



TAP INTO  
**Quality**

DURHAM



1869  
CITY OF MEDICINE

# 2005 – A YEAR OF Contradictions!

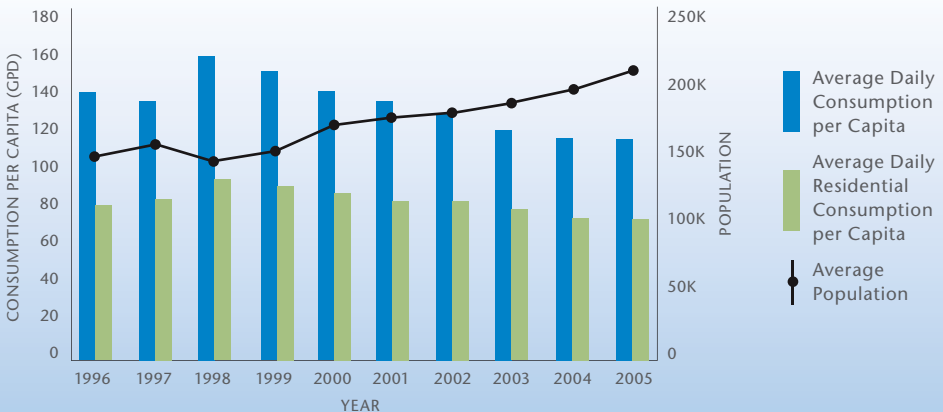
**The calendar year 2005** began as a typical year, with both Lake Michie and Little River at full status.

The lakes remained at normal operating levels through the spring planting season and the hot summer months. However, an unseasonably warm, dry fall caused water demand to remain at summertime usage patterns, leading to declining lake levels. Even with hurricanes creating havoc on the Gulf Coast and in Florida, the triangle area of North Carolina did not receive expected rainfall. It seemed as if there was a force field around the piedmont keeping the rain away. This forced water providers in the area, including Durham, to enact mandatory water restrictions. Durham water customers complied with restrictions and reduced demand by 13.5 percent, extending the water supply. December rains brought the lakes close to full and restrictions were

lifted for Durham. Even with reductions, the average daily water consumption for the City of Durham grew by approximately 3 percent to 27.65 MGD.

Durham's customer base continues to grow and by the end of 2005, the system was providing water to more than 206,000 people. In fact, over the past 10 years the population of Durham's service area has increased by approximately 28 percent; yet per capita daily water usage has decreased by 23 percent (baseline year 1999). The following chart tells an interesting story that reflects weather (dry vs. wet years), education and increased use and availability of water efficient plumbing devices and technologies.

**AVERAGE DAILY CONSUMPTION & POPULATION OVER THE PAST 10 YEARS**



DURHAM

# water sources

## **Tap Water Maintains Full Compliance with Requirements**

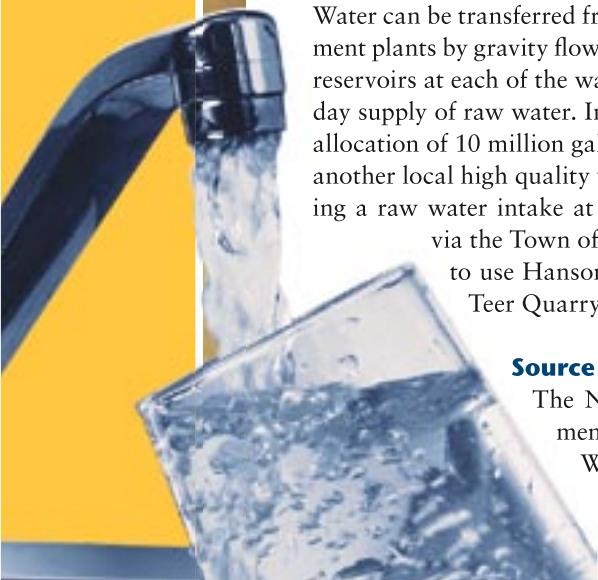
In this 2005 edition of Tap into Quality, you will learn that the City of Durham continues to comply with all state and federal requirements for drinking water. Each year, City staff compile and distribute this report to meet just one of the numerous federal requirements enacted by the Environmental Protection Agency (EPA). In this report, you will find a table showing that Durham's tap water had zero violations of water quality standards during the 2005 calendar year. The substances detected were all well below the levels allowed by EPA. The City tests for more than 150 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 conducted each year. A separate table contains the quantities of more commonly known substances. We have included the second table because many customers have questions throughout the year about the amount of calcium in the tap water or the hardness of the water. We hope you will find this data helpful.

## **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, reliably supplied approximately 19 million gallons per day (MGD) for over 60 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 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 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 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 Hanson Aggregate's Durham Quarry (formerly 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	SOURCE NAME
Little River Reservoir	Lake Michie
SUSCEPTIBILITY RATING	SUSCEPTIBILITY RATING
Moderate	Moderate
SWAP REPORT DATE	SWAP REPORT DATE
March 18, 2005	March 18, 2005

The complete SWAP Assessment report for the City of Durham (PWSID# 03-32-010) 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 e-mail a request to

[swap@ncmail.net](mailto: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 SWAP 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.

**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 combination of filtration, sedimentation and disinfection. However, when ingested, *Crypto* can cause fever, diarrhea, and other gastrointestinal symptoms. As part of the Information Collection Rule, Durham monitored both supply lakes for *Crypto*; it has never been detected in Durham's treated drinking water. Beginning in the fall of 2006, Durham will begin analyzing monthly for *Crypto* at each lake to ensure the continuing safety of the raw water as well as to comply with a requirement of the recently adopted EPA Long Term Two Enhance Surface Water Treatment Rule (LT2ESWTR).

# Community Participation

## PUBLIC OUTREACH AND EDUCATION

How can you be involved in decisions regarding Durham's water system or other City issues? 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 web site to confirm meetings at [www.durhamnc.gov](http://www.durhamnc.gov). City Hall is located in downtown Durham at 101 City Hall Plaza.

### Public Outreach and Education


The Department of Water Management has an ongoing public education and outreach program that covers a variety of water 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 participate in a number of standard events through the year such as the Durham Earth Day Festival, as well as smaller events such as the Parks and Recreation Community Days. Additionally, staff provides presentations to groups of all ages.

As part of our outreach program, the department sponsors an annual poster contest for local school children, grades K through 8. The theme for the 2005 contest was "Water - Use it Wisely!" Students from across the service area submitted approximately 75 interpretations of the theme. Congratulations to our 2005 winners:

- 1ST PLACE:** Meredith Harris  
Neal Middle School
- 2ND PLACE:** Shynese Henderson  
Neal Middle School
- 3RD PLACE:** Ronika Daye  
Shepard Middle School

All three winners also placed respectively in the statewide Water Conservation poster contest, sponsored by the NC American Water Works Association/Water Environment Association.

**QUESTIONS?** Questions regarding the information in this report should be directed to Water Management staff at the Brown Water Treatment Plant at **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 additional information about City operations and services, contact **Durham One Call** at **560-1200**.



**Water Saving Device #37**  
Grab a wrench and fix that leaky faucet. It's simple, inexpensive, and can save up to 140 gallons a week.

2005 CITY OF DURHAM WATER QUALITY SUMMARY

KEY TO ABBREVIATIONS IN TABLE

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	REASON(S) FOR REGULATING SUBSTANCE
<b>Regulated at the Treatment Plants</b>						
<b>Fluoride</b> mg/L	0.99 (0.65 - 0.99)	NO	4.0	4.0	Naturally occurring mineral; also added to promote dental health	Some people who drink water containing fluoride in excess of the MCL over many years could experience an increase in their blood pressure.
<b>Nitrate</b> mg/L (as Nitrogen)	0.38 (< 0.10 - 0.38)	NO	10.0	10.0	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
<b>Turbidity</b> NTU	0.10 (<0.05 - 0.10)	NO	TT	N/A	Soil runoff	Turbidity has no health effects; however, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms, such as bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
<b>Turbidity</b> , % of monthly samples ≤ 0.3 NTU	100%	NO	95%	100%		
<b>Alpha emitters</b> pCi/L Samples were collected and analyzed October 2003.	None detected no range	NO	15	0	Erosion of natural deposits	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water with alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
<b>Beta/photon emitters</b> pCi/L Samples were collected and analyzed October 2003.	None detected no range	NO	50	0	Decay of natural and man-made deposits	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water with beta/photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
<b>Regulated at the Customer's Tap</b>						
<b>Copper</b> mg/L (EPA required triennial sampling conducted in September 2004)	< 0.05 (90th percentile)	NO	AL=1.3	1.3	Corrosion of household plumbing systems <i>None of the targeted 95 sampling sites exceeded the Action Level</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.
<b>Lead</b> µg/L (EPA required triennial sampling conducted in September 2004)	6 (90th percentile)	NO	AL=15	0	Corrosion of household plumbing systems <i>4 out of 95 targeted sampling sites exceeded the Action Level</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.
<b>Regulated in the Distribution System</b>						
<b>Chloramines</b> mg/L (as Cl <sub>2</sub> )	2.8 RAA Running Annual Average	NO	MRDL 4.0	MRDLG 4.0	Water additive to control microbes	Some people who use water containing chloramines well in excess of the MRDL may experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL may experience stomach discomfort or anemia.
<b>Chlorine</b> mg/l	2.6 RAA	NO	MRDL 4.0	MRDLG 4.0	Disinfectant to control microbes; used only in March of each year during system burnout	Some people who use water containing chlorine well in excess of the MRDL may experience irritating effects to their eyes and nose.
<b>Total Coliform Bacteria</b> (as a percent)	0% positive	NO	< 5% positive	0% positive	Naturally present in the environment	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful bacteria may be present.
<b>Five Haloacetic Acids (SHAA)</b> µg/L	30.6 - System Average (<2.0 - 40)	NO	60	0	By-product of drinking water disinfection	Some people who drink water containing HAAs in excess of the MCL over many years may have an increased risk of getting cancer.
<b>Total Trihalomethanes (TTHM)</b> µg/L	52.7 - System Average (38 - 75)	NO	80	0	By-product of drinking water disinfection	Some people who drink water containing TTHMs in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.
<b>Unregulated Substances</b>						
<b>Chlorodibromomethane</b> µg/L	4.0 (< 1.0 - 4.0)	NO	NR	NR	Component of TTHMs	Some people who drink water containing TTHMs in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.
<b>Chloroform</b> µg/L	61 (27.3 - 61)	NO	NR	NR	Component of TTHMs	
<b>Bromodichloromethane</b> µg/L	15.0 (<1 - 15)	NO	NR	NR	Component of TTHMs	
<b>Dichloro-acetic Acid</b> µg/L	22.0 (<1.0 - 22)	NO	NR	N/A	Component of SHAA's	Some people who drink water containing HAAs in excess of the MCL over many years may have an increased risk of getting cancer.
<b>Trichloro-acetic Acid</b> µg/L	18.0 (<1.0 - 18)	NO	NR	N/A	Component of SHAA's	
<b>Sodium</b> mg/L	25.4 (18.1 - 25.4)	NO	NR	20 DWEL	Naturally occurring element in soil and water	Sodium is an essential nutrient; however, consuming high levels of sodium can contribute to high blood pressure.
<b>Sulfate</b> mg/L	17 (14 - 17)	NO	NR	250	Naturally occurring mineral in soil	Sulfate may have a laxative effect for some people who drink water containing high levels of sulfate.
<b>Total Organic Carbon (TOC)</b> mg/l Results show the range of TOC in both source and treated water. Durham's processes remove more than the required 50%.	Average Removal 58% Source 8.6 (4.4 - 8.6) Treated 3.4 (1.9 - 3.4)	NO	NR	TT 50% removal	Naturally present in the environment	Total organic carbon (TOC) has no health effects. However, TOC provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of cancer.

<b>mg/l</b>	milligrams per liter, or parts per million
<b>MCL</b>	Maximum Contaminant Level; the highest level of a contaminant that is allowed in drinking water.
<b>MCLG</b>	Maximum Contaminant Level Goal; the level of a contaminant in drinking water below which there is no known or expected risk to health.
<b>MRDL</b>	Maximum Residual Disinfectant Level; the highest level of a disinfectant allowed in drinking water.
<b>MRDLG</b>	Maximum Residual Disinfectant Level Goal; the level of a drinking water disinfectant below which there is no known or expected risk to health.
<b>AL</b>	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.
<b>TT</b>	Treatment Technique; a required process intended to reduce the level of a contaminant in drinking water
<b>µg/l</b>	micrograms per liter, or parts per billion
<b>pCi/L</b>	Picocuries per liter is a measure of the radioactivity in water.
<b>NTU</b>	Nephelometric Turbidity Units; measures the clarity or cloudiness in water.
<b>N/A</b>	Not Applicable
<b>NR</b>	Not Regulated
<b>ND</b>	Not Detected
<b>&lt;</b>	Less Than
<b>DWEL</b>	North Carolina guidance Drinking Water Equivalent Level
<i>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.</i>	

PHYSICAL AND MINERAL CHARACTERISTICS	
SUBSTANCE, UNIT OF MEASUREMENT	ANNUAL AVERAGE
pH, standard units - range	7.1 - 8.2
Alkalinity, mg/L	25
Calcium, mg/L	4.4
Chloride, mg/L	23.6
Conductivity, micromhos/cm	180
Hardness - Calculated, mg/L	21
Hardness - EDTA, mg/L	25
Orthophosphate, mg/L (as phosphorus)	0.30
Potassium, mg/L	1.9
Total Solids, mg/L	103
Zinc, mg/L	0.28



### **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.

### **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

alum and/or ferric chloride to coagulate particles. After mixing, the water flows into settling basins where the particles clump together (coagulation), become heavy, and settle to the bottom of the basins (flocculation). After disinfection, the clearer water flows through filters, removing the remaining particles. Fluoride is then added prior to distribution to our customers.

### **What can you expect of 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 contami-



### **DID YOU KNOW?**

Water lines are sized to meet fire fighting requirements. Lines would be significantly smaller if they just had to supply water for drinking purposes.

nants 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.

### **Lead in Drinking Water – Should Durham Customers be Concerned?**

Recent local and national news has sparked interest in lead levels in the City's tap water. We would like to take this opportunity to reassure the City of Durham's water customers that the drinking water continues to be in compliance with all state and federal regulations. Durham successfully completed the required triennial sampling for compliance with the Environmental Protection Agency (EPA) Lead and Copper Rule in the fall of 2004. Samples were collected from 95 homes in Durham's service area; homes/addresses were identified based on EPA sampling criteria. The results demonstrated Durham's ongoing compliance with the regulations (see substance table). In fact, Durham's tap water has been in compliance with the Lead and Copper Rule since its inception in 1991. Here's some basic information that can help to ease your concerns about the exposure to lead via drinking (tap) water.

Lead is a common, natural metal that is found throughout the environment;

however it rarely occurs naturally in surface water supplies such as lakes and rivers. Lead enters drinking water primarily as a result of corrosion of materials containing lead used in household plumbing. This is particularly the case with older homes. Piping containing lead is likely to be found only in homes built before 1930. Copper piping took the place of lead piping, but lead based solder was still used until banned by North Carolina in 1985. Brass materials, containing less than 8 percent lead, are now used in almost 100 percent of all residential, commercial, and municipal water distribution systems. This action has significantly reduced the incidence of lead in drinking water. The City has taken additional steps to reduce the leaching of lead into tap water by adding a corrosion inhibitor to drinking water. This effective corrosion control program has been in place since the 1970s.

In older homes or homes that 1) have copper pipes with lead solder or, 2) lead pipes and/or, (3) lead service lines, lead may dissolve into tap water when water stands in lead pipes (or plumbing systems containing lead) for several hours or overnight. The EPA has determined that houses built between 1982 and 1987 meeting the above conditions may have an elevated risk of lead in drinking water.



Please note that lead service lines have not been used for decades; when they are discovered, they are replaced by City Water and Sewer Maintenance staff.

In most cases, customers can reduce or eliminate the chance of lead exposure in tap water by following these guidelines:

- Run cold water from your tap for about one to two minutes before using it for drinking or cooking any time the water in the faucet has gone unused for more than six hours. Flush each faucet individually. To conserve water, use the flushed water for non-consumption purposes such as watering plants or washing dishes. Fill a few bottles of water for drinking after the tap has been flushed to avoid having to flush the taps daily.
- Never cook with or drink water from the hot water tap. Hot water dissolves lead more quickly than cold water. Never use hot tap water to make baby formula or cereal; draw cold water from the tap and heat it on the stove or in the microwave.
- Periodically remove loose debris from the plumbing materials by removing the faucet strainers from all taps and running the water for three to five minutes.

- Have an electrician check the wiring in your home; if grounding wires from the electrical system are attached to the pipes, corrosion may be greater. Check with an electrician to decide if your wiring can be grounded elsewhere.

For more information on lead in drinking water provided by the US Environmental Protection Agency, visit <http://www.epa.gov/safewater/lead/leadfacts.html>.

### **DID YOU KNOW?**

Durham has more than 1,200 miles of water distribution and transmission lines throughout the service area.



DURHAM



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CITY OF MEDICINE

**CITY OF DURHAM**  
*Department of Water Management*  
101 City Hall Plaza  
Durham, NC 27701  
[www.durhamnc.gov](http://www.durhamnc.gov)

**Important** Drinking Water Information Enclosed!



**Water Saving  
Device #79**

**Use a hose nozzle and  
turn off the water while you  
wash your car to save more  
than 100 gallons.**

**EN ESPAÑOL** Este folleto tiene información importante acerca de la calidad del agua que provee la Ciudad de Durham. Si necesita mayor información acerca del contenido de este folleto el personal del Centro Hispano, 201 W. Main Street, Suite 100, teléfono **687-4635**, puede ayudarlo.