

Graywater in Your Garden

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What is graywater? Water from sinks, showers, and laundry tub

No water from toilets (black water), kitchens sinks (food particles), laundry if used to clean diapers, or water containing any harmful chemicals or bleach.

The difference between graywater and rainwater

GRAYWATER

- Produced all year long
- Small tanks, if any
- Only hold < 24 hours
- Not for some vegetables
- Salts can build up from soaps unless flushed
- 29,000 gallons / six months for four people and all hookups
- Permits mostly required

RAINWATER

- Produced in wet season and held until dry season for landscapes
- Large tanks
- Pure, great for all vegetables
- 25,000 gallons for 1500 sf house and 18" of rain per year
- No permits required except for electrical & grading

Graywater advantages:

- Reduces the amount of water needed
- Reduces maintenance for septic systems
- Reduces load on municipal sewer and waste water treatment systems (credits for multi-unit residential, commercial and industrial use)
- Keeps (expensive) landscapes alive during drought – mature landscapes valued at \$20/ sq. ft.
- Little “infrastructure” as opposed to reclaimed water

Graywater disadvantages:

- Not for plants that like acidity – unless pH is balanced
- Need to be careful what you put down the drain—no chlorine, boron, salts
- Liquid detergents better than powders

Where can you use graywater in the landscape?

- Fruit trees & vines, natives that like moderate or regular water
- Veggies-edible part can't touch the graywater
- Perennials, shrubs, groundcovers, and lawns (complex systems)
- Not on root vegetables
- Not on seasonally planted annuals
- Not in the house, yet

How much graywater do you have?

- Compare winter and summer water bills –difference is your outdoor water use.
- Analyze your use:
 - Amount of showers and length
 - Low flow shower head – 2.5 gal/min 10 minute shower= 25 gallons
 - Type of washer and # of loads
 - Top loaders:40 gal, front loaders: 10-20 gallons each time

Water use in typical Bay Area home

- Water use in dry summers almost twice that of wet winter months
- Estimate of 40 gallons of gray water produced per day per person
- Family of four can produce about 9,600 gallons per month water billing
- Just about the water required for “typical” Bay Area landscape

Installation Costs:

- Laundry to landscape
 - \$100-\$200 materials only
 - \$700-\$2,000 full installation
- Single fixture branched drain system
 - \$200-\$400 materials only
 - \$800-\$3,000 full installation
- Complex systems with tanks & pumps
 - \$400-\$600 materials only
 - \$2,000-\$6,000 full installation

2009 California Plumbing Code – Chapter 16A

- Enacted as emergency regulation in August 4, 2009
- May be prohibited only after public hearing and enactment of Ordinance

Graywater “Do’s”

- Be able to easily switch back to sewer
- Label your system
- Discharge under 2” mulch/rock/cover
- Direct water to irrigation field (no storing more than 24 hours)
- Minimize contact with humans and pets
- Have a maintenance manual

Graywater “Don’ts”

- Have ponding or runoff
- Discharge into neighbor’s yard
- Connect to potable water supply
- Include a pump (more room for error)
- Violate other codes/laws
- Damage building
- Use diaper wash water or hazardous chemicals (oily rags, etc.)

Clothes washer system (aka Laundry to Landscape)

- Uses the washing machine pump (can go a little uphill)
- Can be filtered or not
- Best for larger plants

- Advantages
 - No permit required
 - Least expensive
 - Low maintenance, low-tech (but high value system)
- Disadvantages
 - Not good for small plants or lawns

Branched Drain system

- Gravity fed to mulch basins, by splitting water flow
- Good for fruit trees, ornamental shrubs
- Advantages
 - Relatively inexpensive
 - Low maintenance, low-tech (but high value system)
- Disadvantages
 - Permit required
 - Must have 2% slope to function
 - Can't be installed on slab foundations

Simple and complex systems

- Permits required
- Pumped and filtered
- Special emitters
- Complex controllers
- Automatic filter backwash
- Fresh water supplementation (when out of town)
- Advantages
 - Most flexible
 - Good for most types of vegetation
 - Similar to modern irrigation systems (but subsurface)
 - Good for most topographies
 - Good for multi-unit and commercial sites
- Disadvantages
 - Most expensive – about \$6,000 extra
 - Most complicated – must be installed by professionals

Where to get parts?

- Urban Farmer for brass and/or Jandy 3-way valves: ¾", 1" or 2-1/2" valve
- Brass three-way valve at hardware or plumbing supply store
- Air gap assembly – any hardware store
- 1" PE (polyethylene) tubing at Ewing Irrigation (have to order) or Urban Farmer (Blu-Lok in 100' rolls)
- Double ells (RV Cloud or Ashby Plumbing or Oasis.com)
- Actuators (check with greywateraction.org)

Ingredients to avoid – read the labels

- Salt, sodium compounds -- damages soil
- Boron, borax (Bon Ami) -- micronutrient turns into a microtoxin
- Chlorine -- kills bacteria/life (hydrogen peroxide better)

Use these laundry products:

- Oasis
- ECOS (available at Costco and Whole Foods)
- Bio pac liquid detergent
- Wonder balls or Soap nuts
- No powdered detergents, salt, borax, bleach, water softener

Use these shower and sink products

- Aubrey Organics shampoo and conditioner
- Dr. Bronner's
- Oasis all purpose cleaner
- No bleach, hair dye, harsh cleaners, salt baths, epon salts

Use these cleaning products

- Vinegar based cleaners
- Liquid soap based cleaners
- Dr. Bronner's
- No high salt products, bleach, harsh cleaners

References and Resources

- *Create an Oasis with Greywater* by Art Ludwig www.oasisdesign.net
- Greywater Guerrillas, authors of *Dam Nation*
www.greywateraction.org
- Complete gray water system: Rewater, Inc. www.rewater.com
- *California Native Plants for the Garden*, Bornstein et al
- Listserv: ca-standard@graywater.org (latest on graywater changes)
- Take a class for do-it-yourselfers: www.greywateraction.com

California Native Plants adaptable to Greywater Useage, using mulch basins

- Plants that have a moderate or high water requirement
- Plants that do not favor acidic soil or have shown an adverse reaction to recycled water irrigation (i.e. Redwoods)
- Utilize drip or hand watering for more droughty plants
- The following lists adapted from “California Native Plants for the Garden” (Bornstein, Fross, & O’Brien, Cachuma Press
“California Native Plants that tolerate moist habitats”

Perennials:

- Western Columbine *Aquilegia formosa*
- Mugwort *Artemisia douglasiana*
- Wild Ginger *Asarum caudatum*
- Sedge *Carex* (all)
- Stream Orchid *Epipactis gigantea*
- Horsetail *Equisetum*
- Wire Grass, Rush *Juncus* (all)
- Scarlet Monkeyflower *Mimulus cardinalis*
- Seep Monkeyflower *Mimulus guttatus*
- Hooker Evening Primrose *Oenothera elata*
- Redwood Sorrel *Oxalis oregana*
- Monkeyflower Savory *Satureja mimuloides*
- Point Reyes Checkerbloom *Sidalcea calycosa ssp. rhizomata*
- Golden-eyed Grass *Sisyrinchium californicum*
- Goldenrod *Solidago* (all except *californica*)

Grasses:

- Pacific Reedgrass *Calamagrostis nutkaensis*
- Red Fescue *Festuca rubra*
- Deer Grass *Muhlenbergia rigens*
- Alkali Sacaton *Sporobolus airoides*
- Cattails *Typha*

Trees:

- Alder *Alnus* (all),
- California sycamore *Platanus racemosa*
- Cottonwood, Quaking Aspen *Populus* (all)
- California Bay *Umbellularia californica*
- California Fan Palm *Washingtonia filifera*

Shrubs & subshrubs:

- Spicebush *Calycanthus occidentalis,*
- Creek Dogwood *Cornus sericea,*
- Poverty Weed *Iva hayesiana,*
- Pacific Wax Myrtle *Myrica californica,*
- Western Mock Orange *Philadelphus lewsi,*
- Golden Currant *Ribes aureum var. gracillimum,*
- Elderberry *Sambucus* (all),
- Sambucus (all), elderberry