City of Lubbock

Water Quality Report 2002

July 2002

RAIN GARDENS: SUSTAINABLE LANDSCAPES FOR PLAYA COMMUNITIES

by Jason Hodges, Landscape Architect

Chances are you live near one. You probably drive past one on your way to work each day. You've probably played in a park that was built around one. Playa lakes were once the only reliable source of potable water for humans and wildlife on the Southern High Plains. Today, these urban lakes are becoming so polluted with nitrogen, phosphorous, sediment, pesticides, herbicides and trash that fish kills are occurring and aquatic ecosystems are becoming dysfunctional. A fish kill occurs when biological oxygen demand (BOD) exceeds the available oxygen in the water to sustain aquatic life. The fish cannot find enough oxygen in the water, and they suffocate.

The Environmental Protection Agency (EPA) has determined that up to 70% of the pollution in our surface waters comes from rainwater run-off. We tend to believe large industrial polluters cause most water pollution, but this is not the case. Studies have shown that about 50% of pollution comes from individuals and homeowners, due to yard care, yard waste, and chemical pollution from household activities. Although Lubbock residents experience a semi-arid climate, with only 18 inches of rainfall on average annually, our yards contribute to local water quality all year round. Each time rain falls or snow melts, water is directed away from your property and into the street or alley. On its way, it picks up pollutants: dirt, lawn clippings, pet waste, salt, lawn chemicals, gas and oil. This water and the pollution load it carries generally flows to the nearest street and from there to the nearest playa lake.

You can help break the pollution cycle by keeping rainwater on your property and using it the way nature intended: to nourish the plants in your yard.

Rain Gardens are simply perennial gardens constructed in slight depressions or swales where rainwater can be captured to soak naturally into the soil. In the days after a storm, the Rain Garden absorbs, filters, and stores the rainwater and nourishes the ornamental grasses, trees, and flowering perennials. Gardens of varying sizes may be integrated seamlessly into your residential landscape and designed to attract wildlife, provide shade and natural beauty, and reduce the amount of rainwater flowing down the

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Where Does Our Water Come From?

The City of Lubbock's drinking water comes from both surface and ground water sources. During 2002, the citizens of Lubbock used approximately 14 billion gallons of water. Our primary water source is Lake Meredith which is located approximately 150 miles north of Lubbock. The Canadian River Municipal Water Authority manages and maintains this water source and the aqueduct system that transports this water to Lubbock. Of the 14 billion gallons of water used, over 12 billion gallons of the water were supplied by Lake Meredith. The remaining 2 billion gallons used were supplied by well fields located in Bailey county.

Este reporte incluye informacion importante sobre el agua para tomar. Para asistencia en espanol, favor de llamar al telefono 775-2592.

Helpful Definitions for Reading this Report

The following is a list of definitions used in the charts on the following pages:

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

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

Action Level (AL) – The concentration of a contaminant, or substance which, if exceeded, triggers treatment or other requirement which a water system must follow.

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

Part per million (ppm) – One part per million. For example, if you had a million dollars, one part per million would equal one dollar.

Part per billion (ppb) – One part per billion. For example, if you had a billion dollars, one part per billion would equal one dollar.

mrem/year – millirems per year (a measure of radiation absorbed by the body)

NTU – nephelometric turbidity units (a measure of turbidity)

pCi/l – picocuries per liter (a measure of radioactivity)

MRDL – Maximum Residual Disinfection 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 Disinfection Level Goal. The level of drinking water contaminant below which there is no known or expected risk to health. MRDLG's do not reflect the benefits of the use of disinfectants to control microbial contamination.

Important Information for Your Consideration

Special Information for 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 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 (1-800-426-4791).

SUBSTANCE	MONITORING DATE*	MCL	HIGHEST LEVEL DETECTED	MCLG	RANGE	SOURCES OF CONTAMINATION
REGULATED AT TREATMENT PLANT						
BETA/PHOTON EMITTERS	2002	50 pCi/L**	11.9 pCi/L	0	N/A	Decay of natural and man-made deposits
ALPHA EMITTERS	2002	15 pCi/L	8.1 pCi/L	0	N/A	Erosion of natural deposits
COMBINED RADIUM	2002	5 pCi/L	1.3 pCi/L	0	N/A	Erosion of natural deposits
ARSENIC	2002	50 ppb	4.7 ppb	N/A	N/A	Erosion of natural deposits; runoff from orchards
BARIUM	2002	2 ppm	0.2 ppm	2 ppm	N/A	Erosion of natural deposits
FLUORIDE	2002	4 ppm	0.9 ppm	4 ppm	N/A	Erosion of natural deposits
NITRATE	2002	10 ppm	1.05 ppm	10 ppm	N/A	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion
TURBIDITY	2002	TT = 5 NTU TT = % of samples <0.3 NTU	0.20 NTU 100%	0	N/A	Soil runoff
TOTAL ORGANIC CARBON	2002	TT	2.3 ppm	TT	2.0 - 2.8 ppm	Naturally present in environment
DIETHYLHEXYLPHTHALATE	2002	6 ppb	4.12 ppb	0	0-4.12 ppb	Discharge from rubber and chemical factories.
CHLORAMINES	2002	MRDL= 4 ppm	3.0 ppm	MRDLG= 4 ppm	0.4 - 3.0ppm	Water additive used to control microbes
REGULATED IN THE DISTRIBUTION SYSTEM						
TOTAL TRIHALOMETHANES	2002	80 ppb	29 ppb average	0	none detected to 34 ppb	By-product of drinking water chlorination
TOTAL COLIFORM	2002	Presence of coliform in 5% or more of the monthly samples	Highest monthly % of positive samples =0.76	N/A	N/A	Naturally present in environment
HALOACETIC ACIDS (5)	2002	60 ppb	23 ppb	0	none detected to 23 ppb	By-product of drinking water chlorination
REGULATED AT THE CUSTOMERS' TAP						
LEAD	2000	15 ppb AL	2.0 ppb *** No sites exceeded AL	0	< 0.3-5.9 ppb	Erosion of natural deposits; corrosion of household plumbing systems
COPPER	2000	1.3 ppm AL	0.106 ppm*** No sites exceeded AL	1.3 ppm	0.0031-0.177 ppm	Erosion of natural deposits; corrosion of household plumbing systems

*The state allows the city to monitor for some substances less than once per year because the concentrations of these substances do not change frequently. Some of our data, though representative, is more than one year old.

**The MCL for Beta/Photon Emitters is 4 mrem/year. The EPA considers 50 pCi/L to be a level for concern.

***Lead and copper values represent the 90th percentile of results from the last sampling, conducted in September 2000.

How Much Do You Know About Water?

Contaminants may be found in drinking water that may cause taste, color, or odor problems, These types of problems are not necessarily causes for health concerns. For more information about taste, odor, or color of drinking water, please call 775-2614.

SUBSTANCE	MONITORING DATE*	MCL	HIGHEST LEVEL DETECTED	MCLG	RANGE	SOURCES OF CONTAMINATION
UNREGULATED SUBSTANCES#						
CHLOROFORM	2002	Not Regulated	5.9 ppb	Not Regulated	1.1 - 5.9 ppb	Component of Total Trihalomethanes
BROMODICHLORO-METHANE	2002	Not Regulated	7.4 ppb	Not Regulated	none detected to 7.4 ppb	Component of Total Trihalomethanes
DIBROMOCHLORO-METHANE	2002	Not Regulated	13.9 ppb	Not Regulated	none detected to 13.9 ppb	Component of Total Trihalomethanes
BROMOFORM	2002	Not Regulated	7.2 ppb	Not Regulated	none detected to 7.2 ppb	Component of Total Trihalomethanes
SULFATE	2002	300 ppm ^	297 ppm	Not Regulated	N/A	Mineral and Nutrient
ADDITIONAL MONITORING						
ALUMINUM	2002	0.05-0.2ppm^	0.32 ppm^^	N/A	N/A	Water Treatment Chemical
CHLORIDE	2002	300 ppm ^	348 ppm^^	N/A	N/A	Naturally occurring
TOTAL DISSOLVED SOLIDS	2002	1000 ppm^	1167 ppm^^	N/A	N/A	Naturally occurring
AMMONIA	2002	Not Regulated	0.264 ppm average	N/A	0.017 - 1.01 ppm	Water Treatment Chemical
CALCIUM	2002	Not Regulated	60 ppm	N/A	N/A	Naturally occurring
MAGNESIUM	2002	Not Regulated	39 ppm	N/A	N/A	Naturally occurring
SODIUM	2002	Not Regulated	307 ppm	N/A	N/A	Naturally occurring
HARDNESS	2002	Not Regulated	297 ppm	N/A	N/A	Naturally occurring
CONDUCTANCE	2002	Not Regulated	2304 micromhos/cm	N/A	N/A	Naturally occurring
TOTAL ALKALINITY	2002	Not Regulated	190 ppm	N/A	N/A	Naturally occurring
INFORMATION COLLECTION RULE MONITORING (Finished water results)^^^						
HALOKETONES	1997-98	Not Regulated	1.0 ppb	N/A	0-1.0 ppb	By-product of drinking water chlorination
HALOACETONITRILES	1997-98	Not Regulated	7.9 ppb	N/A	0.6-7.9 ppb	By-product of drinking water chlorination
TOTAL ORGANIC HALIDES	1997-98	Not Regulated	115 ppb	N/A	84-115 ppb	By-product of drinking water chlorination
CYANOGEN CHLORIDE	1997-98	Not Regulated	2.9 ppb	N/A	1.5-2.9 ppb	By-product of drinking water chlorination
CHLORAL HYDRATE	1997-98	Not Regulated	3.5 ppb	N/A	0-3.5 ppb	By-product of drinking water chlorination

Unregulated contaminant monitoring helps EPA to determine where certain contaminants occur and whether it needs to regulate those contaminants.

^Secondary Constituent Levels set by the Texas Commission on Environmental Quality.

^^Exceed Secondary Constituent Levels. Substances that exceed secondary levels generally pose no health risks but may cause aesthetic problems relating to taste, odor and other nuisance conditions.

^^^Information Collection Rule monitoring was conducted from July 1997 through December 1998 in order to assist EPA to determine occurrence of some contaminants and whether to regulate those contaminants.

How Much Do You Know About Bottled 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. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

When drinking water meets federal standards there may not be any health based benefits to purchasing bottled water or point of use devices. 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 water poses a health risk. More information about contaminants and potential health effects can be obtained by called the EPA's Safe Drinking Water Hotline at (800) 426-4791.

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street and into the local playa lake. Rain gardens are a great way for both the do-it-yourself homeowner and the large corporation to help reduce, or nearly eliminate, rainwater runoff from their property. Rain gardens, large or small, help recharge groundwater, reduce flooding, and add precious green space to cities.

The design of a rain garden can draw inspiration from just about anything, any place, person or event. Whatever you decide, remember that the garden as well as all landscapes, is a reflection of our society, or cultural beliefs, hopes and aspirations. For my home rain garden, I've drawn inspiration from native playa lakes. In spring, the characteristic bands of vegetation grow in circular swaths around the shallow waters. In the heat of the summer, the sun-baked lake bottom quickly dries up and large cracks open up in the mud. In my design, basic materials of water (when it rains), stone and grasses will be arranged, not to recreate or mimic the landscape of the playa lake, but to evoke the spirit of the place through repetition of color patterns, textural combinations and through the periodic and subtle revelation of water.

Once you have developed a design, there are some technical aspects to consider prior to construction. The single most important characteristic determining the success of the rain garden is the soil infiltration rate. Water must be able to soak into the garden within a matter of hours. To evaluate your own soil, perform a simple percolation test. Begin by excavating a small hole, approximately 12" deep. Fill it full of water and record the time it takes for the water to soak in. A target infiltration rate for this test is around 2 to 3 inches per hour, resulting in a ponding time of 4 to 6 hours. This test will help determine the depth and amount of amendment you'll need to make to your garden soil prior to planting.

Most Lubbock soils are sandy loam and will exhibit infiltration rates satisfactory for development of rain gardens, however a few areas may have clay loam or even a thin heavy clay lense of soil. If you encounter a lighter colored heavy clay soil during excavation, continue excavating until you go through it into underlying soil or excavate to a minimum 30" depth. An ideal rain garden planting mixture will contain approximately 60% clay loam, 20% sand and 20% compost.

If your percolation test goes over 6 hours, incorporate equal amounts of sand and compost into the topsoil you excavated from the garden. If your test results are shorter than two hours, your soil may be too sandy. You may need to add clay loam topsoil to your planting mixture most Lubbock soils are sandy loam and will exhibit infiltration rates satisfactory for development of rain gardens, however a few areas may have clay loam or even a thin heavy clay lense of soil. If you encounter a lighter colored heavy clay soil during excavation, continue excavating until you go through it into soil or excavate to a minimum 30" depth. An ideal rain garden planting mixture will contain approximately 60% clay loam, 20% sand and 20% compost.

A few additional issues should be addressed prior to beginning your project. Make sure your rain garden is located a minimum of 10' from any habitable structure and that the elevation of the garden will be lower than the structure. Always check with utility (water, sewer, gas, electric, phone, etc.) authorities prior to excavating, especially in right of way zones and land use easements near streets and alleys.

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If your percolation test goes over 6 hours, incorporate equal amounts of sand and compost into the topsoil you excavated from the garden. If your test results are shorter than two hours, your soil may be too sandy. You may need to add clay loam topsoil to your planting mixture. Regardless, always incorporate compost into new planting soils and remember to mulch around new plantings.

A primary goal of sustainable building and site development should be, wherever possible, to retain rainwater where it falls, treating water as a resource, not discharging it as a waste product. By incorporating Rain Gardens as landscaping features, rainwater run-off can be harvested, filtered and allowed to soak into the soil on-site, thereby sustaining beautiful landscapes and reducing adverse impacts to our playa communities.

A few additional tips on how you can help reduce rainwater run-off:

- Minimize concrete (impervious) pavement everywhere you can, such as at home, at work, or in neighborhood parks.
- Select porous pavement products for you driveway, yard and landscaping. Porous asphalt, and numerous forms of crushed aggregate are available, such as washed gravel, decomposed granite, crushed brick and crushed cinder block. These materials are utilized successfully throughout West Texas and unlike concrete, these materials allow water to soak into the ground around them.
- Maintain turf grass at a minimum of 3” high in order to increase surface friction and encourage water infiltration into your soil.
- Improve the permeability of your lawn areas by aerating your soil, a process whereby small holes are mechanically or manually punctured 6-10 inches deep into your lawn soil. Aeration opens up the soil to receive air and water and can loosen up the soil structure where previously compacted.

ACKNOWLEGEMENT
Jason Hodges is an award-winning Landscape Architect specializing in ecological restoration and sustainable design. He may be reached at 783-8446.

Are You Taking Responsibility for Your Watering?

If you have an automatic system, are the heads spraying in the right direction? Are the sprinklers in proper working order? Is the timing set correctly or are you watering the street? Do you know how many inches of water your turf really needs? Do you know how many minutes it takes to get to that level of water?

Nobody likes water in the street, please water responsibly.

Wise Watering Tip

Remember watering efficiently saves you money. Watering before 10:00 a.m. and after 6 p.m. insures that all the water that you use to water will go on the grass and not be lost due to evaporation. Watering used during the heat of the day has about a 50% evaporation rate.

Do You Know...

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presences of animals or from human activity. In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

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

Educational Opportunities

The Public Works Education Team provides many programs and opportunities for our citizens and customers to learn about wise resource use in Lubbock. Our programs are available upon request and focus on water conservation, waste reduction and recycling.

In addition, we encourage our customers to contact us any with questions or concerns. It is our goal to keep our customers informed to the best of our ability . Our customers' comments and suggestions are important to us.

To make comments and suggestions, or to find out more information about educational opportunities, please call 775-2596.

Water Quality Report

We Welcome Your Comments

If you have any questions regarding water quality issues, please contact:

- The Safe Drinking Water Hotline at 1-800-426-4791
- For questions about Lubbock's water quality , call 775-2614

  Monday – Friday between 7:30 a.m. and 4:30 p.m.
- For general questions about Lubbock Water Utilities, or additional copies of this brochure, call 775-2596

  Monday – Friday between 8 a.m. and 5 p.m.
- City Council meetings are held the 2nd and 4th Thursday of each month.

  Citizen comments are from 7:30 a.m. to 8:00 a.m.

We're on the web!
www.ci.lubbock.tx.us