



Urban Harvest

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Rain Gardens and Water Retention

Bob Randall, Ph.D.

Many parts of the world, including Greater Houston, have highly erratic rainfall with frequent six inch or more rainfalls and long periods of drought often accompanied in summer months by high levels of evaporation. Our area, with its heavy clay soil in most parts, absorbs rainwater slowly, so runoff even from unpaved and unroofed areas is still often excessive.

When clay is dry, it often sheds water, rather than absorbs it. This causes several problems. The most infamous and dramatic is flooding downstream, but it is by no means the only problem excessive rainfall causes. Runoff also prevents water table recharging and that in turn stresses deep-rooted perennials like trees. These in turn then compete fiercely and usually victoriously for whatever moisture there is with shallow rooted plants including lawn and vegetables. Gardeners then water from their hoses and irrigation systems, spending money that neither they nor their cities really want to spend. There are additional problems with foundations and subsidence that recharged water tables ameliorate, problems caused by silt erosion and soil depletion, and then of course water pollution caused by the washing of chemicals into the bayous and Gulf.

Is the problem the solution? Traditionally flooding has been dealt with at a community-wide level using various combinations of large-scale drainage and retention. The question of whether efforts by residents to reduce runoff from their land would significantly reduce flooding is, however, an open one. What if all properties reduced runoff in ten-inch storms by half? I don't really know what is possible, but I do know from personal experience and reading in the permaculture literature that there are several practical things one can do to reduce runoff, and all of them improve the garden and reduce water costs. So if people knew about them and implemented them, there would be less water heading downstream during storms.

Reducing Runoff

On city lots without steep slopes, there are three main ways you can reduce runoff: (1) heavily mulched perennial gardens, (2) rainwater cisterns, and (3) wet gardens.

Garden Mulch Beds

Almost any heavily mulched garden consisting of well-adapted perennial trees, shrubs and herbaceous plants will, once the root systems establish, absorb more rainwater than does lawn. If the mulch is made from composted wood (not bark), composted leaves and plants, or hay, the effect is particularly dramatic because the soil underneath becomes friable and absorbing. If these beds are edged with Windsor stone or other concrete framing materials, and positioned to slow water

flowing to the street, the effects are especially strong. A large bed can be constructed for \$100-\$200 in less than a day's work.

Cisterns

Rainwater cisterns are much more costly, but will pay back in irrigation water fairly quickly. The idea is to catch all water coming off the roof and use it for irrigation during dry periods. The cost (if you do none of your own work) for one gallon of storage is less than 4 cents per year. In an average year, that gallon of storage will fill up 8 times. So water from cisterns costs less than one half cent per gallon.

Houston and most other cities charge you twice for water—once when you pour it and once when you throw it away (sewage). Since irrigation isn't put back into sewage, but is charged as if it were, irrigation costs the gardener double what other water costs. I pay about six tenths of a cent per gallon for water and the same for sewage, so city water costs me about one and a quarter cents per gallon for irrigation. So cisterns reduce my irrigation bills by half.

Wet Gardens

There are essentially three types of wet gardens: the pond, the bog, and the rain garden. Ponds come in many forms but all of them have mosquito-eating fish and other creatures year round. Ron Jones of U.S. Fisheries and Wildlife teaches an excellent Nature Ponds class for Urban Harvest every summer. Even with a liner six inches under the clay bottom, ponds can be somewhat costly to maintain during dry hot periods unless you have runoff from a roof or hill to keep water levels up.

Bog gardens are put in places that are permanently damp, and feature plants that thrive in permanent wetness. They are much more shallow than are ponds, and may or may not have fish. Since they are shallow, they cost less to keep wet than do ponds, but they need to be designed carefully to avoid becoming mosquito breeders.

Rain gardens, by contrast, are merely low spots that will fill up with water during wet periods and become dry when it does not rain. They are thus much less costly and much less work to maintain, capture water well, and are among the most beautiful flower gardens I have ever grown.

Where to Build

Rain gardens are very easy to build and can easily become the best summer flower garden you have. If you have poorly draining soil, such as gumbo clay, you are in luck. If you have fast draining sand, you will need a liner. To build a rain garden, find a sunny place where water accumulates after a heavy rain or where it travels downhill. If you have clay or loam soil, dig the area about eight inches deep and as big as necessary to hold all the water from all but the biggest storms. Take the soil removed and build up the surrounding area to make it higher. If the area is on a slope—such as drainage to the street, make the dug area longer running perpendicular to the direction of flow, and pile the soil on the downward side of the dug area. This creates what permaculturists have long called a swale. It is one of the best ways to recharge the water tables.

If you have a fast draining sandy soil, you have two choices. To have a rain garden, remove about 14 inches of soil from the area. Line it with recycled plastic or a pond liner, puncture it in a few places for drainage, and then back fill with 6 inches of soil high in clay content. Otherwise, leave it unlined and find plants that thrive with less water than those recommended below.

What to Plant

Once you have your rain garden, plant ornamentals that do well with intermittent high water and drought. There are many kinds, but the following are known to do well in these conditions. The spring blooming plants are mostly early, mid-season, and late Louisiana iris and the swamp crinium *Crinum americana*. Summer and fall includes that crinium and tall plants like the red, Texas star hibiscus (*Hibiscus coccineus*) and the pink with red-centered Halberd-leaved hibiscus (*Hibiscus militaris* {*laevis*}). Medium-sized summer plants include the pink *Physostegia* and the giant red-flowered swamp hibiscus (*Hibiscus moscheutos*). Short plants include society garlic. Also the white spider lily *Hymenocallis galvestonensis* and many other native plants of poor drainage will probably do well.

Maintenance

Occasionally, during summer, if there is a long drought, and I want flowers, I fill the rain garden up. Once or twice a year when the weather is nice, after a rain, I pull out any grasses that are spreading into the rain garden. This improves the look, but isn't necessary for plant health. Also, long after a bloom, I cut dead stalks to the ground. But otherwise, my rain garden is the most beautiful garden I have and has the lowest maintenance. The fact that it helps conserve water, reduces water bills, helps stop flooding, pollution and soil erosion makes it all the better.