

Considering Graywater?



University of California

Agriculture and Natural Resources

UCCE Master Gardener Program

A recent question to the Help Desk asked whether it was perfectly safe to use dish-washing water (kitchen graywater) in the garden?

The answer is no, it is not safe. Pathogens can enter graywater through food sources in the kitchen, which is why use of graywater generated from kitchen sinks and dishwashers is not recommended. Research examining the microbial makeup of kitchen-sourced graywater indicates that direct contact with it can pose a health risk to humans.

But what about other sources of graywater? In the current drought all gardeners in California are trying to maximize water in their gardens. Are you considering graywater? Read on for some things to consider in your decision-making.

What is graywater? In California, the state Health and Safety Code section 1 7922.12 defines graywater as "...untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes." "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers." In 2009, the California Plumbing Code was changed to allow simple laundry-to-landscape systems to be installed in single- and two-family residences without permits (although some communities require registration or permitting of such systems).

Graywater Systems. There are several graywater systems a homeowner could install. The most simple and inexpensive is the laundry-to-landscape system. All other graywater systems require permitting. The more complex the system the more maintenance and expense required. For that reason we think the laundry-to-landscape system is the one most likely to be considered by home gardeners.

Laundry-to-landscape graywater systems are relatively simple and can be a do-it-yourself project. Estimates range from \$200 for do-it-yourself to \$1000 for a professional installation. The East Bay Municipal Utility District offers a \$50 rebate for the 3-way valve that is required for laundry-to-landscape installations. Information on

EBMUD programs can be found at <https://www.ebmud.com/water-and-wastewater/water-conservation/graywater-rebates>.

The San Francisco Public Utility Commission has put out a [Graywater Design Manual](#). While it is written for San Francisco building codes, it does provide good descriptions of the different graywater systems, designs, and pictures to give you an idea of exactly what might be involved in installing a graywater system.

Using graywater in the landscape has potential risk for human health and the landscape. Following the requirements of the California Plumbing Code, your local building codes and the suggestions below will help mitigate risk. The [code requirements](#) for graywater systems including laundry-to-landscape are in Chapter 16 of the 2013 California Plumbing Code, "Alternate Water Sources for NonPotable Applications."

Local permitting requirements. While California allows laundry-to-landscape systems without permits, individual cities may require registration or permits or may prohibit graywater completely so check with your city before proceeding.

Long-term effects of graywater on plants and soil. Because the use of graywater in residential landscapes is relatively new there is not enough research to know the long term effects it may have on your landscape, on your plants, on the soil organisms that are so important for plant health, on soil chemistry or on ground water. More research is needed but what do we currently know?

Graywater can vary in quality and potential risks from site to site. Many household cleaning products, as well as many shampoos, soaps, and detergents, contain dyes, bleach, chlorine, sodium, boron, and phosphate, which can pose significant human and environmental health concerns and can injure and even kill plants at high dosages over a short period or smaller dosages over a longer period. They can add sodium to the soil and change its pH. Most long term studies on plant salt sensitivity use reclaimed water, which has different chemistry than graywater. Some limited studies with graywater have shown damage to avocado, lemon and scotch pine including reduced growth, leaf burning or a reduction in fruit production in response to long graywater irrigation. Common horticultural plants such as camilla, azalea and rhododendrons are known to be salt sensitive. In general, evergreen trees are more salt sensitive than deciduous trees.

Use “clean” cleaning products. If you are going to use graywater in the landscape commit to using cleaning products that are biodegradable, non-toxic and are free of salt (sodium), boron (borax) and chlorine bleach. [Greyaction](#) has a list of products on their website that they say are salt and boron free and pH neutral.

The don'ts of graywater use. Since the microbial content of graywater may be hazardous to human health, it's important that it is not used for spray irrigation, it must not be left to pool or stand, or run off the owner's property. Graywater must not be stored but used within 24 hours of when it is generated. EBMUD doesn't recommend graywater be used within 100 yards of a creek. Graywater is not recommended for vegetable gardens and should not be used on any edible crops that touch the soil or on root crops. Do not use graywater contaminated with human waste, infectious disease organisms, grease, paint residue, gasoline, solvents, or other chemicals found in household and industrial products.

Using graywater. Any soil surface discharge of graywater must be covered with at least 2 inches of mulch, rock or soil at the release point. Mulch basins are often used for discharging graywater. A mulch basin can be constructed by removing several inches of soil and replacing it with coarse organic mulch. The basins are placed in bed areas or near trees and shrubs so the water reaches plant root systems. Do not put the basin directly at the base of tree trunks or shrubs as this could cause crown rot and the feeder roots that take up water are usually located farther out. Knowing the soil texture will help homeowners determine the size of the mulch basin to prevent ponding. Fast draining sandy soils require a smaller basin than slower draining clay soil.

Graywater that has been filtered can be discharged for subsurface irrigation using tubing with emitters placed underground. Unfiltered graywater will clog drip irrigation systems.

Label your graywater valves and direction of flow. Avoid discharge of graywater anywhere it can come in contact with humans or pets. If you use a gardener or landscape maintenance company be sure to let them know where the graywater pipes and discharge points are located.

If you choose to irrigate with graywater, if possible, move the discharge point so it is not concentrated in one place. Monitor your plants for signs of salt burn. Look for brown leaf tip margins or flower buds that do not open. Consider alternating the graywater irrigations with tap water irrigation to help flush the salts through the soil.

Help your soil retain water. Before considering a graywater system, there are other things you can do to help your soil retain as much water as possible. Side dressing around your plants with a thin layer of compost will help the soil retain more moisture. Organisms in the soil will further break down the compost releasing a glue-like substance that will bind soil particles into crumbly clumps, forming spaces for the soil

to hold more air and water. The compost will also help reduce evaporation and provide nutrients to your plants.

Covering your soil with an organic mulch will reduce evaporation. A layer, 2 to 4 inches deep, of medium-sized organic mulch is needed to reduce evaporation. Mulch pieces should be 1 to 3 inches in size. Keep the mulch several inches away from stems of plants to prevent rot or disease. In addition to reducing evaporation, the mulch will reduce soil compaction, erosion and, keep down weeds (which compete with your plants for water). Since the compost will continue to break down overtime more will be needed. Periodically pull back the mulch and add a layer of compost. The mulch will also breakdown and will need to be supplemented.

Other Drought Gardening Tips: Watering deeply but less frequently will cause plant roots to grow more deeply. Deeply rooted plants are more drought tolerant. Avoid heavy pruning which causes spurts in growth and avoid excess fertilizer which also causes extra growth. And pull weeds. Weeds compete with your plants for water.

Many more drought gardening tips can be found at on the California Garden Web article [Drought: Gardening Tips](#) and the UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources Publication 8036 "[Water Conservation for the Home Lawn and Garden](#)"

ADDITIONAL RESOURCES

CHAPTER 16 ALTERNATE WATER SOURCES FOR NONPOTABLE APPLICATIONS 2013
California Plumbing Code

Use of Graywater in Urban Landscapes Janet Hartin and Ben Faber, UC Cooperative Extension <http://ceriverside.ucanr.edu/files/183496.pdf>

San Francisco's Graywater Design Manual
<http://sfwater.org/modules/showdocument.aspx?documentid=55>

East Bay Municipal Utility District Graywater Fact Sheet
<https://www.ebmud.com/sites/default/files/pdfs/Graywater%20Fact%20Sheet.pdf>

Composting and Water Conservation by Rob Bennaton, 2/17/15
<http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=16800>

The California Gardenweb "Drought Gardening Tips"
http://cagardenweb.ucanr.edu/Drought_Gardening_Tips_

UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources Publication 8036 "[Water Conservation for the Home Lawn and Garden](#)" <http://anrcatalog.ucdavis.edu/pdf/8036.pdf>

Got home gardening questions?

The Alameda County Master Gardener's help line is staffed Monday, Wednesdays and Thursdays from 10 to 1, 510-639-1371 or email us at anrmgalameda@ucanr.edu If emailing please provide the following information:

- Name, phone number and city
- Problem description - name of plant if applicable, when the problem began, cultural history such as watering, fertilizing, pruning, pesticides, etc.
- Photographs of the problem, if possible