



County of Brunswick Water Quality Report–2018

IMPORTANT PHONE NUMBERS

BILLING QUESTIONS
(910) 253-2655 Option 2

**WATER
EMERGENCIES**
8:00 a.m. to 4:30 p.m.
(910) 253-2657 Option 1

AFTER HOURS
4:30 p.m. to 8:00 a.m.

Northwest WTP
(910) 371-3490
211 WTP
(910) 454-0512
Alternate
(910) 755-7921

EPA SAFE
DRINKING WATER
HOTLINE
1-800-426-4791

**SOURCE WATER
ASSESSMENT**
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Water Treatment Plant
Updates
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WATER QUALITY
Pages 5 - 6

CONSERVATION
And LEAD Information
Pages 6 - 7

Brunswick County Public Utilities is pleased to share its 2018 annual water quality report. The quality of water that we provide to you is of paramount concern. Our dedicated staff continually tests water from the source to your tap to ensure its quality. During the 2018 calendar year staff sampled for over 150 constituents in the water supply. Brunswick County's water consistently met EPA and state water quality requirements. However, some of the constituents tested for are considered "emerging contaminants" and are not regulated by the EPA or the state. Limited information is available on many of these emerging contaminants and they represent a significant concern to water providers due to the difficulty in removing them with traditional water treatment processes and the potential health concerns that they may pose. These newly discovered compounds, such as GENX and other Perfluoroalkyl Substances (PFAS), have been the subject of numerous news articles, public forums, and research papers. The EPA is considering promulgating regulations for PFAS, but experts indicate that it may take years before enforceable standards are available. However, the Brunswick County Board of Commissioners is acting now to protect our most valuable resource by authorizing the design and construction of the most advanced treatment technology available to remove GENX and other unregulated contaminants from the raw water. See the article below for more information on the proposed Low-Pressure Reverse Osmosis Plant Project that is scheduled to be online by autumn of 2021. Follow our Web site link at <http://www.brunswickcountync.gov/genx/> for updates on the design and construction of our full-scale Low-Pressure Reverse Osmosis water treatment facility. Information on PFAS, 1,4 Dioxane, and other contaminants are available on EPA's Web site at: <https://www.epa.gov/pfas> and at <https://www.epa.gov/dwucmr/learn-about-unregulated-contaminant-monitoring-rule>.

So, moving forward throughout our report this year please take note of our billing phone number and emergency after hours phone numbers as the options have changed; and on Pages 5 and 6 our water quality data that has been compiled for all of 2018. Page 7 has water-saving tips and the best times to irrigate your lawn.

As always, we are here to serve so please reach out if you have questions, or comments.

Regards,

John Nichols, Director of Public Utilities

Glenn Walker, Water Resources Manager



Brunswick County Water Quality Report 2018 Continued:

The Brunswick County Public Utilities Department would like to let you know that we are here to serve you 24 hours a day. If you plan to dig, then call 811 or log on to www.NC811.org to request utility locates. If you have billing questions, call Customer Service at 910-253-2655 Option 2. If you have water quality concerns or questions about the function of your meter, please contact our office at (910) 253-2657 Option 1; we will be glad to work with you to solve any water issues. If you have questions about your backflow device or need it inspected, we can help – please call (910) 253-2683.

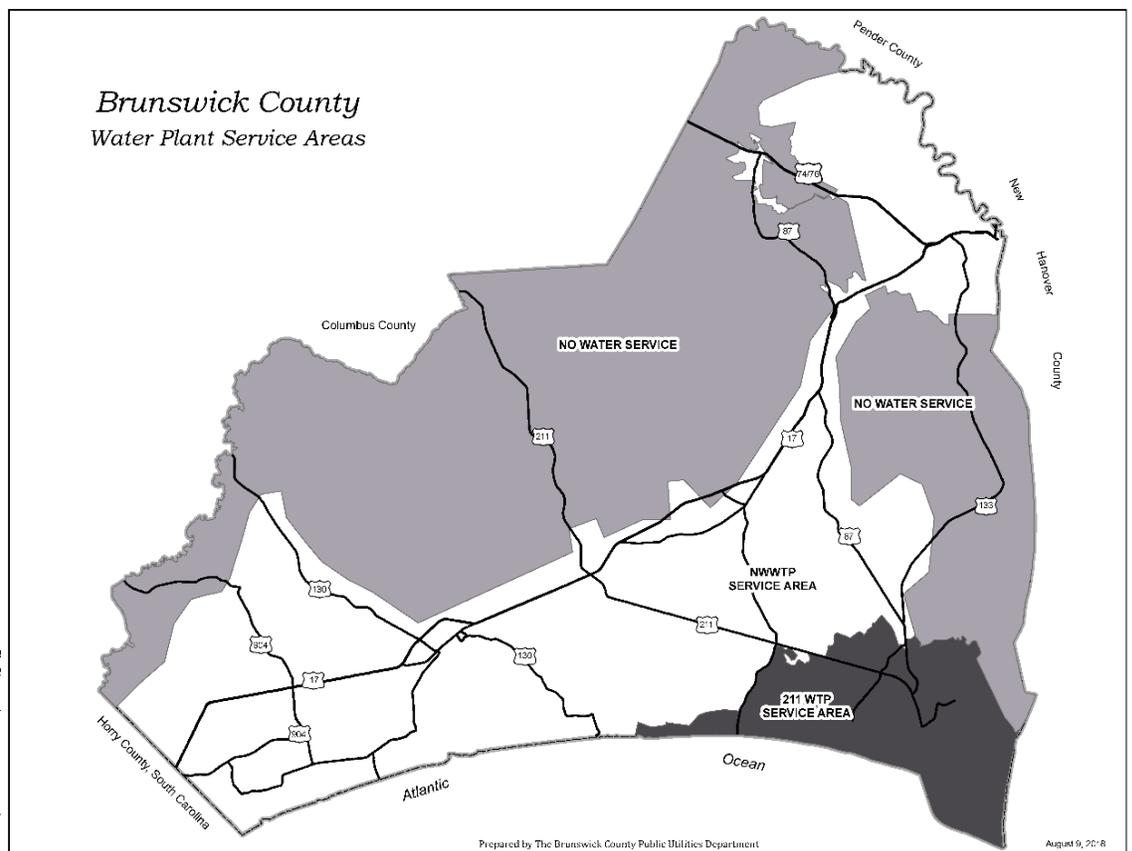
Interesting Facts:

Total Brunswick County Water System Capacity: 30 MGD

The Greatest One Day System Demand of the Year for 2018 was 25.23 million gallons (MGD) on July 4, 2018.

Find Your Service Area

Brunswick County operates two water treatment plants; the 24 million gallon per day Northwest WTP that treats raw water from the Cape Fear River and the 6 million gallon per day groundwater 211 WTP. The three data tables on pages 5 & 6 provide water quality data for the two water treatment plants and the distribution system. Customers in the area of HWY 211 near the towns of St. James, Southport, and Oak Island primarily receive water from the 211 WTP or blended water. Bald Head Island has its own treatment plant, but supplementary water is supplied by the 211 WTP or blended water. All other customers receive water from the Northwest WTP.



Sources of Drinking 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 the surface of the land or through the ground, it dissolves naturally occurring minerals, *radioactive material*, and can pick up substances resulting from the presence of animals or from human activity. Contaminants are anything in the water other than the water molecule. Contaminants that may be present in source water include *microbial contaminants*, such as viruses and bacteria, which may come from wildlife, sewage treatment plants, septic systems, and agricultural livestock operations; *inorganic contaminants*, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, *radioactive material* from oil and gas production, mining, or farming; *pesticides and herbicides*, which typically come from agricultural operations; and *chemicals*, which are often by-products of industrial processes.

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. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.



Brunswick County Water Quality Report 2018 Continued:

The NC Source Water Assessment Program (SWAP)

The North Carolina Department of Environmental Quality (DEQ), Public Water Supply (PWS) Section, Source Water Assessment Program (SWAP) conducted assessments for all drinking water sources across North Carolina. The purpose of the assessments was to determine the susceptibility of each drinking water source (well or surface water intake) to Potential Contaminant Sources (PCSs). The results of the assessment are available in SWAP Assessment Reports that include maps, background information, and a relative susceptibility rating of Higher, Moderate, or Lower.

The relative susceptibility rating of each source for Brunswick County was determined by combining the contaminant rating (number and location of PCSs within the assessment area) and the inherent vulnerability rating (i.e., characteristics or existing conditions of the well or watershed and its delineated assessment area). The assessment findings as of September 2017 are summarized in the table below.

Susceptibility of Sources to Potential Contaminant Sources (PCSs)

Source Name	Susceptibility Rating	SWAP Report Date
CAPE FEAR RIVER	Moderate	Sept. 8, 2017
WELL # 1, 2, 15, 16, 17, 18, & 19	Lower	Sept. 8, 2017
WELL # 3, 5, 6A, 8, 11, 12, & 12A	Moderate	Sept. 8, 2017

The complete SWAP Assessment Report for the Brunswick County Water System may be viewed on the Web by typing the following address into your browser <<https://www.ncwater.org/?page=600>> then enter 0410045. To obtain a printed copy of this report please contact the Source Water Assessment Staff by phone at (919) 707-9098.

It is important to understand that a susceptibility rating of “higher” does not imply poor water quality, only the systems’ potential to become contaminated by PCSs in the assessment area.

211 Water Treatment Plant



The 211 Water Treatment Plant has fourteen (14) different groundwater wells that are tapped into the Castle Hayne Aquifer approximately 175 ft. below the ground’s surface. They use a lime softening process to remove excess calcium from the water. New for 2019 will be the installation of a carbon-dioxide feed system that will ensure better water quality over using liquid acid products. For FY20 the facility will start upgrading to a new filtration system. Facility staff continue to provide quality

water service to the areas of Southport, Oak Island, and St. James Plantation. Congratulations to Michael Albin for attaining his C- Well water treatment license and to Jacob Stephens for attaining his A-Surface water treatment license.



BlueinGreen CO2 system



Brunswick County Water Quality Report 2018 Continued:

Northwest Water Treatment Plant

The Northwest WTP takes water from the Cape Fear River above Lock and Dam #1. Brunswick County Public Utilities is working with CDM Smith to advance the design of needed water treatment plant improvements for the removal of PFAS contaminants. Currently we are at the 60% design phase and expect to bid construction in the fall of 2019. Major elements are: expansion of the existing treatment process from 24 million gallons a day (MGD) to 45 MGD, the addition of Low Pressure Reverse Osmosis (LPRO), and the necessary ancillary equipment to ensure it all works together. The project will be capable of producing water treated by the Low Pressure Reverse Osmosis System in the autumn of 2021 and the entire project is scheduled for completion by December 2022. More detailed information about the LPRO design,

water quality results, and steps we are taking to secure our water future can be found on the Brunswick County Web site:

<<http://www.brunswickcountync.gov/genx/>>.



LPRO 3-D Rendering

Congratulations to Kywan Wilkins and Justin Loiacono for attaining the Maintenance 1 certification, John Addler for attaining his bacteriology certification, and to Billy Benton for attaining his C-Distribution license.

Water Quality Results for 2018

Terms & abbreviations used in the tables below:

- **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 and are non-enforceable public health goals.
- **Maximum Contaminant Level (MCL):** the highest level of a contaminant that is allowed in drinking water as set by the EPA. MCLs are set as close to the MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- **Action Level (AL):** the concentration of a contaminant which, when exceeded, triggers treatment or other requirements which a water system must follow.
- **Locational Running Annual Average (LRAA) –** The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters under the Stage 2 Disinfectants and Disinfection Byproducts Rule.
- **Units**
 - **N/A:** not applicable
 - **ntu:** nephelometric turbidity unit (cloudiness)
 - **ppm-mg/L:** parts per million or milligrams per liter
 - **ppb-ug/L:** parts per billion or micrograms per liter
 - **ppt-ng/L:** parts per trillion or nanograms per liter
 - **pCi/l:** Picocuries per liter (a measure of radiation)
 - **MGD:** million gallons a day
 - **Y/N:** Yes No



Brunswick County Water Quality Report 2018 Continued:

Northwest Water Treatment Plant Analysis						
Listed below are the results of water quality sampling performed from January 1, 2018, to December 31, 2018.						
Questions and Comments: Contact Glenn Walker, Water Resources Manager, 910-371-3490 or glenn.walker@brunswickcountync.gov						
REGULATED ORGANIC CHEMICALS	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low High	Violation Y/N	Source of Contaminant
Turbidity	Treatment Technique Limit of 1.0 ntu	N/A	Average 0.040 ntu	% of samples ≤ 0.3 ntu	N	Soil Runoff
			Maximum 0.355 ntu	99.9%		
Raw Water TOC	Treatment Technique Removal Ratio ≥1 (Step 1)	N/A	Average Removal Ratio 1.24	1.06 1.36	N	Naturally Present in the Environment
Finish Water TOC		N/A				
Total Organic Carbon (TOC)		N/A				
pH	6.8 - 8.5	N/A	7.2	7.1 - 8.3	N	By-Product of Caustic Addition
REGULATED INORGANIC CHEMICALS	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low High	Violation Y/N	Source of Contaminant
Chlorite	1.0 ppm	0.8 ppm	Average 0.71 ppm	0.61 0.82	N	By-Product of Disinfection
Chlorine Dioxide	0.8 ppm	0.8 ppm	Average 0.12 ppm	0.0 0.19	N	Water Additive Used to Control Microbes
Fluoride	4 ppm	4 ppm	Average 0.58 ppm	0.0 1.1	N	Water Additive which Promotes Strong Teeth
Orthophosphate	17 ppm	N/A	Average 1.57 ppm	1.41 2.4	N	Water Additive Used to Control Corrosion
Total Chlorine	4 ppm	4 ppm	Average Minimum 2.81 ppm	1.1 3.0	N	Water Additive Used to Control Microbes
Mono-chloramine Disinfectant Residual	4 ppm	4 ppm	2.44 ppm	0.0 2.99	N	Water Additive Used to Control Microbes
UNREGULATED SUBSTANCES	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low High	Violation Y/N	Source of Contaminant
1,4 Dioxane	Non Regulated	N/A	Average 1.62 ppb	0.51 3.4	N	Purifying Agent in Pharmaceuticals and By-Product of PET Plastic Production
Hardness	Non Regulated	N/A	Average 24.1 ppm	19.1 34	N	Part of the Treatment Process, Erosion of Natural Deposits
Iron	Non Regulated	N/A	Average 0.014 ppm	0.005 0.15	N	Part of the Treatment Process, Erosion of Natural Deposits
Manganese	Non Regulated	N/A	0.018 ppm	0.008 0.73	N	Part of the Treatment Process, Erosion of Natural Deposits
Free Ammonia	Non Regulated	N/A	0.067 ppm	0.0 0.13	N	Water Additive Used to Control Microbes
Sodium	Non Regulated	N/A	20.3 ppm	N/A	N	Part of the Treatment Process, Erosion of Natural Deposits
CRYPTOSPORIDIUM - Cape Fear River 2017		N/A	0.0 oocyst	0	N	Naturally Present in the Environment
UNREGULATED PFAS SUBSTANCES	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low High	Violation Y/N	Source of Contaminant
perfluorobutanesulfonic acid (PFBS)	Non Regulated	N/A	3.62 ppt	<2 4.74	N	By-Product of Chemical Manufacturer
perfluorohexanoic acid (PFHxA)	Non Regulated	N/A	14.8 ppt	1.73 37.1	N	By-Product of Chemical Manufacturer
perfluoro-2-propoxypropanoic acid (GenX)	Non Regulated	N/A	9.91 ppt	<2 38	N	By-Product of Chemical Manufacturer
perfluoroheptanoic acid (PFHpA)	Non Regulated	N/A	15 ppt	1.58 37.7	N	By-Product of Chemical Manufacturer
perfluorohexanesulfonic acid (PFHxS)	Non Regulated	N/A	4.67 ppt	<2 8.32	N	By-Product of Chemical Manufacturer
perfluorooctanoic acid (PFOA)	Non Regulated	N/A	8.28 ppt	2.57 14.4	N	By-Product of Chemical Manufacturer
perfluorononanoic acid (PFNA)	Non Regulated	N/A	2.07 ppt	<2 3.63	N	By-Product of Chemical Manufacturer
perfluorooctanesulfonic acid (PFOS)	Non Regulated	N/A	11.7 ppt	3.36 19.3	N	By-Product of Chemical Manufacturer
perfluorodecanoic acid (PFDA)	Non Regulated	N/A	1.92 ppt	<2 3.04	N	By-Product of Chemical Manufacturer

- **Northwest WTP has monitored for Cryptosporidium** (a protozoan) monthly as recently as 2017 and did not detect oocysts (egg-like structure) in the Cape Fear River raw water supply during that sample period. Cryptosporidium is a microbial parasite which is found in surface water throughout the U.S. Although Cryptosporidium can be removed by filtration, the most commonly used filtration methods cannot guarantee 100 percent removal. The Northwest WTP takes precautions to kill and remove Cryptosporidium oocysts by using Chlorine Dioxide as a pre-oxidant disinfectant in our raw water supply line and then again applying Chlorine Dioxide just before and after filtration.
- Unregulated contaminants are those which EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist EPA in determining the occurrence of unregulated contaminants in drinking water and whether future regulations are warranted.



Brunswick County Water Quality Report 2018 Continued:

HWY 211 Groundwater Treatment Plant Analysis							
Questions and Comments: Contact Jeremy Sexton, Water Resources Superintendent, 910-454-0512 or jeremy.sexton@brunswickcountync.gov							
	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low	Range High	Violation Y/N	Source of Contaminant
UNREGULATED SUBSTANCES							
Turbidity	Non Regulated	N/A	Average 0.11 ntu	0.04	1.4	N	Part of the Treatment Process, Erosion of Natural Deposits
pH	Non Regulated	N/A	-----	6.9	8.2	N	Part of the Treatment Process
CO2	Non Regulated	N/A	7.1 ppm	3.0	14	N	Part of the Treatment Process
Alkalinity	Non Regulated	N/A	40 ppm	24	124	N	Part of the Treatment Process, Erosion of Natural Deposits
Hardness	Non Regulated	N/A	111 ppm	73	189	N	Part of the Treatment Process, Erosion of Natural Deposits
Iron	Non Regulated	N/A	0.02 ppm	0	0.18	N	Part of the Treatment Process, Erosion of Natural Deposits
Chloride	Non Regulated	N/A	21 ppm	18	24	N	Part of the Treatment Process, Erosion of Natural Deposits
Free Ammonia	Non Regulated	N/A	0.02 ppm	0	0.11	N	Water Additive Used to Control Microbes
REGULATED INORGANIC CHEMICALS			Brunswick County Amount Detected	Range Low	Range High	Violation Y/N	Source of Contaminant
Fluoride	4 ppm	4 ppm	0.53 ppm	0.1	1.0	N	Water Additive Used to Promote Strong Teeth
Orthophosphate	17 ppm	N/A	14 ppm	0.72	2.2	N	Water Additive Used to Control Corrosion
Total Chlorine	4 ppm	4 ppm	2.8 ppm	1.8	3.4	N	Water Additive Used to Control Microbes
Mono-chloramine	4 ppm	4 ppm	2.8 ppm	2.7	3.0	N	Water Additive Used to Control Microbes

Distribution System Analysis							
Questions and Comments: Contact Mickey Thompson, Water Distribution Superintendent, 910-253-2404 or mickey.thompson@brunswickcountync.gov							
LEAD AND COPPER	Action Level (AL)	MCLG	Brunswick County Amount Detected	# of Samples above the AL	Exceedence of the Action Level? Y/N		
Copper 90th percentile 6/1/17 - 8/31/17	1.3 ppm	1.3 ppm	0.120 ppm	1	N	Corrosion of Household Plumbing	
Lead 90th percentile 6/1/17 - 8/31/17	0.015 ppm	0 ppm	≤0.003 ppm	0	N	Corrosion of Household Plumbing	
ORGANIC CHEMICALS	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low	Range High	Violation Y/N	Source of Contaminant
Total Trihalomethanes Stage 2	LLRA 80 ppb	N/A	Highest LLRA 32.8 ppb	10	58	N	By-product of Disinfection
Total Haloacetic Acids Stage 2	LLRA 60 ppb	N/A	Highest LLRA 22.5 ppb	2.0	34	N	By-product of Disinfection
REGULATED INORGANIC CHEMICALS	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low	Range High	Violation Y/N	Source of Contaminant
Chlorite	1.0 ppm	0.8 ppm	Average 0.47 ppm	0.35	0.66	N	By-product of Disinfection
Nitrate	10 ppm	10 ppm	<1.0 ppm	N/A		N	By-product of Disinfection
PESTICIDES, VOLATILE, & SYNTHETIC ORGANIC CHEMICALS	There Were No Regulated Pesticides, Volatile or Synthetic Organic Chemicals Detected in the Distribution System (Beyond those listed above) for the 2018 Sample Period						

Did You Know?

The EPA and Brunswick County Want You to Know About Potential Household Lead Contamination

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. Brunswick County Public Utilities provides high-quality drinking water but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes, before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (800-426-4791) or at <http://www.epa.gov/safewater/lead>.



Brunswick County Water Quality Report 2018 Continued:

- **How Does Brunswick County prevent** and monitor for lead in our drinking water?
 - We don't use lead service lines between the distribution pipes and our water meters.
 - We have an active corrosion control and prevention plan that requires us to feed a corrosion inhibitor (orthophosphate) and to monitor the residual daily at the water plants and weekly in the distribution system.
 - Brunswick County building codes have required plumbing materials to be low or free of lead since 1987.
 - We monitor for lead and copper in homes that were built before 1987 and may be at higher risk for exposure due to susceptible plumbing materials (copper pipe with lead solder joints) at least every three years.

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).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised 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 Quality in the Home

Remove and flush faucet aerators regularly. This helps to keep debris such as pipe solder and sediment from clogging aerator screens, as well as provide the best quality water possible.

What about Home Filtration Systems? Brunswick County Public Utilities does not recommend whole house filtration systems because these systems tend to remove the disinfection properties of the water and may waste a significant amount of water. The removal of disinfection chemicals in turn will allow bacteria to grow in your household plumbing. If you must use a filtration system purchase one that goes “under the counter”, attaches to the kitchen faucet, or is a part of your refrigerator. This allows the disinfected water to remain in the plumbing, preventing bacterial growth.

Ways You Can Conserve Water!

Brunswick County Public Utilities asks that you use water wisely. By following the recommendations outlined below, you may be able to reduce the amount of water you use.

- **IRRIGATE DURING OFF PEAK HOURS**
Peak demand for water is between 5:00 a.m. to 10:00 a.m. and 4:00 p.m. to 7:00 p.m. If irrigation is necessary, irrigate during off peak times. This will help to ensure proper water pressure for more efficient irrigating.
- **REDUCE IRRIGATION FREQUENCY**
For established lawns, daily irrigation is not required. Irrigate only when there is no moisture in the root zone.
- **WHEN PURCHASING NEW OR REPLACEMENT APPLIANCES AND FAUCETS**
Look for the Energy Star compliant symbol and the EPA's Water Sense symbol. These ensure the appliances are both energy and water efficient.

