Water Quality
ANNUAL REPORT

To Our Customers

I am pleased to present you with Concord Public Works' *Annual Water Quality Report*. In keeping with local sustainability goals, it is quite possible that you are reading this report in our newly offered electronic format! While such an offering is certainly environmentally "friendly," the report and information contained within will continue to be made available for all, in whatever format works best for you. As such, hard copies of this report will continue to be made available upon request or for convenient pick-up at designated public facilities including the Town House, Library, and Concord Public Works' Offices.

Concord Public Works continues to accept and embrace its role and responsibility as a local environmental and water resource steward. We are fortunate to serve in a community where such an approach is not only valued but supported, especially when faced with long-range planning challenges or major system investments. While I may see the world through a blue colored lens, I believe there is nothing more precious than our local water resources and the water system that I am charged with managing.

For the most part, the day-to-day efforts undertaken by the personnel within Concord Public Works is generally done with little fanfare and attention. This report is specifically designed to highlight where your drinking water comes from, what it contains, the different treatment processes used to enhance it, and tips on how you can increase your water use efficiency. Most importantly, Concord's drinking water quality continues to meet or exceed all State and Federal drinking water standards. As always, if you have any questions regarding this report, please feel free to contact me at 978-318-3250.

Respectfully,

Alan H. Cathcart
Superintendent, Water/Sewer Division, Concord Public Works

2012 HIGHLIGHTS

Concord received the Community Water System of the Year award from the Massachusetts Water Works Association—a very prestigious award that is awarded to one exemplary water system each year

Completed the rehabilitation of the Route 2A Satellite Pumping Station to include UV disinfection which ensures compliance with 2013 Surface Water Treatment Rule requirements

Completed rehabilitation of the Nagog Pond Dam

Retained design contractor to begin Nagog Pond Master Plan and pilot testing of filtration treatment technologies

Activated new 12 by 18-inch diameter satellite well at the Deaconess Well site to restore the permitted withdrawal from the site

Replaced antiquated and undersized water mains along Belknap Street and on the CCHS campus

For questions about this report or to learn more about protecting Concord's water supply, contact Melissa Simoncini, Senior Environmental and Regulatory Coordinator at 978-318-3250.

Water Quality Summary

To ensure that tap water is safe to drink, the EPA enforces regulations that require stringent monitoring of specific contaminants within public water supply systems. Within Concord's system, over 500 tests are run each year to assess approximately 145 potential contaminants like bacteria, perchlorate, pesticides, metals, etc. Only substances detected in Concord's drinking water in 2012 are listed in the summary table below. The presence of these substances does not indicate that the water poses a health risk. These substances are divided into 3 categories, Primary, Secondary, and Lead & Copper Parameters. The Primary parameters list includes contaminants and associated limits of these contaminants that can adversely affect public health and are known or are anticipated to occur in public water systems. Secondary parameters are set for aesthetic purposes and are designed to assist the EPA in determining their occurrence in drinking water and whether future regulation is warranted. We are proud to report that Concord's water quality testing program not only meets EPA's requirements for drinking water but goes above and beyond those requirements to satisfy the higher standards we have set for ourselves. Additional water quality information is available on our website at *www.concordma.gov/water.*

PRIMARY PARAMETERS

Substance	Units	Highest Level Detected	Range of Levels Found	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Violation	Major Sources in Drinking Water
Barium	ppb	39	9.6–39	2000	2000	No	Erosion of Natural Deposits
Bromate[2]	ppb	6.9	6.9	10	0	No	By-product of drinking water disinfection
Chlorine[2]	ppm	0.33	0.02–2.05	4 (MRDL)	4 (MRDLG)	No	Water treatment for disinfection
Fluoride[1]	ppm	1.4	0.1–1.4	4	4	No	Erosion of natural deposits; Water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Haloacetic Acids[2]	ppb	2.8	ND–5.6	60	No Standard	No	By-product of drinking water disinfection
Nitrate	ppm	2.1	0.12–2.1	10	10	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Combined Radium (2011)	pCi/L	1.1	ND–1.1	5	0	No	Erosion of natural deposits
Trihalomethanes[2]	ppb	11.31	0.62–23	80	No Standard	No	By-product of drinking water disinfection
Turbidity[3]	NTU	0.99	0.70–0.99	5	1	No	Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of water quality

SECONDARY PARAMETERS

Substance	Units	Highest Level Detected	Range of Levels Found	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Violation	Major Sources in Drinking Water
Calcium	ppm	32	5–32	No Standard	No Standard	No	Erosion of natural deposits
Chloride	ppm	200	22–200	250	250	No	Naturally present in the environment
Copper	ppm	0.084	0.0029–0.084	1.3	1.3	No	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives
Hardness	ppm	79	12–79	No Standard	No Standard	No	Erosion of natural deposits
Iron	ppb	94	ND–94	300	No Standard	No	Erosion of natural deposits
Magnesium	ppm	9.2	1.3–9.2	No Standard	No Standard	No	Erosion of natural deposits
Manganese	ppb	33	ND–33	50	No Standard	No	Erosion of natural deposits
Methyl Tertiary-Butyl Ether	ppb	1.6	ND–1.6	No Standard	No Standard	No	Fuel Additive
Potassium	ppm	38	2.8–38	No Standard	No Standard	No	Naturally present in the environment
Sodium	ppm	86	10-86	No Standard	No Standard	No	By-product of drinking water treatment; Naturally present in the environment
Sulfate	ppm	43	ND–43	250	No Standard	No	Naturally present in the environment
Total Dissolved Solids	ppm	430	91–430	500	500	No	Naturally present in the environment

LEAD & COPPER PARAMETERS

Substance	Units	90th Percentile Level Detected	90th Percentile Action Level (AL) (EPA's MCL)	# samples (# exceeding AL)	Ideal Goal (EPA's MCLG)	Exceeds Action Level	Major Sources in Drinking Water
Lead (2011)	ppb	3.1	15	30 (0)	0	No	Corrosion of household plumbing systems; Erosion of natural deposits; see statement below
Copper (2011)	ppm	0.48	1.3	30 (0)	1.3	No	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservative; see statement below

TERMS & ABBREVIATIONS

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

MCL: (Maximum Contaminant Level) The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology.

MCLG: (Maximum Contaminant Level Goal) The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety.

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

MRDLG: (Maximum Residual Disinfectant Level Goal) The level of a drinking water disinfectant below which there is no known expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

ppb: parts per billion or micrograms per liter

ppm: parts per million or milligrams per liter

pCi/L: picocuries per liter

ND: none detected

NTU: Nephelometric Turbidity Units

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

90th Percentile: Out of every 10 homes, 9 were at or below this level.

FOOTNOTES

1 **Fluoride:** The Concord Board of Health voted to fluoridate the drinking water in 1969. Fluoridation using Sodium Fluoride began in 1970. For questions about water fluoridation, contact the Concord Board of Health at 978 318 3275. The Massachusetts Department of Public Health's ideal goal for fluoride is 1 ppm.

2 **Haloacetic Acids, Trihalomethanes and Free Chlorine:** The highest level detected represents the highest running annual average for these contaminants. The range of levels found may have results in excess of the MCL but the running annual average of all sample locations is used to determine compliance.

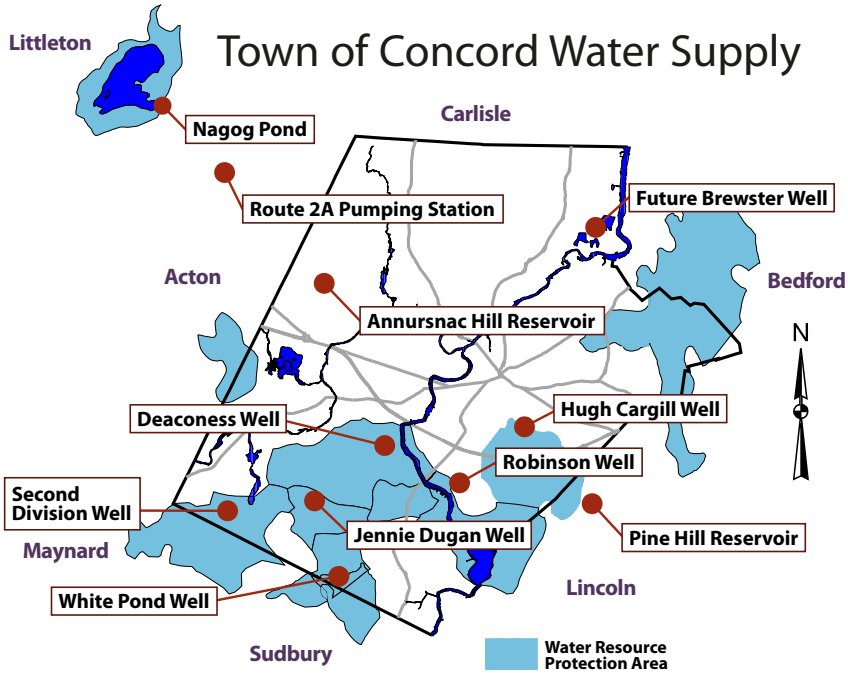
3 **Turbidity:** Turbidity is a measure of the cloudiness of the water. We monitor it because it is an indicator of good water quality and the effectiveness of disinfectants.

Water Supply

Concord's water system consists of six groundwater supplies located in Concord and one surface water supply located on the Acton/Littleton town line. In addition, it has associated pumping stations, two storage reservoirs with a 7.5 million gallon total capacity, approximately 130 miles of water main, and over 1,250 fire hydrants. Depending on the season, all available production facilities may be called upon to satisfy system demands which may fluctuate between 1.5 million gallons per day (MGD) during the winter months to over 4 MGD in the summer. Concord's public water system is interconnected with Acton and Bedford for emergency backup, if ever needed.

Water Treatment

In accordance with State and Federal drinking water requirements, Concord's water is treated before it gets to your tap. Treatment includes: *disinfection*—via the addition of liquid chlorine at all supplies and plus ozone/UV light at the Nagog Pond water supply; *corrosion control*—via the addition of potassium hydroxide and polyphosphate to raise the natural pH of the water and reduce its corrosiveness to household plumbing; *fluoridation*—via the addition of sodium fluoride to help in the prevention of tooth decay; *iron sequestration*—performed by adding polyphosphate to reduce the frequency of discoloration events; and *iron and manganese removal*—performed by pressure filtering the Deaconess and White Pond wells. Due to a high level of water quality in Nagog Pond, the Town continues to operate this source under a filtration waiver. Chemical adjustments and disinfection are provided as noted in the Source Treatment Table (below) to ensure that safe drinking water is delivered to customer's taps.



Drinking Water and People with Weakened Immune Systems

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

SOURCE TREATMENT

	Nagog Pond, Acton, MA	Jennie Dugan Well	Deaconess Wells	White Pond Wells	Second Division Well	Robinson Well	Hugh Cargill Well
Source ID	01S	01G	03G, 10G	04G, 08G, 09G	05G	06G	07G
Potassium Hydroxide to Adjust pH for Corrosion Control	♦	♦	♦	♦	♦	♦	♦
Ultra-Violet Light for Disinfection	♦						
Chlorine for Disinfection	♦	♦	♦	♦	♦	♦	♦
Ozone for Disinfection	♦						
Fluoride to Promote Strong Teeth	♦	♦	♦	♦	♦	♦	♦
Polyphosphate for Iron & Manganese Treatment and Corrosion Control	♦	♦	♦	♦	♦	♦	♦
LayneOx™ Pressure Filtration for Iron & Manganese Removal			♦	♦			
Source Water Protection (SWAP) susceptibility rating*	High	Moderate	High	High	High	High	High

*Susceptibility ratings were developed as a part of the SWAP report and reflect the proximity of potential contaminant sources like farms, golf courses and residential houses to water supplies. Complete SWAP reports are available at 135 Keyes Road and online at *www.mass.gov/dep/water/drinking/3067000.pdf*.

Residents can help to protect Concord's water supplies by:
- Practicing good septic system maintenance
- Supporting water supply protection initiatives at the next town meeting
- Limiting pesticide and fertilizer use

Water Conservation

Spruce Up Your Sprinkler System and Save

It's been a long, hard winter for your yard. While your plants go dormant to cope with the colder weather, your sprinkler system can feel the effects of winter, too. Cracks in the pipes can lead to costly leaks, and broken sprinkler heads can waste water and money. A leaking irrigation system can cause your water bill to increase over $500 a billing cycle!

Now is the perfect time to spruce up your irrigation system before you ramp up your watering efforts this spring and summer. To get started, follow these four simple steps—*inspect*, *connect*, *direct*, and *select*:

- **Inspect**. Check your system for clogged, broken, or missing sprinkler heads. If you're not the do-it-yourself type, go with a pro—look for an irrigation professional certified through a WaterSense labeled irrigation program.
- **Connect**. Examine points where the sprinkler heads connect to pipes/hoses. If water is pooling in your landscape or you have large wet areas, you could have a leak in your system. A leak as small as the tip of a ballpoint pen (1/32nd of an inch) can waste about 6,300 gallons of water per month.
- **Direct**. Are you watering the driveway, house, or sidewalk instead of your yard? Redirect sprinklers to apply water only to your lawn or prized plants.
- **Select**. An improperly scheduled irrigation controller can waste a lot of water and money. Update your system's schedule with the seasons, or select a WaterSense labeled controller to take the guesswork out of scheduling.

Don't forget to add "sprinkler spruce-up" to your spring cleaning list this year. Learn more about maintaining a water-smart yard by visiting the Concord Water's Conservation & Efficiency webpage at *www.concordma.gov/water* and the U.S. Environmental Protection Agency's WaterSense website at *www.epa.gov/watersense/outdoor.*

Is your irrigation system running in the rain?

All irrigation systems in town are required to have a rain sensor which prevents your irrigation system from operating while it is raining. Rain sensors are excellent water savings tools . . . when they are installed properly and are maintained regularly.

A rain sensor must be located at the roofline where it can collect a true representation of the rainfall and in a median area that gets equal amounts of sun and shade. It must not be on an exterior wall of a house under a roof hang, close to ground level, under dense foliage that creates an umbrella or in an extremely sunny or shady location.

Did you know . . .

If your **irrigation** system is more than **10 years old**, it is likely that the sprinkler heads are beginning to experience some degree of **failure** that may be significantly contributing to **wasted water**.

See the Public Works Updates in the *Concord Journal* for more helpful hints, water saving tips and information on current projects.

News and Notes

Let's Make Water Conservation a Habit

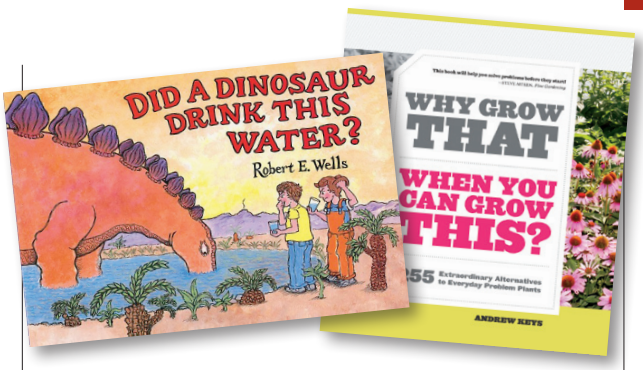
Do you have gorgeous landscaping that requires little to no irrigation?

Concord Water wants to share your success story on our webpage!

Concord water is looking to feature landscapes with water-smart features, such as:

- Drought-tolerant, low water-using, or native plants
- Mulch around shrubs and garden plants
- Limited or functional use of turfgrass
- Water-efficient irrigation design and components (i.e., micro, drip or weather-based irrigation)

To be considered, send us an email with your name, landscape photo, and a short write-up on your experience to *watersmart@concordma.gov* with "watersmart yard" in the subject.



Increase your Water IQ

Books for Adults

Why Grow That When You Can Grow This?
Want a low maintenance garden that looks great? Andrew Keys shares 255 extraordinary alternatives to everyday problem plants.

Books for Kids

Did a Dinosaur Drink This Water?
(ROBERT E. WELLS)
One Well—The Story of Water on Earth
(ROCHELLE STRAUSS)

Books are available at the Concord Free Public Library.

Get Involved

The Public Works Commission oversees the work of Concord Public Works. Their meetings provide an opportunity to become more involved in issues relating to the water system. They typically meet the second Wednesday of each month at 7:15 pm. Please check the PWC website for exact dates and location.

For more information regarding water quality and resource protection initiatives, or if you have a neighborhood concern in a resource protection area (depicted on the map on page 3), please contact Melissa Simoncini, Senior Environmental & Regulatory Coordinator at 978-318-3250 or *msimoncini@concordma.gov*.

Seasonal Water Demand Management Plan

Town of Concord, Massachusetts

	Seasonal Water Conservation Advisory	Outdoor Water Use Restriction	Outdoor Water Use Emergency
	Best Management Practices	State of Water Supply Conservation—Declaration by Public Works Commission	
	Residential Water Conservation Rates in Effect May 1–September 30	Water Demand Approaching Limit of Supply OR Drought Watch/Warning in Effect	Water Demand Has Exceeded Supply. Water Pressure/Fire Protection at Risk OR Drought Emergency in Effect
OUTDOOR WATER ACTIVITIES			
Lawn Watering	**Recommended**[1] Max 2 Day per Week (before 9am)	**Restricted**[2] Max 2 Day per Week (before 9am)	**Prohibited**[2]
Swimming Pools	**OK** Filling or Topping Off	**Restricted**[2] Topping Off Only	**Prohibited**[2]
Washing Car/Truck/Boat	**OK**	**Recommended** Bring to Commercial Car Wash	**Prohibited**[2] Bring to Commercial Car Wash
Flower Beds & Vegetable Gardens	**OK**	**Recommended** Handheld Watering Only	**Restricted**[2] Handheld Watering Only

1 Unless otherwise advised by qualified lawn care specialist.

2 Enforceable with fines ($50, 1st offense. $100, subsequent offenses).

April 2012

You can help conserve water indoors all year long by utilizing the following recomended practices:
Only wash full loads in your laundry and dish washing machines. Keep showers short and remember that showers use less than baths.

Visit concordma.gov for current State of Demand Management
Sign up for Water and Sewer Divison email updates by subscribing to News and Notices on the *concordma.gov* homepage.

Cross Connection Control and You

Concord Public Works' Water Rules and Regulations, as well as Massachusetts' drinking water regulations, require that public water systems be protected from potential contamination resulting from cross connections.

What is a cross connection?

A cross connection occurs whenever a potable drinking water line is directly or indirectly linked to a piece of equipment or piping containing non-potable (polluted) water.

Why should I be concerned?

An unprotected or inadequately protected cross connection in your home or workplace could contaminate the drinking water not only in your building, but also in neighboring homes and businesses. Severe illnesses have been caused by cross connection contamination that could have been prevented.

How does this happen?

Typically this occurs when equipment, plumbing fixtures or attachments such as garden hoses may contain chemicals or water that becomes contaminated over time. When something unexpected happens that alters water pressure in the line or the direction of water flow, contaminants are then sucked from the equipment and into the drinking water line.

Can it happen at my home?

Outdoor hose bibbs and garden hoses tend to be the most common sources of cross connections at home. The garden hose creates a hazard when submerged in non-potable water such as a swimming pool or when attached to a chemical sprayer for weed killing. Fertilizer, garden chemicals or other materials may contaminate hoses left lying on the ground. Other household cross connections can occur when lawn irrigation systems, boilers, water filtration devices, and fire service systems are connected to the home's plumbing.

How can I be protected?

All industrial, commercial and institutional facilities are annually surveyed to ensure that all potential cross connections are identified and eliminated or protected by a backflow preventer. We also inspect and test these backflow preventers to make sure they are providing maximum protection.

At home, do not attach any chemical or non-potable liquid applicators to anything connected to your plumbing system. Outdoors, install hose bibb vacuum breakers on any outside faucet. Owners of in-ground irrigation systems are required to have an operable backflow preventer installed on the system.

What is a Backflow Preventer?

A Backflow Preventer is a mechanical device installed in the plumbing line to prevent the introduction of pollutants or contaminants into the drinking water supply. Types include reduced principal assembly, (RPBP) double check valve assembly (DCVA), pressure vacuum breaker assembly (PVB) and "air gap". The most simple type is the "air gap" or simply keeping the end of the water line or hose from coming in direct contact with the vessel being filled with water.

Where can I get more information?

If you need more information you can contact the Plumbing Inspector's office or the Water & Sewer Division.

Potential Sources of Contaminants

Contaminants that may be present in source water include:

- **Microbial contaminants**, such as viruses and bacteria, may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants,** such as salts and metals, can be naturally occurring or result from urban storm water runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, and farming.
- **Pesticides and herbicides** may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants** include synthetic and volatile organic chemicals that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants** can be naturally occurring or be the result of oil and gas production, and mining activities.

In order to ensure that tap water is safe to drink, the Department and EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. FDA and the Massachusetts Department of Public Health regulations establish limits 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 some small amounts of certain substances which the EPA calls "contaminants." The presence of these substances does not necessarily indicate that the water poses a health risk. For example, naturally occurring dissolved minerals are commonly found in well water. More information about the substances found in drinking water and their potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791 or the Massachusetts Drinking Water Program at 1-617-292-5770.

Three Ways to Help Protect Concord's Water in 2013

Our drinking water supply is precious and we need to do everything we can to protect it. Protection of Concord's untreated supply is the first line of defense in ensuring cost effective, safe drinking water.

DO NOT FLUSH YOUR UNUSED PHARMACEUTICALS! Bring your unwanted medications and sharps to the Unwanted Medication Collection Event sponsored by Concord Public Works and REUSIT, on Concord's semi-annual Drop-Off Day, May 4th and October 19th at 135 Keyes Road.

DON'T DUMP HAZARDOUS WASTE into household drains, storm drains, on the ground or in the trash. Bring hazardous waste to the Minute Man Regional Hazardous Waste Facility in Lexington one weekend/month April–November. Curbside subscribers receive a free pass and non-subscribers pay the facility directly. *www.concordma.gov/recycle*

KEEP STORMWATER CLEAN by practicing healthy household habits. Keep common pollutants like pesticides, pet waste, grass clippings and automotive fluids off the ground and out of stormwater. *www.concordma.gov/engineering*

2013 Rain Barrel Program

Special offer for Concord Water Customers

- Natural Whiskey Barrels: $127.50
- Refinished Whiskey Barrels: $142.50
- Plastic Barrels: $72.50
  Available in Black, Blue, Grey and Terracotta



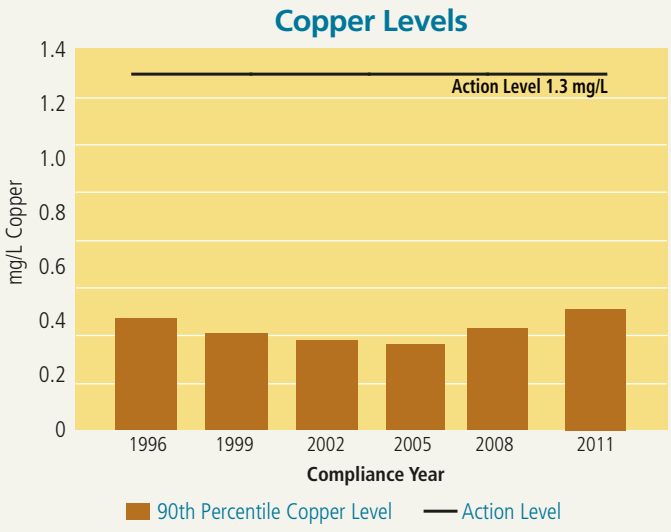

Order deadline is Wednesday, April 24, 2013.
For more information and to place your order, visit *www.upcycle-products.com* and select the Concord, MA Order Form on the right-hand side of the homepage.

Water Quality

Lead & Copper

In accordance with U.S. Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (MassDEP) regulations, Concord's Water Division tests for lead and copper on a three-year schedule. The last round of lead and copper sampling was completed in late summer 2011 and will be repeated in late summer 2014. A total of 30 homes throughout Concord are sampled on this schedule to confirm the effectiveness of our corrosion control efforts. The two graphs on this page summarize Concord's compliance levels for the past five compliance periods. More information is available in the Water Quality Summary on page 2.

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. Concord Water 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 from the EPA's Safe Drinking Water Hotline at *http://www.epa.gov/safewater/lead* or visit the Concord Public Works website at *www.concordma.gov/cpw.*



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Water Quality ANNUAL REPORT

Printed on 100% Recycled Paper

CONCORD PUBLIC WORKS
Water/Sewer Division
PWS ID 3067000
135 Keyes Road
Concord, MA 01742

Help us help you! Make sure you are signed up to receive emergency notification.

Concord Water utilizes many methods to notify Concord Water Customers of emergency situations like large water main breaks and water quality upsets. Two proven emergency notification methods that we have utilized are the Town of Concord's Code Red System and the Concord News and Notices (email updates). It takes less than five minutes to sign up for both invaluable notification services. Help us help you be notified quickly in the case of a water emergency.

Code Red is the more efficient version of old reverse-911. Even if you have a land-line phone you are not automatically registered with the Code Red emergency notification service. To register go to *www.concordma.gov*, select the "Emergency Notification System Registration" button and follow the instructions. We encourage you to make sure that each one of your cell phones and home phones are registered. This is a Town-wide notification system.

Concord News and Notice email updates are a great way to stay informed about what is happening around Town, like Town Office closures due to holidays/snow events, water main flushing, water emergency notifications and/or special programs like rain barrels. To Subscribe to the Concord News and Notices go to *http://www.concordma.gov/Subscriber*.