



2015 Annual Drinking Water Quality Report

Why This Report?

The Safe Drinking Water Act requires the Lincoln Water System to annually issue a report describing the quality of your drinking water. The purpose of this report is to raise your understanding of drinking water and awareness of the need to protect our drinking water sources. This report provides an overview of last year's water quality data collected from January 1 through December 31, 2015, including details about your sources of water, what it contains and how it compares to State and Federal standards.

Este formulario tiene información muy importante acerca del agua que usted bebe. Consiga que alguien se lo lea en español.

Báo cáo này chứa thông tin quan trọng về nước bạn uống. Tìm một người đọc nó cho bạn bằng tiếng Việt.

Where Does Our Water Come From?

The sources of drinking water (both tap and bottled) include rivers, lakes, streams, ponds, reservoirs, springs and wells. Fortunately, our community receives its water from a self-replenishing source naturally high in quality. Lincoln's water comes from wells where the ground water is under the direct influence of surface water. In 2015, more than 11.6 billion gallons of water was pumped from these wells to serve the 272,996 people who use an average of about 31.8 million gallons of water each day.

A source water assessment of our water supply has been completed by the Nebraska Department of Environmental Quality (NDEQ). The assessment includes maps, an inventory of potential contaminant sources and a determination of the vulnerability of the system to contamination. If you have any questions or would like to view the source water assessment, please call John Keith, 402-441-1622, to schedule an appointment.



This report and other information about water are available on the City's website at lincoln.ne.gov (keyword: water).

OUR GOAL

"...the quality of water produced and distributed shall meet or exceed all State and Federal standards governing such distribution."

--excerpt,

Statement of Purpose, Lincoln Water System



To Learn More

For answers to questions you may have or to learn more about the water you drink, call John Keith at 402-441-1622. This report and other information about water are available on the City's website at lincoln.ne.gov (keyword: water).

If you would like to participate in the decision-making process, please contact the City Clerk to arrange to be placed on the agenda for the regularly scheduled Monday City Council meetings.

Test Results (2015 data unless otherwise noted)

Regulated Contaminants

Tested and Detected	Units	Regulatory Limit (MCL)	Goal (MCLG)	Ashland Plants	Lincoln (a)	Violation Yes/No	Likely Source
Inorganic Contaminants							
Arsenic - Ashland	ppb	10	N/A	6.9-9.8	-	No	Erosion of natural deposits; runoff from orchards; runoff from glass and electronic production
Barium - Ashland (07/13)	ppb	2000	2000	98-106	-	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Chromium - Ashland (07/13)	ppb	100	100	1.20-1.42	-	No	Discharge from steel and pulp mills; erosion of natural deposits
Copper (c) - Lincoln (06/13) 90th percentile	ppm	1.3*	1.3	N/A	0.02-0.96 0.69	No	Corrosion of household plumbing; erosion of natural deposits; leaching from wood preservatives
Fluoride (d) (monthly)	ppm	4	4	0.98-0.99	0.85-1.0 (b)	No	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Lead (c) (6/13) - Lincoln 90th percentile	ppb	15*	0	N/A	ND-8.63 (b) 3.5	No	Corrosion of household plumbing; erosion of natural deposits
Nickel - Ashland (07/13)	ppb	100	N/A	1.57-1.63	-	No	Erosion of natural deposits; leaching
Nitrate+Nitrite - Ashland	ppm	10	10	0.43-1.1	-	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Synthetic Organic Contaminants (Pesticides and Herbicides)							
Atrazine - Ashland	ppb	3	3	0.09-0.17	-	No	Runoff from herbicide used on row crops
Radioactive Contaminants							
Gross Alpha (4/07 - Ashland)	pCi/L	15	0	3.2-10.2 (f)	-	No	Erosion of natural desopits
Radium 226 and 228 combined Ashland	pCi/L	5	0	0.62-1.04	-	No	Erosion of natural desopits
Uranium combined (1/06) Ashland	ug/L	30	0	5.6-8	-	No	Erosion of natural desopits
Disinfection - By-Products							
Trihalomethanes - Lincoln LRA	ppb	80	N/A	12.4-21.3	22.0-52.3 (f) 26.5-36.2	No	By-product of drinking water chlorination
Total Haloacetic Acid (HAA5) - Lincoln LRA	ppb	60	N/A	N/A	7.7-28.2 (f) 9.2-17.2	No	By-product of drinking water chlorination
Bromate	ppb	10	0	1.7-3.4	N/A	No	By-product of drinking water ozonation
Clarity							
Turbidity (e)	NTU	0.3	N/A	0.01-0.19	N/A	No	Soil runoff
Microbiological	Total Coliform Maximum Contaminant Level	Goal (MCLG)	Highest Monthly Positive Coliform Samples	Total Positive E. Coli or Fecal Coliform Samples in 2015	Violation	Fecal Coliform or E. Coli Maximum Contaminant Level	Likely Source of Contamination
Coliform Bacteria	5% of monthly samples are positive	0	2 (1.32%)	0	No	Fecal Coliform or E. Coli MCL; A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or E. Coli positive.	Total Coliform Bacteria are naturally present in the environment. Fecal coliform and E. Coli are present in human and animal fecal waste.

Key to Test Results

MCL - Maximum Contaminant Level: The highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLGs 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. MCLGs allow for a margin of safety.

ppm (parts per million) = mg/L (milligrams per liter) - One ppm corresponds to 1 gallon of water in 1,000,000 gallons of water.

ppb (parts per billion) - One ppb corresponds to 1 gallon of water in 1,000,000,000 gallons of water.

N/A - Not applicable; ND - Not detected; pCi/L - pico Curies per liter (measure of radioactivity)

NTU - Nephelometric Turbidity Unit: A measure of the cloudiness of the water

- (a) No water was pumped from Lincoln peaking wells in 2011-2015.
- (b) Samples collected from homes and businesses in the distribution system.
- (c) Water from the treatment plant does not contain lead or copper. Tests for lead and copper are collected from the customer's tap to ensure the substances have not been dissolved from the customer's service or interior piping system.
- (d) Fluoride is added in treatment to bring the natural level of about 0.4 ppm to the optimum of 0.8 ppm.
- (e) TT - Treatment Technique

* Action Level is the concentration of a contaminant which triggers treatment or another requirement which a water system must follow.

- (f) Samples collected quarterly in 2015

LRA - Locational Running Average

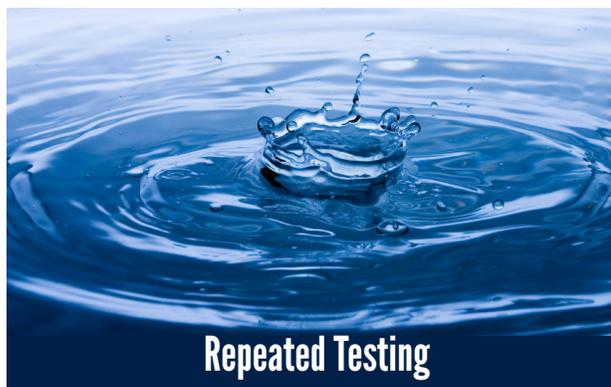
Water Quality Parameters 2015

(Average of 12 monthly water quality analyses)

pH (in pH units)	7.74
Total Alkalinity (CaCO ₃)	174 ppm
Total Hardness (CaCO ₃) (13 grains per gallon)	215 ppm
Total Dissolved Solids	385 ppm
Calcium	62 ppm
Chloride	24 ppm
Iron	<0.05 ppm
Manganese	2.2 ppb
Sodium	37.8 ppm
Sulfate	100 ppm

Lincoln's water is moderately hard.

Alkalinity, pH and hardness are important if considering a water softener.



Unregulated Contaminants Tested

Although unregulated, Lincoln Water System monitors the following contaminants:

Tested and Detected	Units	Ashland
Total Organic Carbon	ppm	2.0-3.4 (f)
Radon (1/06)	pCi/L	218-261

Tested and Not Detected:

1,1,1,2-Tetrachloroethane, 1,1,2,2-Tetrachloroethane, 1,1-Dichloroethane, 1,1-Dichloropropene, 1,2,3-Trichloropropane, 1,3-Dichloropropane, cis-1,3-Dichloropropene, 2,2-Dichloropropane, Bromobenzene, Bromomethane, Chlorobenzene, Chloroethane, Chloromethane, Dicamba, Dibromomethane, m-Dichlorobenzene, m-Xylene, o-Chlorotoluene, o-Xylene, p-Chlorotoluene, p-Xylene, Aldrin, Butachlor, Dieldrin, Metribuzin, Propachlor, Paraquat, Methyl-T-Butyl-Ether (MTBE), 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, 1,2-Dibromoethane, 2-Chlorotoluene, n-butylbenzene, sec-Butylbenzene, tert-Butylbenzene, n-Propylbenzene, p-Isopropyltoluene, trans-1,3-Dichloropropene, Bromochloromethane, Chloropyrifos, Dichlorodifluoromethane, Hexachlorobutadiene, Naphthalene, Trichlorofluoromethane, Butylate, Cyanazine, 1,2-Dibromoethane, Fonofos, Isopropylbenzene, 1,2,3-Trichlorobenzene, Trifluralin, aldicarb, aldicarb sulfone, aldicarb sulfoxide, carbaryl, methomyl, 3-hydroxycarbofuran, Dimethoate, 2,2',4,4',5,5'-Hexabromodiphenyl ether (HBB), 2,2',4,4',5,5'-Hexabromodiphenyl ether (BDE-153), 2,2',4,4',5-Pentabromodiphenyl ether (BDE-99), 2,2',4,4',6-Pentabromodiphenyl ether (BDE-100), Terbufos-sulfone, 2,2',4,4'-Tetrabromodiphenyl ether (BDE-47), 1,3-Dinitrobenzene, RDX (Hexahydro-1,3,5-trinitro-1,3,5-Triazine), TNT (2,4,6-Trinitrotoluene), N-Nitrosodiethylamine (NDEA), N-Nitrosodi-N-butylamine (NDBA), N-Nitrosodi-N-propylamine (NDPA), N-Nitrosomethylethylamine (NMEA), N-Nitrosopyrrolidine (NPYR), Acetochlor, Acetochlor ESA, Acetochlor OA, Alachlor ESA, Alachlor OA, Metolachlor ESA, Metolachlor OA

Regulated Contaminants Tested and Not Detected:

Inorganic Chemicals: Antimony, Asbestos, Beryllium, Cadmium, Cyanide, Mercury, Selenium, Thallium. Volatile Organic Chemicals (VOC's): Benzene, Carbon Tetrachloride, o-Dichlorobenzene, p-Dichlorobenzene, 1,2-Dibromo-3-chloropropane, 1,2-Dichloroethane, 1,1-Dichloroethylene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Dichloromethane, 1,2-Dichloropropane, Ethylbenzene, Chlorobenzene, Tetrachloroethylene, 1,2,4-Trichlorobenzene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, Styrene, Toluene, Xylenes (total). Non-Volatile Synthetic Organic Chemicals including herbicides and pesticides: Alachlor, Benzo(a)pyrene, Chlordane, Dalapon, Di(2-ethylhexyl)adipate, Dinoseb, Di(2-ethylhexyl)phthalate, Diquat, 2,4-D, Endothall, Endrin, Ethylene Dibromide, Heptachlor, Heptachlor Epoxide, Hexachlorobenzene, Hexachlorocyclopentadiene, Lindane, Methoxychlor, Pentachlorophenol, Polychlorinated Biphenyls, Simazine, Picloram, Toxaphene, 2,4,5-TP (Silvex), Carbofuran, Oxamyl.

Purifying Our Water

Thanks to the natural filtration of the aquifer, nature has already done much of the work in enhancing the quality of Lincoln's water. Our water still contains iron and manganese, which pose no health concern but can stain clothing and plumbing fixtures if left untreated. To remove these unwanted elements, water is pumped to the water treatment plants. The water flows through one of two processes before it is sent to your home or business.

- The oldest process, highly effective since the 1930s, uses aeration, chlorination, detention and filtration. An exact amount of chlorine is added to the water in a large underground reservoir.

The water is held in the reservoir for up to two hours. The iron and manganese form particles which are then trapped in the sand and gravel filters. The filters are cleaned every 120 hours using a process called backwashing.



- The second process uses ozone technology. Ozone, an extremely strong oxidizer and disinfectant, reacts quickly with iron and manganese to form particles which are then removed in the filtration process.

The next step is vital to protecting the health of our community. Once the water passes through the filters, small but exact amounts of chlorine and ammonia are added. These chemicals combine to form a disinfectant called "chloramine," which prevents the growth of bacteria in the City's water pipes. Finally, fluoride is added to help prevent tooth decay.

What Does This Information Mean?

As the regulations require, we routinely test your water for numerous contaminants. These include total coliforms, turbidity, inorganic contaminants, nitrate, nitrite, lead and copper, volatile organic contaminants, total trihalomethanes and synthetic organic contaminants. The contaminants found in Lincoln's water are shown in the test results table on the inside of this brochure. The State allows us to test for some contaminants less often than once per year when the concentrations of these contaminants do not change frequently. Therefore, some of this data may be more than one year old.

The presence of contaminants does not necessarily indicate a health risk. More information about contaminants and potential health effects can be obtained from EPA's website at epa.gov, by calling the EPA hotline at 800-426-4791 or by calling the Lincoln-Lancaster County Health Department at 402-441-8000.

What Else Is Done To Protect My Water?

The residential customer, the business customer and the commercial/industrial customer all share equally in protecting Lincoln's water. One way to do this is through a "cross connection control program." A cross connection is any physical or potential connection between the drinking water supply and a source of possible contamination or pollution. The purpose of the program is to protect the drinking water supply system by either eliminating cross connections or installing approved backflow prevention devices to prevent the contamination from entering the drinking water supply.

Contaminants and pollutants can enter the drinking water supply when there is a sudden loss of pressure from heavy usage or a fire in the area of a broken water main. When that happens, contaminated water could be siphoned through the plumbing system into the public water mains. These pressure drops occur somewhere in the City almost every day. Backflow prevention devices are invaluable in preventing contaminants from entering the water supply in these situations.

Every five (5) years, property owners and tenants are required by the Nebraska Department of Health and Human Services regulations to inspect their plumbing systems and report any suspected or potential cross connections to the Lincoln Water System. Residential and commercial customers are notified when a "premise survey" is required. These surveys must be completed and sent back to the Lincoln Water System. All cross connections to the public water supply must be protected with a suitable backflow prevention device.

Property owners and tenants have the responsibility to ensure that no cross connections exist on their property and that they are properly protected with an approved backflow prevention device. Property owners and tenants must have these devices tested annually to ensure proper, continuous operation. A list of registered testers can be obtained from the Lincoln Water System by calling 402-441-5912. The cost of the test is the responsibility of the owner. For more information on the cross connection program, visit the City's website at lincoln.ne.gov (keyword: water).

In addition, City ordinance requires the installation of backflow prevention devices on lawn irrigation systems. Even though State law does not require these devices to be tested, property owners are encouraged to have the devices tested annually to protect against contamination of the interior plumbing system.

How Pure Is Our Drinking Water?

As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and can pick up substances resulting from the presence of animal or human activities. Things that can impact the purity of our water include microbial contaminants, organic or inorganic contaminants, and even pesticides, herbicides and radioactive contaminants. To ensure that tap water is safe to drink, the EPA regulations limit the amount of contaminants in drinking water. Although a few contaminants such as atrazine and total trihalomethanes and arsenic were detected during testing, the concentrations were below the levels required by EPA.

Atrazine is an herbicide used by farmers to kill weeds in corn and grain sorghum. Atrazine is applied to the fields at planting time. When it rains, atrazine is washed from fields and enters streams and rivers.

Trihalomethanes includes four chemicals formed when chlorine, which is added to the water to kill bacteria, reacts with naturally occurring organic matter in the water. The maximum level allowed is 80 parts per billion, and Lincoln's water is always below this level. It should be noted that any harmful health effects caused by disinfection by-products are small compared with the health risks associated with inadequate disinfection.

Arsenic, a natural occurring element associated with soil and rock, is also detected in Lincoln's drinking water and remains below USEPA limits. The Safe Drinking Water standard (MCL) for arsenic is 10 ppb (parts per billion). While Lincoln's drinking water meets EPA's standard, it does contain between 6.9 ppb - 9.8 ppb arsenic based on testing performed in 2015. Prior to 2015, the highest arsenic level was 8.2 ppb as reported in previous Consumer Confidence Reports. EPA's standard balances arsenic's possible health effects against the cost of removing it from drinking water. EPA continues to research the health effects. At concentrations much higher than regulatory levels, arsenic is known to cause some types of cancer and other health problems. Lincoln Water System continues to evaluate options for future treatment and removal of arsenic as regulations require.

Lead And Copper

Lincoln's water does not contain lead as water leaves the treatment plant and is distributed to customers. However, lead in pipes and lead solder used in home and business plumbing systems can introduce lead into drinking water. Homes built before 1988 in Nebraska are more likely to have lead pipes, fixtures and/or solder. On-going testing of water in Lincoln sampled at the tap from homes constructed before 1988 continue to show lead and copper below USEPA health-based action levels.

Lincoln's water has a pH above 7.5 and is moderately hard so lead and copper from plumbing materials don't tend to dissolve into the water. Lead and copper sampling is performed by the Lincoln Water System every three years as required by the USEPA Lead and Copper Rule (LCR). The results for the fifty-two (52) samples collected in 2013 were below the USEPA action level of 15 parts per billion lead and 1,300 parts per billion copper.

If present, elevated levels of lead can cause serious health problems, especially for infants, young children and pregnant women. Lead in drinking water is primarily from materials and components associated with service lines and home

plumbing. Lincoln Water System 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 the 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 Safe Drinking Water Hotline at 1-800-426-4791; the EPA website www.epa.gov/safewater/lead; the DHHS/Division of Public Health/Office of Drinking Water at 402-471-2541; or you may call the Lincoln Lancaster County Health Department at 402-441-8000 with any health-related questions.

Special Health Requirements

While the presence of chloramines in our water is not a cause for concern among the general public, home dialysis patients, immuno-compromised individuals and aquarium owners must take special precautions before the water can be used.

Water used for kidney dialysis equipment may require further treatment. Please contact your doctor or dialysis technician to ensure that your home equipment is adequate and proper tests are being made every time it is used.

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



Conserve . . . Reduce Outdoor Water

The last time Lincoln had mandatory water restrictions was during the drought of 2012. Since that time the City has revised its Water Management Plan to simplify watering restrictions. One important change was placing all multi-family, commercial, industrial, governmental properties, street medians and single family properties with a common irrigation system on a set schedule regardless of address. **Designated watering days for these properties will be on Sundays, Tuesdays and Fridays regardless of property address as shown below. Single family properties and duplexes will remain on the same designated day schedule based on even/odd numbered addresses as in previous years.**

Property Type	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Multi-family, commercial, industrial, governmental, institutional properties, street medians and single family properties (townhome developments) with a common irrigation system. All addresses.	●		●			●	
Single family properties and duplexes with even numbered addresses (ending in 0,2,4,6 or 8)	●			●		●	
Single family properties and duplexes with odd numbered addresses (ending in 1,3,5,7 or 9)			●		●		●

On warm summer days, several million gallons of treated drinking water are used to irrigate lawns in Lincoln. Customers are reminded that the three (3) designated day watering schedule is to provide flexibility how and when lawns are watered. The schedule is not meant to suggest that lawns be watered all three (3) days. Rather, property owners should consider using only minimal amounts of water to maintain landscapes and restrict weekly watering to one (1) or two (2) days, if possible.

Another change to simplify the plan is to allow occasional outdoor watering at any time using an attended, handheld hose. This change allows for minimal watering of landscape materials, container plantings and bird baths without risk of ticketing during mandatory restrictions.



For additional online information regarding the Water Management Plan and other helpful tips on water conservation, please visit lincoln.ne.gov (keyword: water). Or, contact the Water Management Hotline at 402-441-1212.



Water Conservation Poster Contest

Lincoln fifth-graders participate annually in a water conservation poster contest sponsored by the Mayor's Environmental Task Force. The top entry received in 2015 was submitted by Kaidence Boyd of Huntington Elementary, whose artwork was displayed on a StarTran bus board.



Lincoln Water System Facts

- LWS spends \$1.37 million for electricity and diesel fuel to pump water to Lincoln and another \$1.37 million for electricity to move water to all parts of the City.
- Every person in Lincoln used an average of 116 gallons of water every day in 2015 compared to 128 gallons per day in 2014.
- The City of Lincoln covers an area of more than 93 square miles.
- Lincoln Water System maintains 1,211 miles of water mains, 11,320 fire hydrants and 26,370 valves.
- 117 broken mains were repaired in 2015.
- Water services are owned and maintained by the property owner.
- Water delivered to your home or business can vary in temperature from 41°F to 77°F.