

US EPA ARCHIVE DOCUMENT

American Society of Landscape Architects



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www.epa.gov/greenskapes

Designing for Water Efficiency

- Practices, Products & Protection for Water Efficient Use in Landscapes



Conventional Wisdom

30 Years ago

- Butter on a burn reduced the pain and improved healing.
- After a heart attack bed rest for one month was a doctors orders.
- Fertilizer full of nitrogen makes lawns and flowers grow better.

What can ASLA and EPA Do Together?

- **Landscape architecture encompasses the analysis planning, design, management, and stewardship of the natural and built environments.**
- **ASLA members can design landscape to reduce water usage by 50% NOW.**

Your Water Quality Report

- Run off from fertilizer
- Erosion sends us heavy metals
- Cleaners needed for drinking water



Tropical Storm Allison, 2001, Buffalo Bayou. Allison devastated much of Harris County and was the costliest tropical storm in U.S. History.



City of Houston Department of Public Works and Engineering WATER QUALITY REPORT

The City of Houston's drinking water **meets or exceeds all Texas Commission on Environmental Quality (TCEQ) and Environmental Protection Agency (EPA) requirements.**

Safe Drinking Water Act Amendments
The following information has always been available to City of Houston customers. Since October 1999, all community water systems have been required to provide their customers an annual report on the quality of their drinking water.

2004 CONTAMINANTS DETECTED IN YOUR DRINKING WATER: NONE WAS ABOVE THE MCL

Sources of Drinking Water

The sources of tap water and bottled water include lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land, it picks up substances that dissolve naturally in groundwater, and it picks up substances from the presence of animals or human activity. Contaminants that may be present in source water include minerals such as viruses and bacteria, inorganic substances such as pesticides and herbicides, organic chemicals, and synthetic and volatile organic chemicals, and inorganic constituents.

Main System 1010013

Houston customers receive their water from the Main System.

City of Houston Water Sources

The total production from all sources averaged 889 million gallons per day (MGD) in 2004. The City of Houston draws 70% of its treated drinking water from its four surface water treatment plants. Surface water comes from the San Jacinto River through the Conroe and Houston, and the Trinity River through Livingston. The remaining 30% comes from 193 permitted wells at 93 separate groundwater plants. These are very deep wells, producing water from the Evangeline and Chicot Aquifers, and are not vulnerable to surface contamination. The TCEQ completed a Source Water Assessment for the City of Houston, and results indicate that some of our sources are susceptible to certain contaminants. The sampling requirements for our water system are based on this susceptibility and previous sample data. Any detection of these contaminants will be found in this Report. For more information on source water assessments and protection efforts at our system contact 713/842-4031.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. Contaminants may be found in drinking water that may cause taste, color, or odor problems. Presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline 800/426-4791.

What about arsenic levels?

While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the cost of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems. Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system and may have an increased risk of getting cancer.

CONTAMINANT (units)	MCLG	MCL (max. level allowed)	SURFACE WATER	GROUNDWATER	SOURCES OF CONTAMINANTS
Alpha Emitters (pCi/l)	0	15	<2.0 Average Highest <2.0 (2003)	1.3 Average Highest 21.7	Erosion of natural deposits
Arsenic (ppb)	0	10***	<2.0 Average Highest <2.0	3.1 Average Highest 3.8	Erosion of natural deposits
Atrazine (ppb)	3	5	<0.2 Average Highest 0.2	<0.2 Average Highest < 0.2 (2003)	Runoff from herbicide used on row crops; commonly found in surface water at low levels
Barium (ppm)	2	2	0.0518 Average Highest 0.0664	0.2865 Average Highest 0.3460	Discharge of mining wastes; erosion of natural deposits
Beta/Photon Emitters (pCi/l)	0	50***	<4.0 Average Highest 5.0 (2003)	7.5 Average Highest 12.7	Decay of natural or man made deposits
Copper (ppm)	1.3	90% below AL=1.3	90% below 0.216 at customer tap - none exceeded AL** (2002)	90% below 0.216 at customer tap - none exceeded AL** (2002)	Erosion of natural deposits; corrosion of household plumbing
Ethylbenzene (ppb)	700	700	<0.5 Average Highest <0.5	<0.5 Average Highest 1.2	Discharge from petroleum refineries
Fluoride (ppm)	4.0	4.0	0.8 Average Highest 0.7	0.2 Average Highest 0.3	Water sensitive which promotes strong salts; erosion of natural deposits
Lead (ppb)	0	90% below AL=15	90% below 4.1 at customer tap - none exceeded AL** (2002)	90% below 4.1 at customer tap - none exceeded AL** (2002)	Erosion of natural deposits; corrosion of household plumbing
Nitrate (ppm) as N	10	10	Total Nitrate & Nitrite 0.30 Average Highest 0.37	Total Nitrate & Nitrite 0.12 Average Highest 0.23	Runoff from fertilizer use; erosion of natural deposits
Nitrite (ppm) as N	1	1	Total Nitrate & Nitrite 0.30 Average Highest 0.37	Total Nitrate & Nitrite 0.12 Average Highest 0.23	Runoff from fertilizer use; erosion of natural deposits
Selenium (ppb)	50	50	<0.3 Average Highest <0.3	5.1 Average Highest 10.2	Erosion of natural deposits
Toluene (ppm)	1	1	<0.0005 Average Highest <0.0005	<0.0005 Average Highest 0.0002	Discharge from petroleum factories
Combined Radium (pCi/l)	0	5	<1.0 Average Highest 1.0 (2003)	<1.0 Average Highest 3.8	Erosion of natural deposits
Total Xylenes (ppm)	10	10	<0.0015 Average Highest <0.0015	<0.0015 Average Highest 0.0025	Discharge from petroleum factories; discharge from chemical factories

** Calendar Year 2004 data unless otherwise specified
 ** Includes groundwater and surface water sites
 *** EPA considers 50 picocuries per liter to be the level of concern for beta particles.
 **** These arsenic values are effective January 23, 2006. Until then, the MCL is 50 ppb and there currently is no MCLG.

TERMINOLOGY

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Maximum Contaminant Level (MCL): The highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available technology.
Maximum Contaminant Level Goal (MCLG): 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.
Maximum Residual Disinfectant Level Goal (MRDLG): The level of drinking water disinfectant below which there is no known or expected risk to health.
Maximum Residual Disinfectant Level (MRDL): The highest level of a drinking water disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Treatment Technique (TT): A required process intended to

Unregulated Contaminants: Unregulated contaminants are those for which EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist EPA in determining the occurrence of unregulated contaminants in drinking water and whether future regulation is warranted.

MEASUREMENT DEFINITIONS

NTU nephelometric turbidity units
 pCi/l picocuries per liter
 (a measure of radioactivity)
 ppm parts per million
 ppb parts per billion
 EPS entry points sampled
 NA not applicable

En Español

Este informe contiene información muy importante sobre de su agua que bebe. Tradúzcalo, o hable con alguien que lo entienda. Para más información por favor llame Línea de Ayuda de Houston marcando 311.

Water Wars

- *PBS*
- *POINT OF VIEW*
- *'Thirsty'*



Water Quality and Soil Quality

- Soil Quality makes it easier to manage Water Quality.
- Cleaner water flows from a green roof than a shingled roof.



Our Soil Needs Help

- What is clay?
- What changes clay?
- How do you stop run off?



Fertigation is 911

- Israel's history – fertigation.
- Precise application of the nutrients and biology.
- Fertigation has produced 400% increase in tomato crop yield.



What is in a Green Roof

- Plants
- Perlite and compost tea
- Not much water – 8.33 lbs per gallon



Drainage & Rain Harvesting

- Using drainage plans to harvest water for irrigation purposes.
- Do detention ponds allow water to percolate back into the aquifer?
- What is subsidence?
- Using pervious paving for groundwater infiltration.

Residential Growth



Compost Tea and Fertigation



Specifications

- www.landscapivitamins.com
 - Specifications for finished biological compost on the test results page.
 - Recipe for making your own Compost Tea in the FAQ section.

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