CITY OF DURHAM
Department of Water Management
101 City Hall Plaza
Durham, NC 27701

www.DurhamNC.gov

WATER USE IT WISELY

Important
Drinking Water
Information
Enclosed!

EN ESPAÑOL Este folleto tiene información importante acerca de la calidad del agua que provee la Ciudad de Durham. Si necesita más información acerca del contenido de este Folleto, el personal de El Centro Hispano puede ayudarle 201 W. Main Street # 100 Durham NC, 27701, teléfono **919-687-4635**.

WATER QUALITY REPORT 2010

water: A to Z

DEPARTMENT OF WATER MANAGEMENT

Dear Durham Water Customers,

The alphabet blocks that children use creatively help form the foundation of their learning processes. Similarly, water is an essential building block for the community. This year's water quality report, **Water: A to Z**, focuses on the different ways that water impacts our lives every day.

Safe drinking water plays a vital role in public health. In Durham – and throughout North America – we generally drink from any public tap without any concern. But worldwide, an estimated 3 million people die every year from preventable waterborne diseases. We are proud of our consistent compliance with rigorous federal and state water quality standards.

A reliable water supply is absolutely critical for fire suppression. The lines that deliver water to homes and businesses are sized to meet fire flow requirements rather than the actual drinking water needs of our customers. In fact, several destructive fires in the early 1900s led to the City's acquisition of the privately owned Durham Water Company to address both water supply and water quality concerns.

Without a reliable supply of safe water, critical employers will not locate – or chose to remain – in Durham. For some businesses, water may be the primary ingredient in their product, while others may use water to run chillers for sensitive computer equipment. Hospitals cannot serve patients, restaurants cannot serve customers and schools and daycares have to close their doors if water service is not available.

At home, we use water for a myriad of purposes beyond the obvious ways of washing clothes and dishes, taking baths/showers and brushing our teeth. That's why it is so important to learn to become better stewards of this limited natural resource. Adopting water-efficient behaviors and practices at work, home and play will extend our water supplies for our children and grandchildren, as well as help us adapt to more limited supplies affected by drought and climate change. Promoting water efficiency is one reason we expanded our Toilet Rebate/Credit program to include non-residential customers.

As you read through this report, take a moment to think about all the different opportunities we have in this community thanks to safe drinking **Water** – which enhances the overall quality of life we enjoy and makes Durham a great place to live, work and play.

Best regards,

Don Greeley
Director, Department of Water Management

Aquifer

An underground layer of permeable rock, sediment or soil that yields water. The pore spaces in aquifers are filled with water and are interconnected so that water flows through them.

Zooplankton

Small floating or weakly swimming animals in the food chain that inhabit the water columns of lakes and other natural bodies of water.

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**.

Notice Under the Americans with Disabilities Act

Persons who require assistance should call (919) 560-4197, TTY (919) 560-1200, or e-mail ADA@DurhamNC.gov no later than 48 hours before the event.

Aviso bajo el Acto de Americanos Discapacitados

Personas que requieran asistencia deben llamar (919) 560-4197, TTY (919) 560-1200, o enviar un correo electronico ADA@DurhamNC.gov por lo menos 48 horas antes del evento.

water: A to Z

Water – covers 75 percent of the Earth, but only 3 percent of that is fresh water . . . and only 1 percent is available for drinking water uses because 2 percent is frozen in glaciers.

That readily available 1 percent is in streams, rivers, lakes or in underground ***Aquifers***, and must be treated through various complex processes to ensure its safety. And the work doesn't stop with the treatment process – a network of underground pipes, valves and ***backflow prevention devices*** must all be in place and carefully maintained to ensure the delivered product remains safe to the tap!

Providing this award-winning safe drinking water requires a 24/7/365 commitment from treatment plant and distribution system operators. It also requires a well trained support staff of lab technicians and chemists, meter readers and mechanics, engineers and inspectors – to name just a few of the positions within the department.

As you read through this year's report, we hope that you gain a better understanding of the processes necessary to manage and treat your drinking water from source to tap. Careful planning, cooperation and collaboration with regional partners and customers are all necessary so that we can continue to meet the needs of our growing service area, in a cost-effective and consistent manner.

Award-Winning Water

In November 2010, tap water from the City's Wade G. Brown Water Treatment Facility placed third in the annual Best Tasting Tap Water Competition held in conjunction with the annual conference of North Carolina water and wastewater professionals. Durham's tap water competed with 21 samples submitted by water providers across the state. Since the contest began in 1985, Durham has finished in the top three seven times, finishing number one in 1999 and 2006!

Tap Water Compliance History

The City of Durham is required to test for more than 150 different constituents in the drinking water. The compounds listed in the tables in this water quality report represent just a fraction of the total number of required and voluntary analyses. During 2010, all detected substances were below the water quality levels allowed by the Environmental Protection Agency (EPA).

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 surface water sources. Lake Michie, built in 1926, reliably supplied approximately 19 million gallons per day (MGD) for over 80 years. To meet the needs of the growing community, the City constructed the Little River Reservoir in 1988 to provide an additional 18 MGD of water, giving the City a combined capacity (safe yield) of 37 MGD. Water may be transferred from the two supply lakes to the City's two treatment plants by gravity flow, hydropower or electric power. Terminal reservoirs at each water treatment plant hold about a two-to-three day supply water.

In 2002, the City of Durham obtained an allocation of approximately 10 million gallons of water per day from Jordan Lake, another local high quality water source. Currently, Durham accesses this water as needed via the Town of Cary's water system. With regional partners, Durham is exploring opportunities to build an additional intake at Jordan Lake. The City also obtained the Teer Quarry to use as off-line water storage. Water stored in the quarry was accessed for emergency purposes during the drought of 2007–2008. Permanent facilities to allow for filling the quarry from a number of sources during normal conditions are currently in the design phase.

What can you expect of your drinking water?

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. To ensure that tap water is safe to drink, the EPA regulates the amount of certain substances in your tap water. The Food and Drug Administration establishes limits

Zeta potential

The electrical potential that exists across the interface of solids and liquids. In the water treatment process, coagulation or flocculation between molecules and particles increases as the zeta potential decreases. Measuring the zeta potential is an indicator of the efficiency of the coagulation process.

Teer Quarry

for contaminants in bottled water to protect public health. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at (800) 426-4791.

Source Water Information Available

The State's Source Water Assessment Program (SWAP) conducted periodic assessments of all drinking water sources across North Carolina. The purpose of the assessments is to determine the susceptibility of each drinking water source (well or surface water intake) to potential contaminant sources (PCS).

The susceptibility rating for each water source was determined by considering the number and location of potential contaminants, along with the conditions of the City's water sources and watershed. A susceptibility rating of "higher" does not imply poor water quality – only the systems' potential to become contaminated in the assessment area. The assessment findings are summarized in the table below:

SUSCEPTIBILITY OF SOURCES TO POTENTIAL CONTAMINANT SOURCES (PCSs)

SOURCE NAME	SUSCEPTIBILITY RATING	SWAP REPORT DATE
Little River Reservoir	Moderate	March 18, 2005
Lake Michie	Moderate	March 18, 2005

For a more detailed report, visit www.deh.enr.state.nc.us/pws/swap. Please note that because SWAP results and reports are periodically updated, the results on this web site may differ from the results that were available at the time this Water Quality Report was prepared.

To obtain a printed copy of the SWAP report, please mail a 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 SWAP report please contact DENR's Source Water Assessment staff by phone at 919-715-2633.

How does water travel?

As water travels over 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 the following:

- 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 that can be naturally occurring

How is Durham's water treated?

Durham's two drinking water facilities provide water to approximately 246,180 people according to the 2010 census. The oldest facility is the Williams Water Treatment Plant on Hillandale Road, and was built in 1917. It has been expanded and upgraded a number of times and has a current capacity of 22 MGD. The Brown Water Treatment Plant, on Infinity Road, was built in 1977 and has a current capacity of 30 MGD. Both plants operate using optimized conventional water treatment processes.

At the water treatment facilities, raw water is mixed with caustic to adjust the pH (acidity or alkalinity). Ferric sulfate is added to cause particles to clump together or coagulate. After mixing, the water flows into settling basins where the particles stick together, become heavy, and settle to the bottom of the basins (flocculation). After chloramination (chlorine + ammonia added as a disinfectant), the water flows through sand/anthracite filters to remove any remaining particles. **Fluoride** is then added prior to distribution to our customers.

The City of Durham has added fluoride to its drinking water since 1957 to promote dental health. Existing state regulations required a target concentration of 1.0 mg/l for fluoride. Recently, the EPA determined that dental health could still be maintained with lower levels of fluoride. Based on this, NC regulators have allowed water systems to decrease their fluoride target levels to 0.7 mg/l. The City changed dosage levels for fluoride immediately upon receiving approval.

Hydrofluorosilicic acid

The official chemical name of fluoride that is added to water to promote dental health.

2010 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 (MCLG)	POTENTIAL SOURCE(S) OF SUBSTANCE
REGULATED AT THE TREATMENT PLANTS					
Fluoride mg/L	0.86 (0.47 – 1.00)	NO	4.0	4.0	Naturally occurring mineral; also added to promote dental health
Nitrate mg/L (as Nitrogen)	0.21 (< 0.10 – 0.33)	NO	10.0	10.0	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Turbidity NTU	0.08 (0.05 – 0.10)	NO	TT	N/A	Soil runoff
Turbidity, % of monthly samples ≤ 0.3 NTU	100%	NO	95%	100%	
Total Organic Carbon mg/l (TOC) Results show the range of TOC in both source and treated water. Durham's processes remove more than the required 50%.	Average Removal 68% Source 6.61 (4.75 –10.50) Treated 2.10 (1.23 – 3.40)	NO	NR	TT 50% removal	Naturally present in the environment
Alpha emitters pCi/L (Samples collected & analyzed February 2008)	None detected (no range)	NO	15	0	Erosion of natural deposits
Beta/photon emitters pCi/L (Samples collected & analyzed February 2008)	None detected (no range)	NO	50	0	Decay of natural and man-made deposits
REGULATED AT THE CUSTOMER'S TAP					
Copper mg/L (EPA required triennial sampling conducted in July – September 2010)	< 0.05 (90th percentile)	NO	AL=1.3	< 1.3	Corrosion of household plumbing systems None of the targeted 87 sampling sites exceeded the Action Level
Lead mg/L (EPA required triennial sampling conducted in July – September 2010)	< 0.003 (90th percentile)	NO	AL=0.015	0	Corrosion of household plumbing systems None of the targeted 87 sampling sites exceeded the Action Level
REGULATED IN THE DISTRIBUTION SYSTEM					
Chloramines mg/L (as Cl_2)	2.9 RAA (Running Annual Average)	NO	MRDL 4.0	MRDLG 4.0	Disinfectant to control microbes
Chlorine mg/l	2.3 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	27.9 – System Average (9 – 54)	NO	60	0	By-product of drinking water disinfection
Total Trihalomethanes (TTHM) µg/L	39.8 – System Average (24 – 74)	NO	80	0	By-product of drinking water disinfection
UNREGULATED SUBSTANCES					
Sodium mg/L	29.3 (21.5 – 36.1)	NO	NR	20 DWEL	Naturally occurring element in soil and water
Sulfate mg/L	46 (36 – 52)	NO	NR	250	Naturally occurring mineral in soil

In 2010 quarterly water samples were collected from the distribution system and tested for 26 specific contaminants that are a part of a larger group of contaminants called synthetic organic compounds (SOC's). Of these 26 contaminants only one, Dalapon, was detected at a concentration of 0.0014 mg/l, which is well below the maximum allowable limit of 0.2000 mg/l. (Dalapon is a general use herbicide and is classified as such by the US Environmental Protection Agency.)

The City of Durham (PWSID # 03-32-010) routinely monitors for over 150 contaminants in your drinking water to comply with Federal and State laws. The table below lists all the drinking water contaminants that were detected during **testing conducted from January 1 through December 31, 2010**. Water providers are allowed 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 water quality, is more than one year old.

ELEMENTS OF INTEREST

SUBSTANCE, UNIT OF MEASUREMENT	ANNUAL AVERAGE
pH, standard units (range)	7.3 – 7.7
Alkalinity, mg/L	23.0
Calcium, mg/L	4.8
Chloride, mg/L	12.1
Conductivity, micromhos/cm	209.0
Hardness - Calculated, mg/L	20.0
Hardness - EDTA, mg/L	22.0
Orthophosphate, mg/L (as phosphorus)	0.88
Potassium, mg/L	1.8
Total Solids, mg/L	129.0
Zinc, mg/L	0.73

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; a measure of the radioactivity in water
NTU	Nephelometric Turbidity Units; measures the clarity or cloudiness in water
N/A	Not Applicable
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 a potentially adverse 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 that comes from animal wastes and occurs naturally in rivers and lakes throughout the United States. Controlling and minimizing development and animal activities in our watershed reduces the occurrence of *Crypto* in source water. This microscopic organism is typically 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. Although Durham had already monitored source water for *Crypto* as a part of the Information Collection Rule, we began monthly monitoring in fall 2006 as a part of the Long Term Two Enhanced Surface Water Treatment Rule (LT2SWTR). *Crypto* has not been detected in any monitoring events to date; long term the results of monitoring will determine whether or not additional treatment will be necessary.

Lead and Drinking Water

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Department of Water Management is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 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 on the EPA's website at www.epa.gov/safewater/lead, the Safe Drinking Water Hotline or at or the City's website at www.DurhamNC.gov/Departments/WM/Lead.cfm.

Cross Connections and Backflow Prevention

Ensuring that the drinking water provided to customers is safe does not stop at the end of the treatment process. In fact, federal and state regulations require the City to protect the water from potential contamination or pollution all the way to the customer's tap. Contamination can occur when the supply line to a customer is connected to equipment containing a substance not fit for drinking purposes. These connections are called cross-connections. To prevent situations like this from occurring, the department's Cross-connection control (CCC) staff implements the City's CCC ordinance.

The ordinance requires all industrial, commercial, and irrigation customers to obtain a backflow permit and install backflow prevention assemblies. ***Backflow preventers*** are specially designed valves that respond to drops in system pressure and help to avert system contamination from various kinds of cross connections. These assemblies must be installed on the customer's property before any branching of the private system. After an approved assembly has been installed and tested, it must be retested annually. For more information on the City's CCC Program and ordinance, visit the City's website at www.DurhamNC.gov.

Water System Improvement Projects

During the past few years, Water Management has begun several significant projects to rehabilitate, renew and expand our water system facilities. These projects make up over 50 percent of the department's annual Capital Improvement Program (**CIP**) and are funded by our ratepayers. Projects of this size and scope generally take several years to complete as they move from design through permitting and construction to completion.

Many of the current water projects are driven by regulatory requirements. The upgrades at both the Williams Water Treatment Plant (WTP) and the Brown WTP will address treatment process improvements to reduce the formation of disinfection byproducts in the distribution system (refer to the substance table on page 4 for more information on TTHMs and HAAs). We are also expanding the Brown WTPs treatment capacity by 12 MGD for a total capacity of 42 MGD.

Installation of the New Brown WTP 42 inch Distribution Line

Several smaller projects will improve the system's **reliability** by providing additional standby power and emergency pumping. Other projects address long deferred maintenance issues such as rehabbing chemical feed systems, sludge transfer pumps and filters, rebuilding/replacing finished water pumps, and replacing valves, drives and other motors.

In addition to electrical upgrades at the facilities, new Supervisory Control And Data Acquisition (better known as **SCADA**) systems will be installed at both WTPs, dams, booster stations and elevated storage tanks. SCADA systems allow staff to remotely – in real time – monitor processes in the treatment facilities as well as at other locations in the distribution system.

The City is also in the design phase for a new 3.0 MG elevated storage tank in southeast Durham which will improve the reliability and system pressure in this portion of the service area. Other distribution system projects underway include the Southern Reinforcing Main project and the Hillandale Dual Water Line project. More information on these and other CIP projects can be found on the City's website at ww2.DurhamNC.gov/CIP/Main.cfm.

The City completed Phase 1 of the four-phase Automated Meter Reading (**AMR**) project in December of 2010. More than 20,000 electronic meters were replaced in several districts, most north of Interstate 85. With this drive-by technology, one meter reader can now collect readings from approximately 3,800 meters in 2.5 hours – a task that used to take 8 staff members up to two days. In the remaining phases of the project, another 60,000 meters will be replaced so that all accounts in the system – both residential and non-residential – will be read using this technology. As more portions of the system are converted to AMR, the City anticipates moving to monthly billing for all accounts.

Rebate

The City's High Efficiency Toilet Rebate Program allows residents and businesses with a City of Durham water account to replace their existing toilets with more efficient, WaterSense certified models. Eligible applicants receive a $100 credit on their water bill for every qualified toilet replacement. For more information, visit www.DurhamSavesWater.org or call (919) 560-4381.

The Department of Water Management is committed to providing public education and outreach activities covering a variety of water topics, from water conservation and water efficiency to water quality. Citizens are urged to contact Conservation Program staff for presentations or to set up tours of facilities.

A major component of the outreach program is the annual conservation/water efficiency themed poster contest for local students in kindergarten to eighth grade. Each year, these students artistically demonstrate their understanding of the importance and value of safe drinking water. In this report, we are featuring the winning entries for the past two years. These were chosen from among 270 total submittals from 11 schools.

2010 Poster Contest

Every Drop Counts

133 entries

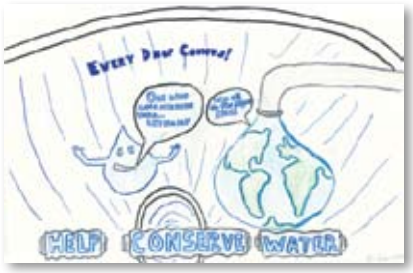
Grade 3-5 Winners

1st Place	Ian Layzer	Durham Academy
2nd Place	Christen Mela	Durham Academy
3rd Place	Earnisha Thomas	Durham Academy

Grade 6-8 Winners

1st Place	Keels Jones	Voyager Academy
2nd Place	Natalie Liller	Voyager Academy
3rd Place	Jemar Beulah	Chewning Middle School

1st Place Grade 3-5 by Ian Layzer



1st Place Grade 6-8 by Keels Jones

2011 Poster Contest

Catch the Wave of Water Conservation

135 entries

Grade K-2 Winners

1st Place	Mukta Dharmapurikar	Durham Academy
2nd Place	Sarah Davis	Immaculata Catholic School
3rd Place	Lahari Vellanki	Immaculata Catholic School

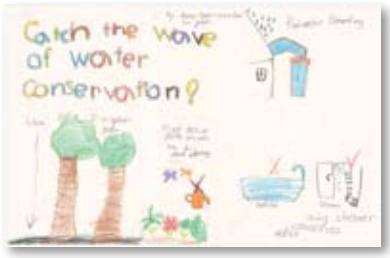
Grade 3-5 Winners

1st Place	Hank Kelly	Montessori Community School
2nd Place	Sarah Kim	Durham Academy
3rd Place	Shaylen Atma	Durham Academy

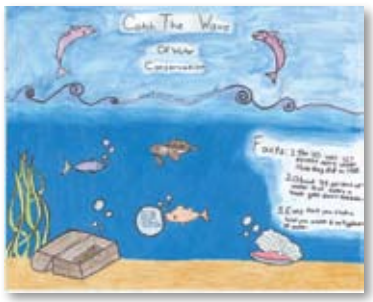
Grade 6-8 Winners

1st Place	Meg Shepherd	Voyager Academy
2nd Place	Rachael C.M. Hand	Trinity School
3rd Place	Jordan Mangum	Voyager Academy

1st Place Grade K-2 by Mukta Dharmapurikar



1st Place Grade 3-5 by Hank Kelly



1st Place Grade 6-8 by Meg Shepherd

Community Participation

Do you have an interest in how decisions regarding Durham's water system or other City issues are made? The public is 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. City Hall is located in downtown Durham at 101 City Hall Plaza.