Goal (MCLG)	Actual Level in 2017	Possible Sources in Water
Required Reporting					
	Turbidity A measure of the amount of suspended particles in the water (cloudiness); an indicator of overall water quality and filtration effectiveness.	Requires a specific treatment technique; 95% of monthly samples must be less than 0.3 NTU	N/A	0.12 NTU Highest level detected 100% of monthly samples met the limit Range: 0.05 - 0.12	Soil runoff
	Cryptosporidium A parasite spread through human and animal waste that causes gastrointestinal illness.	None	Zero *Cryptosporidium* oocysts per 1 liter of water	Zero *Cryptosporidium* oocysts per 1 liter of water	Human and animal sources
	Giardia A parasite spread through human and animal waste that causes gastrointestinal illness.	None	Zero *Giardia* cysts per 1 liter of water	Zero *Giardia* cysts per 1 liter of water	Human and animal sources
Detected in Our Water		**Only compounds listed in this table were found in our water, and all were detected at levels below the regulatory limit.**			
Inorganic Compounds	Copper A metal widely used in household plumbing that may corrode into water.	90th percentile of all samples collected must be less than the 1.3 ppm action level	1.3 ppm	0.06 ppm* (No samples exceeded the action level) Range: 0 to 0.12 ppm	Corrosion of household plumbing materials
Inorganic Compounds	Lead A metal no longer used in water pipes, but may be present in plumbing fixtures or old pipes; may corrode into water.	90th percentile of all samples collected must be less than the 15 ppb action level	0 ppb	90th percentile = 1.3 ppb* (No samples exceeded the action level) Range: 0 to 3.1 ppb	Corrosion of household plumbing materials
Inorganic Compounds	Nitrate/Nitrite Nitrates and nitrites are nitrogen-oxygen compounds that can become a source of pollution in the form of unwanted nutrients.	10 ppm	10 ppm	0.10 ppm	Runoff from fertilizers
Inorganic Compounds	Fluoride A substance that is naturally occurring in some water sources, particularly groundwater. It is also added to drinking water to help prevent tooth decay.	4 ppm	4 ppm	0.14 ppm in source water 0.61 ppm in finished water Range <0.10 to 0.61 ppm	Naturally occurring in source water and adjusted during treatment to prevent tooth decay.
Disinfectants	Chlorine Dioxide A disinfection agent added in small amounts to protect against microbes.	800 ppb	800 ppb	100 ppb Range: 0 to 100 ppb	Added for disinfection
Disinfectants	Chloramine Residual A compound of chlorine and ammonia added in small amounts to treated water to protect against microbes.	4 ppm MRDL	4 ppm MRDLG	2.63 ppm Running Annual Average Range: 2.2 – 3.0 ppm	Added for disinfection
Disinfection Byproducts	Total Trihalomethanes (Stage 2) Stage 2 of the Disinfectants and Disinfection Byproducts Rule requires the locational running annual average (LRAA) for each sampling location to be below the MCL. CWS has eight sampling locations.	Locational Running Annual Average must be below 80 ppb	N/A	Highest level detected: 22.46 ppb Range: 3.55 – 22.46 ppb	Byproduct of disinfection
Disinfection Byproducts	Total Haloacetic Acids (Stage 2) Stage 2 of the Disinfectants and Disinfection Byproducts Rule requires the locational running annual average (LRAA) for each sampling location to be below the MCL. CWS has eight sampling locations.	Locational Running Annual Average must be below 60 ppb	N/A	Highest level detected: 31.11 ppb Range: 6.37 – 31.11 ppb	Byproduct of disinfection
Disinfection Byproducts	Chlorite A byproduct formed when chlorine dioxide is used to disinfect water.	1 ppm	1.0 ppm	Highest level detected: 1.0 ppm Range: 0.13 – 1.0 ppm	Byproduct of disinfection
Organic Compounds/ Bacteria	Total Organic Carbon (TOC) The measure of organic substances in a body of water, mostly from naturally occurring sources such as plant material. TOC provides a measurement for the potential formation of disinfection byproducts.	No MCL; EPA requires a specific treatment technique.	Required % removal varies from 35% - 55% TOC removal, depending on source water quality	Removal ratio RAA = 1.39 Removal Range: 54% to 63.9% 60.5 % removed	Naturally present in the environment
Organic Compounds/ Bacteria	Total Coliform Bacteria A group of bacteria whose presence in water indicates possible contamination with soil or waste from warm blooded animals.	Presence of coliform bacteria greater than or equal to 5% of monthly samples	0%	1.9% highest % of positive monthly samples Range: 0 – 1.9% All repeat samples were satisfactory	Naturally present in the environment
	*Results are from 2015. EPA requires testing for copper and lead once every three years.		Visit the Water Quality Reports page on our website for complete test results that include the compounds NOT detected in our water.		
	Abbreviations: **ppm:** Parts per million (mg/L) **ppb:** Parts per billion (ug/L) **LRAA:** Locational Running Annual Average **RAA:** Running Annual Average **NTU:** Nephelometric Turbidity Units				

Annual Taste & Smell Changes

Water is safe despite natural, seasonal changes in aesthetics.

Timing:
Spring through early summer.

Root Causes:
Cold temperatures that last (Ex. Jan. 2018 storm/freeze).
Certain harmless algae flourish, then smell/taste occurs when they decompose.

Rapid rise in temperature:
Reservoir "flips" (cold water sinks, warm rises) and stirs up natural deposits.

Culprits:
Harmless blue-green algae in Bushy Park Reservoir produce compounds that create earthy-musty taste and smell.

Geosmin
Found in beets, providing their earthy flavor.
Relatively easy to neutralize or remove from drinking water.

MIB (2-Methylisoborneol)
Difficult to neutralize or remove.

Detection:

Our lab
Gas chromatograph/mass spectrometer (GC/MS).

Taste/sniff panel: Our noses are very well trained, often comparable to GC/MS results.

Customers
Some people can detect beginning at 5 parts per trillion (ppt).
Many people can detect at 15 ppt or above.

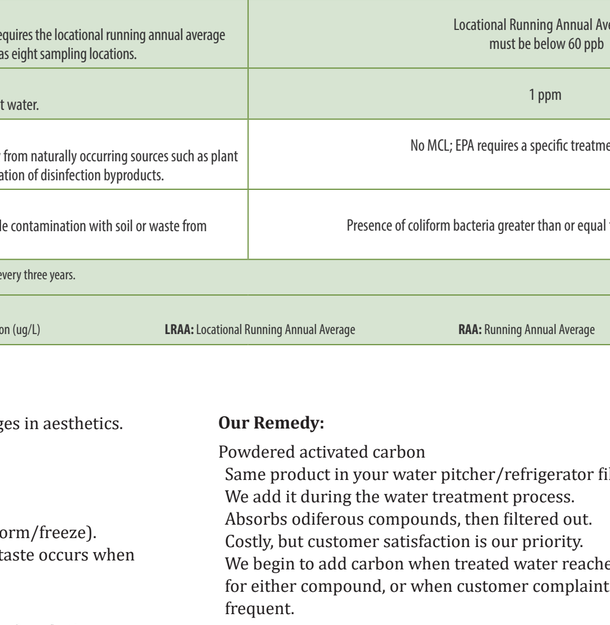
Our Remedy:

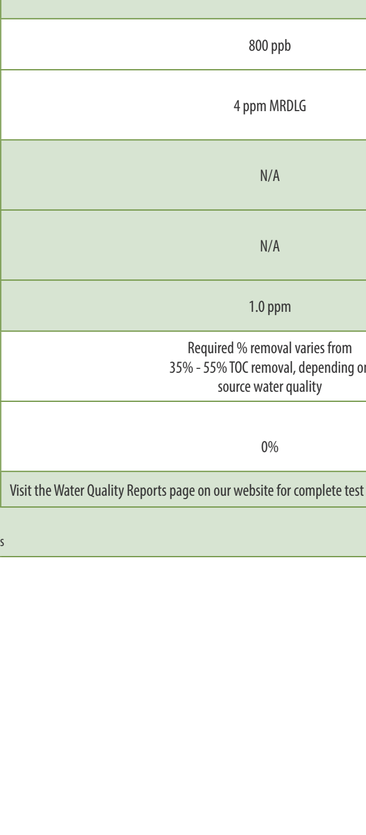
Powdered activated carbon
Same product in your water pitcher/refrigerator filter.
We add it during the water treatment process.
Absorbs odiferous compounds, then filtered out.
Costly, but customer satisfaction is our priority.
We begin to add carbon when treated water reaches 15 ppt for either compound, or when customer complaints become frequent.

Home Remedies:

Refrigerate before consuming, or add ice.
Use water pitchers or refrigerator filters with carbon filters.

Concerns:
Customer Service: (843) 727-6800 I info@charlestoncpw.com





Possible Contaminants in Source Water

The sources of drinking water, both tap water and bottled water, include rivers, lakes, streams, ponds, reservoirs, springs, and wells.

As water travels over land and into waterways, it dissolves natural minerals and picks up substances from animals or human activity.

To protect public health, water treatment plants reduce contaminants to safe levels established by regulations.

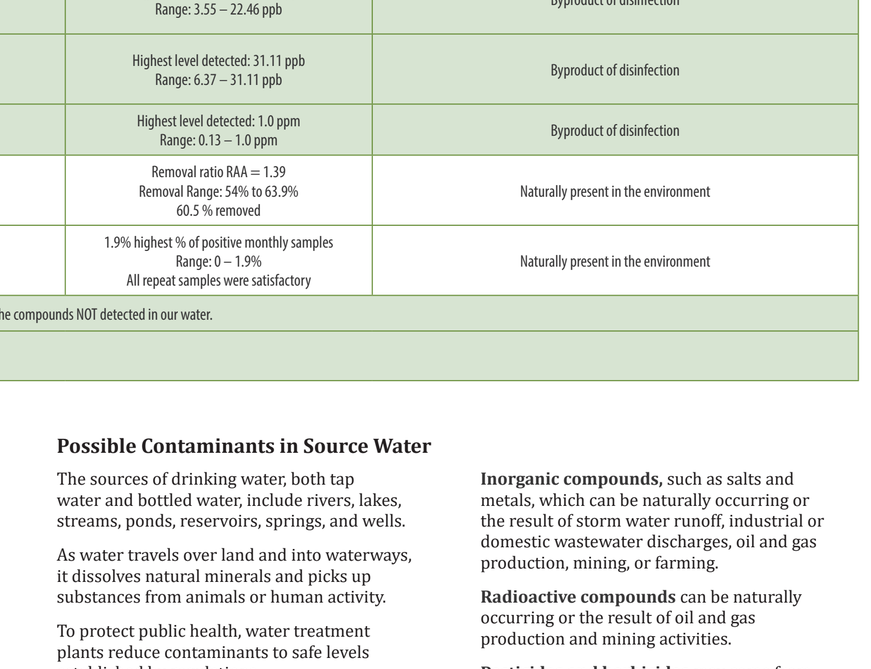
Microbes, such as viruses and bacteria, may come from septic systems, livestock, pets and wildlife.

Organic compounds, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, can also come from gas stations, runoff, and septic systems.

Inorganic compounds, such as salts and metals, which can be naturally occurring or the result of storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

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

Pesticides and herbicides may come from agriculture, runoff, and residential uses.
NOTE: None were found in our source water or treated water when we tested for more than 250 of them in 2017. See website for complete list at www.charlestonwater.com



Published June, 2018
Designed by Julie Larson

Key Staff

Jane Byrne, PhD
Director, Water Treatment
Hanahan Water Treatment Plant
BS, Biochemistry and Chemistry, Aston University
PhD Physical Chemistry, Newcastle University
"A" operator license: Water Treatment, Waste Water Treatment

"Our team is dedicated to producing the highest quality drinking water for our customers and excellent fire protection for our community."

Becky Thames
Lab Director
Hanahan Water Treatment Plant
BS, Biology, Francis Marion University
Masters of Earth and Environmental Resource Management, University of South Carolina
Masters Of Business Administration, The Citadel
"A" operator license: Water Treatment

"I work with a great team of water professionals, and we're all proud of what we do to protect the health of our community."

Jason Thompson
Source Water Manager
Hanahan Water Treatment Plant
BS, Chemistry, University of Tennessee at Chattanooga
Licensed water treatment professional
Responsible for the development and oversight of the source water management plans for both water sources; Bushy Park Reservoir and the Edisto River.

"Water quality begins at the source."

Fluoride Position Statement

Adopted by the Board of Commissioners October 24, 2017

The Charleston Water System (CWS) supports the recommendations of the World Health Organization, American Medical Association, Canadian Medical Association, Centers for Disease Control and Prevention (CDC), American Dental Association, Canadian Dental Association, South Carolina Dental Association and other professional organizations in the medical community, for the proper fluoridation of public water supplies as a public health benefit. We also support regular scrutiny of the most current peer reviewed research on fluoride and the positions of the medical and dental community.

We adjust the naturally occurring level of fluoride in our drinking water in a responsible, effective, and reliable manner that includes monitoring and controlling fluoride levels as mandated by state and/or federal laws, regulations and recommendations. We carefully monitor and adjust potable water to achieve the scientifically recommended concentration of fluoride for protection against dental caries, which is 0.7 parts per million. Our annual cost for this program is about $110,000, which equates to $0.25 per person across the approximately 450,000 people in our water service area.

The CWS participates in the fluoridation of water under the guidance of the South Carolina Department of Health and Environmental Control (SCDHEC), Oral Health Division. SCDHEC coordinates their program in conjunction with the CDC and the U.S. Department of Health and Human Services.

If there are questions regarding these programs, please contact:

SCDHEC
Division of Oral Health
2100 Bull Street, Columbia, S.C. 29201
P: (803) 898-9577
F: (803) 898-2065

Charleston Water System

*Position statement for unregulated contaminants coming soon.

Service Interruptions

Water Outage Notification

We always notify impacted customers before we work on water mains. We knock on doors, use door hangers, post signs in neighborhoods, or use out-call technology. Major outages are posted on our homepage, social media channels our automated phone system at (843) 727-6800, and shared with media when appropriate.

Water Main Repairs

- Most take a few hours.
- Planned repairs and maintenance are scheduled during off-peak water demand.

Discolored Water

It's not harmful, just let your cold water faucet run until clear.

You may have it when we work on a water main in your area. Mineral deposits build up on pipe walls can dislodge and dissolve when pressure changes. We do our very best to prevent it by flushing the system via nearby fire hydrants, which also scours away mineral deposits.

Boil Water Advisories

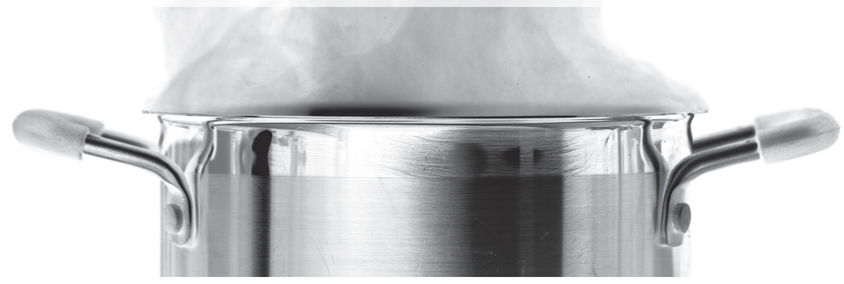
A precautionary measure advising people to boil tap water before use.

They're issued after an event that could allow bacteria to enter the water distribution system, such as a large water main break, a widespread loss of system pressure, or a natural disaster.

It takes at least 16 hours to get bacteria test results back, so a boil water advisory is issued until test results say the water is safe. Boiling water for at least one minute kills any bacteria present.

We post info on our website, Twitter, Facebook, phone system, we make out-dial phone calls and use electronic sign boards - all in addition to notifying news media.

We rarely issue boil water advisories because our crews quickly isolate broken water mains by closing valves, fixing, flushing, and disinfecting the pipe before putting it back into service. This prevents contamination from soil and bacteria, which is why boil water advisories are not issued after routine water main repairs.



Source Water Protection

To raise awareness about preventing water pollution, SC DHEC identifies potential sources of contamination for each drinking water source in the state. www.scdhec.gov/HomeAndEnvironment/Water/SourceWaterProtection/

Charleston Water System

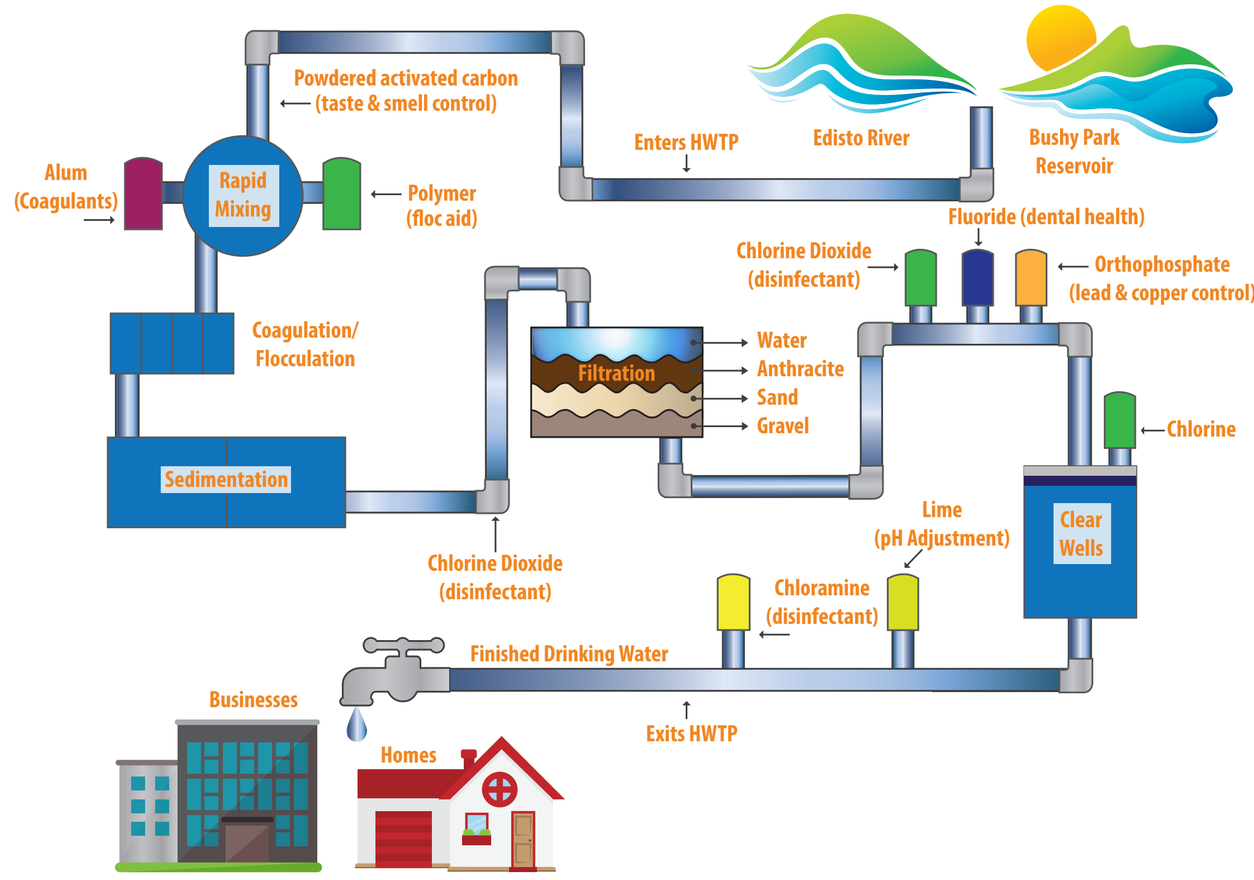
How You Can Help

Stormwater runoff pollutes local waterways.

- Pick up the poop! Pet waste adds bacteria and excess nutrients, which contribute to algae growth that chokes out plants and wildlife.
- Don't over-fertilize your lawn. It washes into storm drains, streams, rivers and oceans.
- No dumping in storm drains. They empty directly into a waterway.
- Proper disposal of oils, paints, and other chemicals.

The Bushy Park Reservoir, our primary water source.

Water Treatment Process



Before arriving at your tap, water is treated at the Hanahan Water Treatment Plant (HWTP) to remove sediment, bacteria, and other impurities. The plant is a member of the Partnership for Safe Water and meets or exceeds all water quality standards.

Water Sources
Water from the Bushy Park Reservoir and Edisto River flows through deep tunnels to our plant.

Rapid Mixing
Once it arrives, pH is adjusted and water is rapidly mixed with aluminum sulfate (alum), a coagulant that helps the impurities stick together to form bigger particles called floc.

Flocculation
After rapid mixing, the water flows into flocculation basins, where the flow of water is slowed and the floc has time to grow bigger.

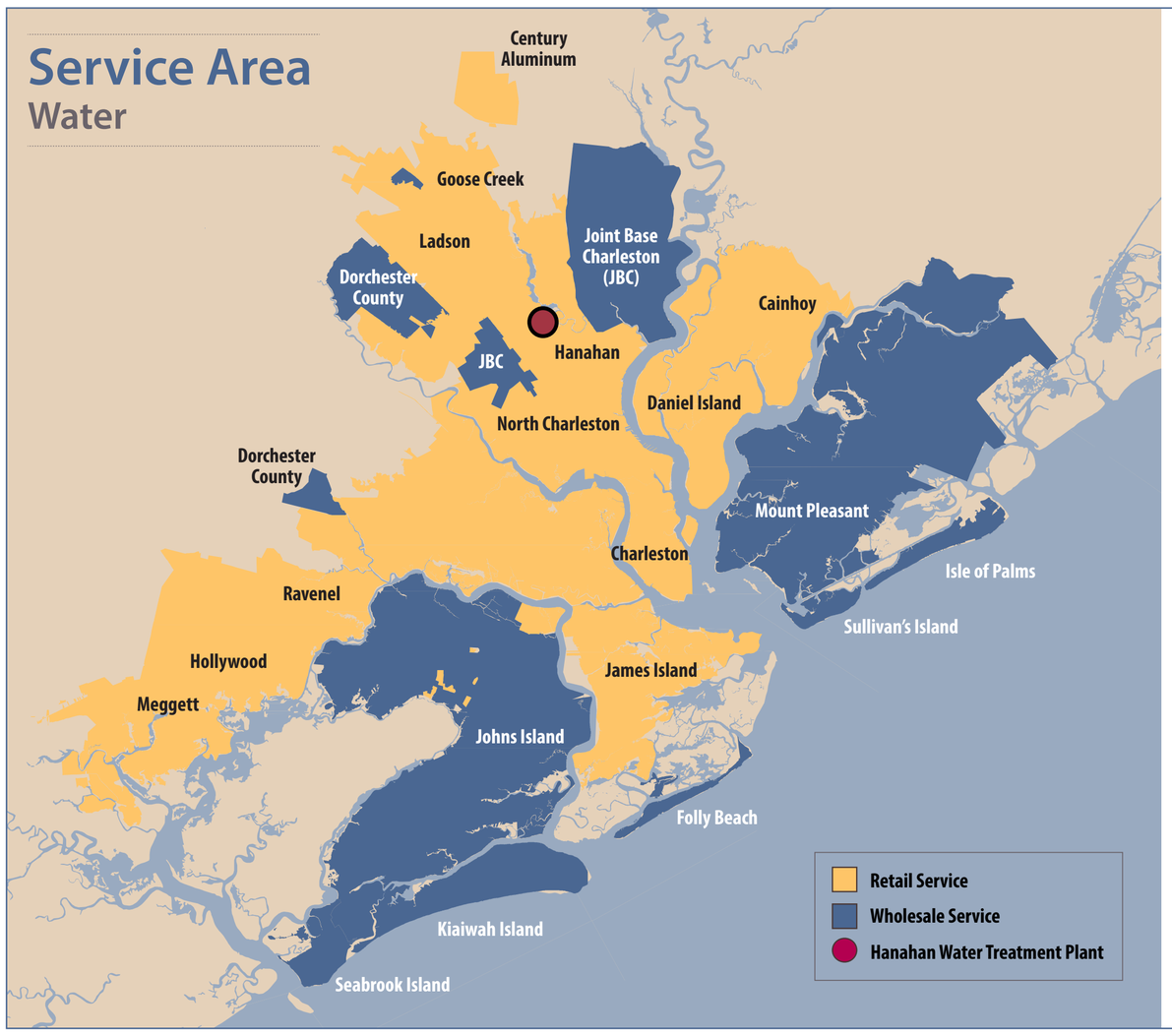
Sedimentation
Next, the water flows into sedimentation basins, where heavy floc particles sink to the bottom and are removed.

Filtration
Now the water travels through large filters made of anthracite, sand, and gravel. This removes any remaining microscopic particles and microorganisms.

Disinfection
Finally, the water is disinfected to protect against bacteria. We use chlorine dioxide and a combination of chlorine and ammonia called chloramines to disinfect the water. Fluoride is added to support good dental health.

Distribution
Treated water is then pumped into pipes that deliver it to more than 450,000 people and businesses in the greater Charleston area.

Service Area
Water



Quick Facts:
Million Gallons a Day (MGD)

58 MGD
Average volume of treated water

96 MGD
Winter Storm Grayson (Jan., 2018)
Extended freeze. Many broken water mains.

105.5 MGD
Record volume (Dec., 1989)
Extended freeze. Many broken water mains.

115.4 MGD
SC DHEC permitted volume

Charleston Water System

Charleston Water System

We're a publicly owned water and wastewater utility. We provide clean drinking water to more than 450,000 people in the greater Charleston area, including direct retail service to 120,000 homes and businesses and wholesale water service to neighboring utilities and municipalities. Our public water system identification number is 1010001.

Get Involved

We're governed by a board of elected Commissioners, which meets monthly. These meetings are open to the public, and citizen participation is welcomed. Meetings are typically held the fourth Tuesday of every month at 9 a.m. at 103 St. Philip Street. For more information, visit www.charlestonwater.com.

Speakers Bureau

Topics tailored for your school or community group.

Questions/additional copies:

Communications Manager: (843) 727-7146

En español:

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien.

Customer Service

(843) 727-6800 / customerservice@charlestoncpw.com

Main Office (Downtown)
103 St. Philip St., Charleston, SC 29403
Walk-in, drive-thru, and night deposit
M-F 8am - 5pm, closed holidays

North Area Office
6296 Rivers Ave., Charleston, SC 29418
Walk-in, drive-thru, and night deposit
M-F 8am - 5pm, closed holidays

Youtube.com/CharlestonWater
*Our water treatment video is awesome!

facebook.com/charlestonwater

@ChasWaterSystem

Charlestonwater.com