

DURHAM



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CITY OF MEDICINE

TAP INTO Quality



Dear Durham Water Customers,

In 2007, Durham weathered a punishing drought by carefully managing our water resources. Yet things are not “back to normal.” Indeed, our community’s definition of “normal” water usage must change forever. Conservation must become a way of life all the time – whether in a drought or not. That’s why this report is themed “Changing Attitudes.”

Every person in every Durham household and business must continue to embrace the attitude this drought has instilled: Our drinking water is scarce and precious, and we must use it judiciously. Using water-saving practices and devices, we’ve impressively reduced our per-person water use over the past decade. But we can do more. Read about conservation on Page 6 and 7.

The drought also forced us to recognize the value of water. Durham water has been significantly underpriced for years. As a comparison, one gallon of gasoline costs more than \$3, yet, that same \$3 pays for the thousands of gallons of water a person needs for three weeks. In July, Durham water rates will increase to cover costs and meet capital needs. We’ll also use tiered rates to encourage residents to use less water.

As we managed the challenges of the drought last year, we proudly maintained our focus on water quality. We are pleased to report that the City complied 100 percent with state and federal drinking water standards and reporting requirements during 2007. To address customer concerns and regulatory requirements, we analyzed more than 700 samples for lead (see table, Page 7). The results showed that the steps we took in 2006 addressed the issue of lead leaching into customers’ tap water. While we’re confident the issue is resolved, we will continue to monitor it. We still advise customers living in homes built prior to 1986 to run water for one to two minutes before using it for cooking or drinking if it has been standing in pipes longer than six hours. Remember to catch this water for your plants.

As spring turns to summer, we will continue to monitor our lake levels closely and be ready to tighten water restrictions if necessary. Hopefully, working together we can ensure that we meet our water needs for years to come.

Sincerely,



Don Greeley and Vicki Westbrook,
Deputy Directors

QUESTIONS? Questions regarding the information in this report should be directed to Water Management staff at the Brown Water Treatment Plant, **560-4362**. For information on water conservation or to arrange a tour of facilities, call **560-4381**. Call **560-4411** for all billing questions. For information about City operations and services, contact **Durham One Call** at **560-1200**.

CHANGING *Attitudes*

The spring of 2007 began the usual way, with Durham's reservoirs full. Through the summer, however, the lack of rain and record high temperatures quickly took a toll. By mid-August, a severe drought had our city and much of North Carolina in its grip.

Durham quickly had to change its attitude toward water.

To combat the high demand created by the drought, mandatory restrictions were enacted at the end of September. The restrictions, extra efforts to conserve, cooler temperatures and seasonal shifts in behavior all helped reduce water use about 40 percent over several weeks.

Unfortunately, the drought continued to escalate through the fall into what climatologists call an "exceptional drought." The City tightened restrictions to help further reduce consumption and alter attitudes. To help offset the demands on Lake Michie and Little River Reservoir, Durham began to draw from Jordan Lake through the Town of Cary and brought the Teer Quarry reservoir online on an emergency basis.

The drought persisted through the winter, and our community's new attitude and the hard work of City staff helped to keep demand more than 10 percent below the previous year. As winter ended, the Triangle finally received some relief in the form of regular rainfall in February and March. By April, both of Durham's reservoirs were again full. But our community's new, cautious attitude toward drinking water must remain unchanged.

Tap Water Compliance History

In this 2007 edition of *Tap into Quality*, you will learn that the City of Durham's tap water had zero violations of any standards during the 2007 calendar year. The substances which were detected were all well below the levels allowed by the Environmental Protection Agency (EPA). The City is required to test for more than 100 different constituents in the drinking water, and the compounds listed in the tables represent just a fraction of the total number of required and voluntary analyses. The City of Durham received an "Exceedance of Lead in Drinking Water – Action Required" from the State on March 29, 2007 for 2006 sampling results.

THE 2007 DROUGHT

- With mandatory restrictions in place (effective September 21), consumption dropped by 15 percent for November and 21 percent for December compared to those same months one year prior.
- The rain deficit for calendar year 2007 was 7.24" below normal.
- Between September 21 and December 31 2007, the City responded to 611 conservation ordinance violation reports, issued 222 written warnings and issued six formal notices of violation.
- The Teer Quarry was brought online on an emergency basis at the end of December. Approximately 224 million gallons were pumped from the Quarry from December through February.
- Durham utilized approximately 137 million gallons of its Jordan Lake Allocation in 2007 via the Town of Cary. For water quality information for the Town of Cary, please visit www.townofcary.org.
- At the height of the drought, Lake Michie was 20.8 feet below full and Little River fell 26.2 below full.

Durham water sources

The sources of drinking water – both tap and bottled – include rivers, lakes, streams, ponds, reservoirs, springs and wells. Durham is fortunate to have two high quality sources of raw (untreated) water. Lake Michie, built in 1926, has reliably supplied approximately 19 million gallons per day (MGD) for over 80 years. Driven by rapid development in the mid 1980s, the City constructed the Little River Reservoir and Dam in 1988 to provide an additional 18 MGD of water, for a combined capacity (safe yield) of 37 MGD. In addition to having two water supplies, Durham also has two water treatment plants, the Williams Water Treatment Plant (located on Hillandale Road) and the Brown Water Treatment Plant (located on Infinity Road). Water can be



Durham's Teer Quarry

transferred from the two supply lakes to the two treatment plants by gravity flow, hydropower or electric power. Terminal reservoirs at each of the water treatment plants hold about a two-to-three day supply of raw water. In 2002, the City of Durham obtained an allocation of 10 million gallons of water per day from Jordan Lake, another local high quality water source. Future plans call for building a raw water intake at Jordan Lake; however current access is via the Town of Cary's water system. The city also plans to use the Teer Quarry for additional water storage.

Source Water Information Available

The North Carolina Department of Environment and Natural Resources (DENR), 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. Since these reports are over 100 pages each, DENR requires only that water providers present the basic information from the report in each year's water quality report.

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

SUSCEPTIBILITY OF SOURCES TO POTENTIAL CONTAMINANT SOURCES (PCSs)	
SOURCE NAME Little River Reservoir	SOURCE NAME Lake Michie
SUSCEPTIBILITY RATING Moderate	SUSCEPTIBILITY RATING Moderate
SWAP REPORT DATE March 18, 2005	SWAP REPORT DATE March 18, 2005

The complete report for the City of Durham may be viewed on the Web at: <http://www.deh.enr.state.nc.us/pws/swap>. Or you may order a printed copy of this report by written request to: Source Water Assessment Program – Report Request, 1634 Mail Service Center, Raleigh NC 27699-1634, or emailing a request to swap@ncmail.net. Please indicate the system name (City of Durham), PWSID (03-32-010), and provide your name, mailing address and phone number. If you have any questions about the report please contact the Source Water Assessment staff by phone at 919-715-2633.

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. The City's “moderate” rating indicates a lesser potential for contamination.

2007 CITY OF DURHAM WATER QUALITY SUMMARY

SUBSTANCE AND UNIT OF MEASUREMENT	MAX. LEVEL DETECTED AND RANGE	VIOLATION YES/NO	MAX. LEVEL ALLOWED (MCL)	IDEAL GOAL (MCGL)	POTENTIAL SOURCE(S) OF SUBSTANCE
REGULATED AT THE TREATMENT PLANTS					
Barium mg/L	0.026 (<0.025 – 0.026)	NO	2.0	2.0	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride mg/L	0.99 (0.79 - 0.99)	NO	4.0	4.0	Naturally occurring mineral; also added to promote dental health
Nitrate mg/L (as Nitrogen)	0.42 (<0.10 – 0.42)	NO	10.0	10.0	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Turbidity NTU	0.11 (<0.07 – 0.11)	NO	TT	N/A	Soil runoff
Turbidity, % of monthly samples ≤ 0.3 NTU	100%	NO	95%	100%	
Total Organic Carbon (TOC) mg/L <small>Results show the range of TOC in both source and treated water. Durham's processes remove more than the required 50%.</small>	Average Removal 56% Source 10.0 (4.1 – 10.0) Treated 4.3 (1.3 – 4.3)	NO	TT 50% removal	N/A	Naturally present in the environment
Alpha emitters pCi/L <small>Samples were collected and analyzed October 2003. Next sample date October 2008.</small>	None detected no range	NO	15	0	Erosion of natural deposits
Beta/photon emitters pCi/L <small>Samples were collected and analyzed October 2003. Next sample date October 2008.</small>	None detected no range	NO	50	0	Decay of natural and man-made deposits
REGULATED IN THE DISTRIBUTION SYSTEM					
Chloramines mg/L (as Cl ₂)	2.9 RAA Running Annual Average	NO	MRDL 4.0	MRDLG 4.0	Water additive to control microbes
Chlorine mg/L	2.7 RAA	NO	MRDL 4.0	MRDLG 4.0	Disinfectant to control microbes; used only in March of each year during system burnout
Total Coliform Bacteria (as a percent)	0% positive	NO	5% positive	0% positive	Naturally present in the environment
Five Haloacetic Acids (5HAA) µg/L	48.5 – System Average (13.0 – 96.0)	NO	60	N/A	By-product of drinking water disinfection
Total Trihalomethanes (TTHM) µg/L	67.0 – System Average (47.0 – 92.0)	NO	80	N/A	By-product of drinking water disinfection
UNREGULATED SUBSTANCES					
Chlorodibromomethane µg/L	11.0 (<1.0 – 11.0)	NO	NR	NR	Component of TTHMs
Chloroform µg/L	81.0 (16.0 – 81.0)	NO	NR	NR	Component of TTHMs
Bromodichloromethane µg/L	18.0 (5.0 – 18.0)	NO	NR	NR	Component of TTHMs
Dichloro-acetic Acid µg/L	38.0 (12.0 – 38.0)	NO	NR	N/A	Component of 5HAAs
Trichloro-acetic Acid µg/L	55.0 (4.0 – 55.0)	NO	NR	N/A	Component of 5HAAs
Sodium mg/L	25.7 (17.9 – 25.7)	NO	NR	20 DWEL	Naturally occurring element in soil and water
Sulfate mg/L	30.0 (26.0 – 30.0)	NO	NR	250	Naturally occurring mineral in soil

The City of Durham (PWSID # 03-32-010) routinely monitors for over 150 contaminants in your drinking water according to Federal and State laws. The table beginning on page 4 lists all the drinking water contaminants that were detected during **testing conducted from January 1 through December 31, 2007**. The EPA or the State requires water providers to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. Some of the data, while representative of the water quality, is more than one year old.

PHYSICAL AND MINERAL CHARACTERISTICS

SUBSTANCE, UNIT OF MEASUREMENT	ANNUAL AVERAGE
pH, standard units - range	7.3 – 7.8
Alkalinity, mg/L	25.0
Calcium, mg/L	4.8
Chloride, mg/L	13.7
Conductivity, micromhos/cm	162.0
Hardness - Calculated, mg/L	26.0
Hardness - EDTA, mg/L	23.0
Orthophosphate, mg/L (as phosphorus)	0.93
Potassium, mg/L	21.8
Total Solids, mg/L	106.0
Zinc, mg/L	0.86

KEY TO ABBREVIATIONS IN TABLE

mg/L	milligrams per liter, or parts per million
MCL	Maximum Contaminant Level; the highest level of a contaminant that is allowed in drinking water
MCLG	Maximum Contaminant Level Goal; the level of a contaminant in drinking water below which there is no known or expected risk to health
MRDL	Maximum Residual Disinfectant Level; the highest level of a disinfectant allowed in drinking water
MRDLG	Maximum Residual Disinfectant Level Goal; the level of a drinking water disinfectant below which there is no known or expected risk to health
AL	Action Level; the concentration of a contaminant, which if exceeded, triggers treatment or other requirements that a water system must follow. Action Levels are reported at the 90th percentile for homes at greatest risk
TT	Treatment Technique; a required process intended to reduce the level of a contaminant in drinking water
µg/L	micrograms per liter, or parts per billion
pCi/L	Picocuries per liter is a measure of the radioactivity in water
NTU	Nephelometric Turbidity Units; measures the clarity or cloudiness in water
N/A	Not Applicable
ND	Not Detected
NR	Not Regulated
<	Less Than
DWEL	North Carolina guidance Drinking Water Equivalent Level

Special Note: MCLs are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Special Concerns

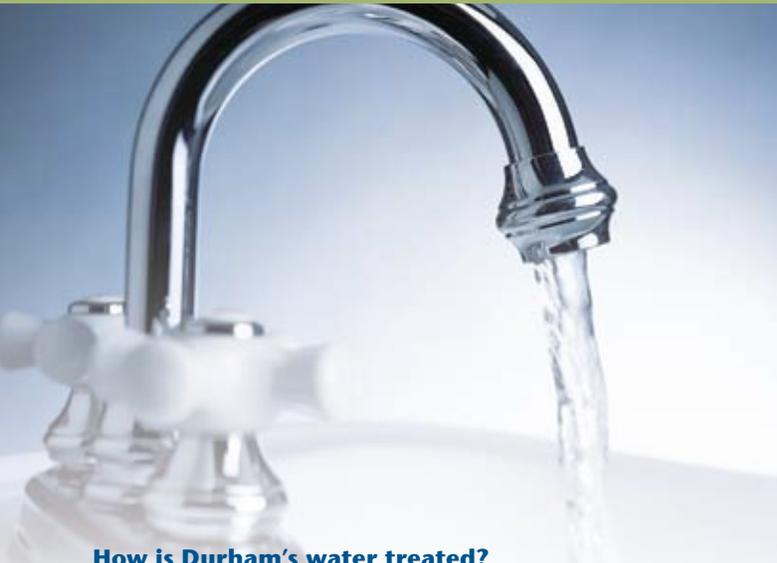
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants 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 microbial organisms are available from the **Safe Drinking Water Hotline at 800-426-4791**.

What is Cryptosporidium?

Cryptosporidium (*Crypto*) is a microbial parasite which occurs naturally in rivers and lakes throughout the United States and comes from animal wastes. Controlling and minimizing development and animal activities in our watershed reduces the occurrence of *Crypto* in raw water. This microscopic organism, while a concern for water providers, is typically very effectively removed by the water treatment process, a combination of filtration, sedimentation and disinfection. However, when ingested, *Crypto* can cause fever, diarrhea, and other gastrointestinal symptoms. As part of the EPA's Information Collection Rule, Durham monitored both supply lakes for *Crypto*. In the fall of 2006, Durham began monthly monitoring for *Crypto* at each of our water supply lakes to ensure the continuing safety of the raw water, as well as to comply with the EPA Long Term Two Enhanced Surface Water Treatment Rule. The results of the monitoring will determine whether or not additional treatment is needed to remove these parasites from the drinking water. *Crypto* has not been detected in previous monitoring events.

Get Involved

Citizens are welcome to attend regularly scheduled meetings of Durham's City Council. Council meetings are held the first and third Monday of each month at 7 p.m. City Council members also have regular work sessions to prepare for Council meetings. These sessions occur on Thursdays—two weeks prior to each regular Council meeting. Work sessions are held at 1 p.m. in the Council's Committee Room on the second floor of City Hall. Council meetings are held at City Hall in the Council Chambers on the first floor. Check the City's website to confirm meetings at www.durhamnc.gov. City Hall is located in downtown Durham at 101 City Hall Plaza.



How is Durham's water treated?

Both the Williams Water Treatment Plant (built in 1927, current capacity of 22 MGD) and the Brown Water Treatment Plant (built in 1977, current capacity of 30 MGD) operate using optimized conventional water treatment processes. At the water treatment facilities, raw water is mixed with caustic to adjust the pH and aluminum sulfate (alum) to coagulate particles. After mixing, the water flows into settling basins where the particles stick together (coagulation), become heavy, and settle to the bottom of the basins (flocculation). After disinfection through chloramination, the clearer water flows through filters, removing the remaining particles. Fluoride is then added prior to distribution to our customers.

How does water travel?

As water travels over the surface of the land or through the ground, minerals and other materials are dissolved naturally. Water can also pick up substances that are the result of animal or human activity. Source water may contain microbial contaminants, such as viruses and bacteria; inorganic contaminants such as salts and metals; pesticides and herbicides from agriculture or urban run-off; organic chemicals from industrial processes or run-off; and radioactive contaminants which can be naturally occurring.

What can you expect of your Drinking Water?

In order to ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration establishes regulations for contaminants in bottled water that must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 800-426-4791.

Water Wise:

Top 10 Water Conservation Tips

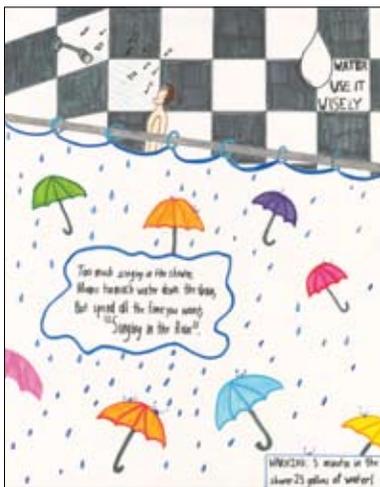
There are a number of ways to save water, and they all start with you. Here's a list of 10 Water Conservation Tips to get you started.

1. Replace shower heads with water efficient 1.5 gallon per minute (or less) models.
2. Install a High Efficiency Toilet (HET) that uses just 1.28 gallons per flush.
3. Use dye tablets or food coloring to check for toilet leaks. Remove the toilet tank cover and add 10 drops of food coloring into tank, wait 15 minutes and check for color in the toilet bowl. If you see any color in your toilet bowl, then you have a leak and it should be repaired immediately.
4. Don't use the toilet as a wastebasket. Using a wastebasket instead of the toilet for tissues and other bits of trash will save water.
5. Try to collect the running water that is wasted while waiting for it to get hot and use it for watering indoor plants, household chores, toilet flushing, etc.
6. A dishwasher uses the same amount of water whether it is full or just partially full of dishes, so you should delay the washing of dishes until you are able to fill the dishwasher and avoid multiple washings.
7. Select the proper water level for laundry since many clothes washers allow control over the amount of water to be used. Consider replacing your washing machine with a front-load washing machine which can use 30% less water than a top-loading machine.
8. Fixing leaky faucets or pipes joints will save 20 gallons or more per day. A leaky faucet may simply need a new washer or inexpensive repair kit.
9. Use a shut-off nozzle on your hose to completely turn off the water when you are not using it. Do this anytime you must use water outdoors.
10. Rainwater from roof tops can be collected and delivered by the house gutters to containers or to a rain barrel for garden uses and other outdoor chores.

Understand and Conserve a Precious Resource

Public Education

The department has an ongoing public education and outreach program that covers a variety of topics, from conservation to water quality to careers in the field. Our program seeks to provide the community with important and timely tips and information about drinking water and to make sure customers understand the significance of the work the Department of Water Management does. Staff participates in a number of city-wide events throughout the year such as the Durham Earth Day Festival and CenterFest, as well as smaller events such as the Parks and Recreation Community Days. Additionally, staff provides presentations and facility tours to groups of all ages, including our annual “H₂O!” Festival, an event for school children to learn more about our water system in a fun and festive atmosphere.



1st Place Winning “Water - Use It Wisely” Conservation Poster by Christopher Camitta, Grade 3, Little River Elementary

UPDATE ON LEAD

We would like to take this opportunity to reassure our customers that on-going sampling at each of the City’s two treatment plants demonstrates that there is NO lead in the water leaving either of the two facilities. Also, there is no lead in the water flowing through the distribution system that supplies water to your homes.

During the early portion of 2007, Durham was still responding to concerns of lead in tap water. In January, staff voluntarily initiated additional testing in customer homes to ensure that measures put in place to reduce corrosivity were effective. By the end of February, over 150 sites meeting EPA’s Tier 1 criteria (built between 1983 and 1985) had been sampled. This was conducted even before receiving an “Exceedance of Lead in Drinking Water – Action Required” notice for sampling conducted in 2006 (see last year’s report). The notice, received on March 29, 2007, required that the City sample Tier 1 sites for two consecutive six month periods, continue to evaluate the corrosion control program and step up public education on lead in drinking water by mailing brochures to customers and conducting additional activities. Only one of the sampled sites exceeded the action level for lead. The very successful results of the year long sampling are summarized in the table below.

LEAD AND COPPER SAMPLING RESULTS

SUBSTANCE AND UNIT OF MEASUREMENT	MAX. LEVEL DETECTED AND RANGE	EXCEEDANCE YES/NO	MAX. LEVEL ALLOWED (MCL)	IDEAL GOAL (MCLG)	POTENTIAL SOURCE(S) OF SUBSTANCE	REASON(S) FOR REGULATING SUBSTANCE
REGULATED AT THE CUSTOMER’S TAP						
Copper, mg/L	90th percentile		AL = 1.3	1.3	<i>Corrosion of household plumbing systems</i>	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson’s disease should consult their health care provider.
January – June 2007	<0.050	NO			None of the 208 sampling sites collected in September exceeded the Action level	
July – December 2007	<0.050	NO			None of the 120 sampling sites collected in the June – September timeframe exceeded the Action Level	
Lead, µg/L	90th percentile		AL = 15	0	<i>Corrosion of household plumbing systems</i>	Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.
January – June 2007	<3	NO			One of 212 sample sites exceeded the Action Level	
July – December 2007	<3	NO			None of 120 sample sites exceeded the Action Level	