

A Solar Ark Conserves All Water Used...

## **A GRAY WATER SYSTEM**

### Words to Know:

**Gray Water** — Water that has been used that is not contaminated with urine, feces or harsh chemicals.

**Black Water** — Water that has been used that is contaminated with urine, feces, or harsh chemicals.

**Gray Water System** — A system that facilitates using gray water for trees and plants.

**Drywell** — A covered pit that allows gray or black water to drain into the soil where it is filtered and purified.

# SYNERGY AND GRAY WATER

If you use water more than once you will need less water. If you need less water you will need a smaller holding tank. If you use less water you will need a smaller dry well, surface mound or septic system. Less water requires a smaller pump. A smaller pump requires a smaller and less expensive electrical system.

## Guidelines for an Effective Gray Water System

(Much of the following information comes from an article by Claire Anderson in Mother Earth News, August/September 2004, pp. 100-106.)

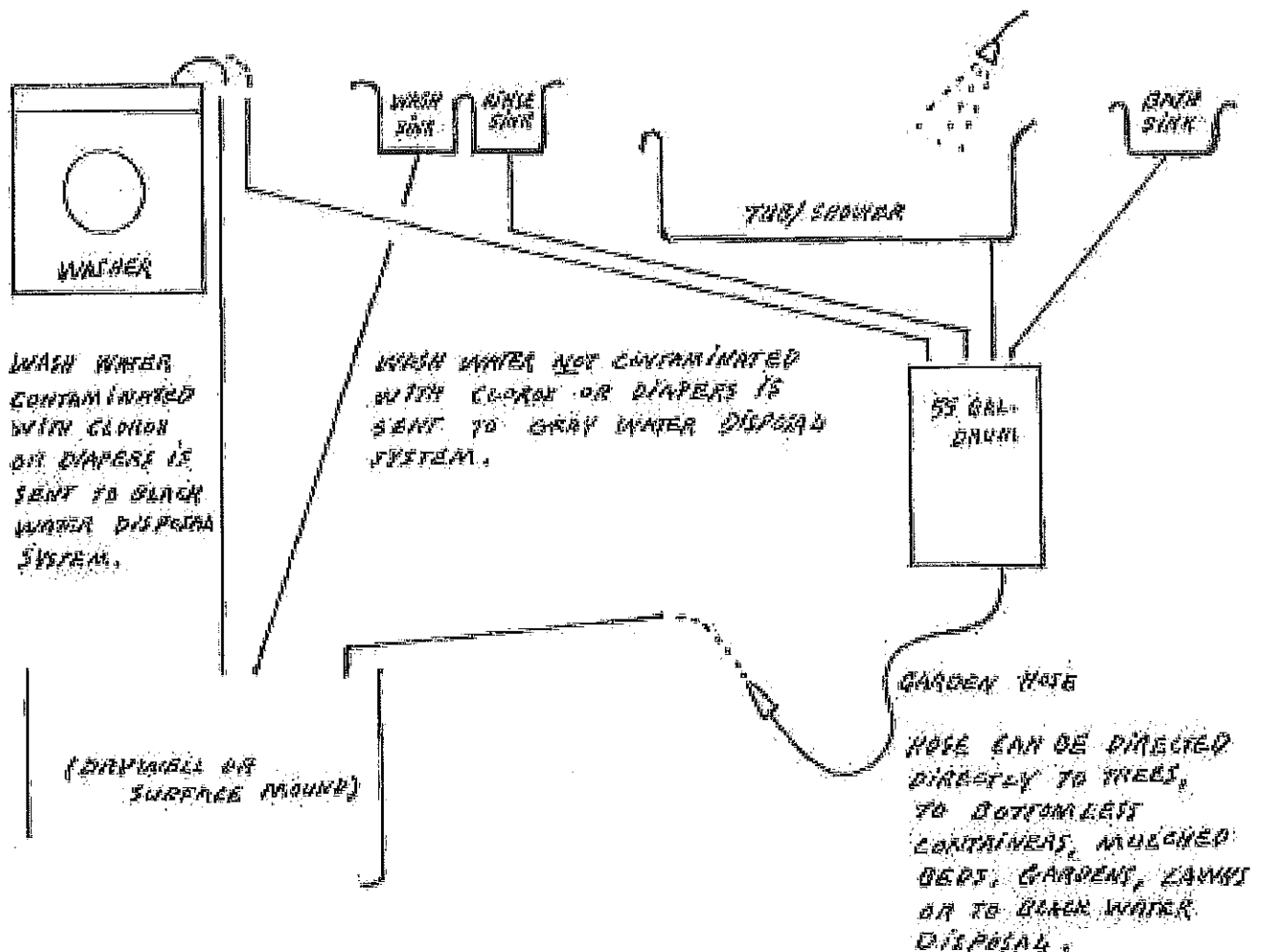
1. Do not save gray water in a tank. It will become black water as bacteria multiplies.
2. Do not use kitchen sink water that is contaminated with food particles which attract insects and animals. This water should go to a black water disposal system.
3. Do not use water that has been used to wash diapers; it is contaminated with feces. It should go directly to a black water disposal system.
4. Do not over-water plants and trees. Make sure you have adequate space and drainage for the amount of gray water you produce.
5. Use fresh water about 50% of the time to help wash away salts that can build up and damage plants.
6. Acid-loving plants do not like gray water.
7. Do not let gray water stand in pools. Catchment basins must be large enough to absorb all the water sent to them.

### How to size catchment basins

kitchen sink ..... 5 to 15 gallons per person per day  
bathroom sink ..... 1 to 5 gallons per person per day  
top-loading washer..... 30-50 gallons per load  
front-loading washer ..... 10 gallons per load  
bathtub..... 25-40 gallons per bath  
(from *Create an Oasis with Gray Water*)

8. Do not plant edible root crops in gray water.
9. Be careful not to splash gray water on edible plants.
10. Wash all edible plants with soap or iodine.
11. Do not use perforated pipe - it clogs.

# GRAY WATER SYSTEM

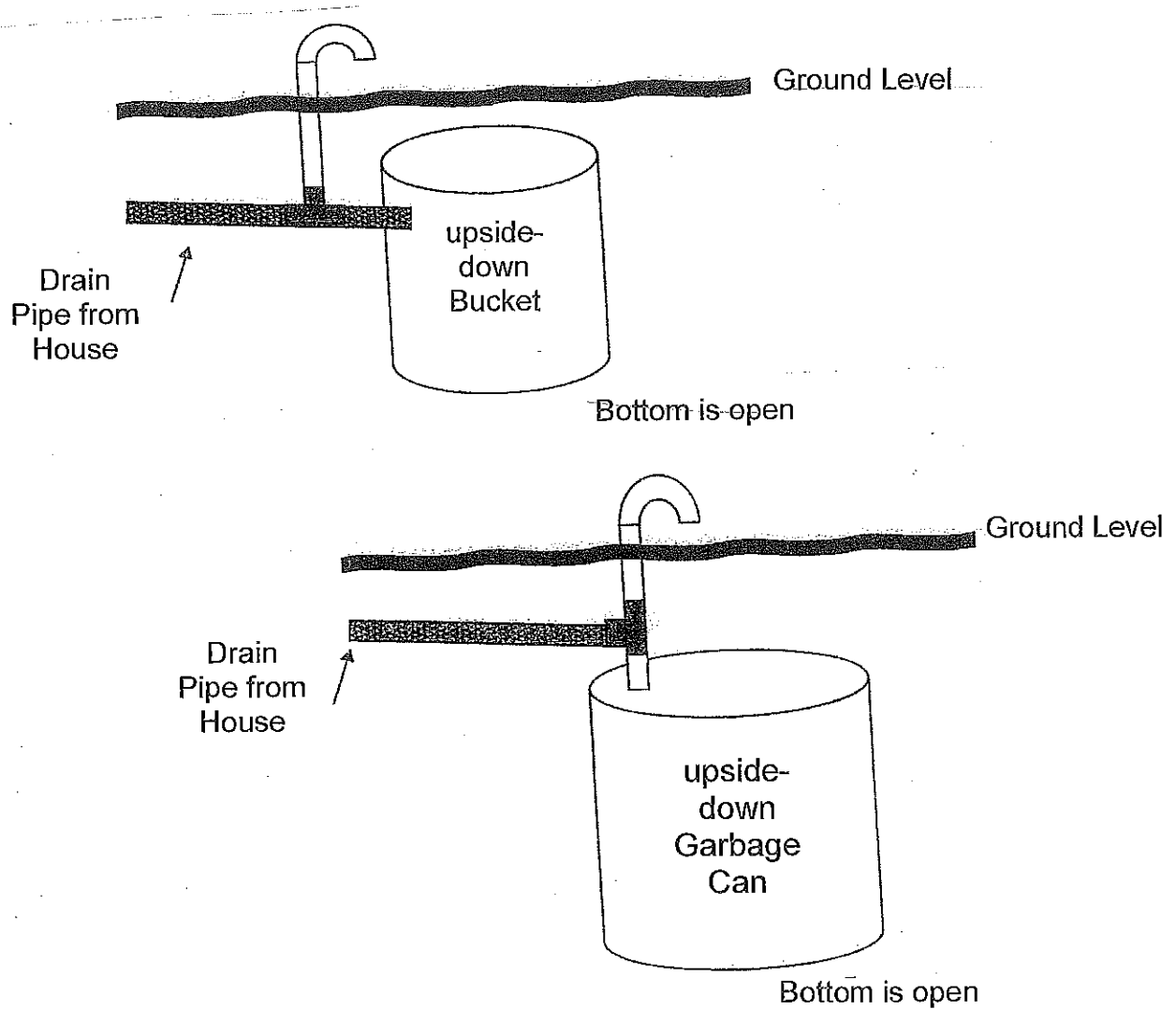


## Notes:

1. 55 gallon drum is NOT a holding tank. The drum contains large volumes of water from washers and bath tubs only long enough to drain. If gray water is not needed for vegetation, water is diverted to a drywell or surface mound.
2. Wash water can be directed to black water or gray water disposal by moving drain hose.

# SIMPLE, EFFECTIVE GRAY WATER STRATEGIES

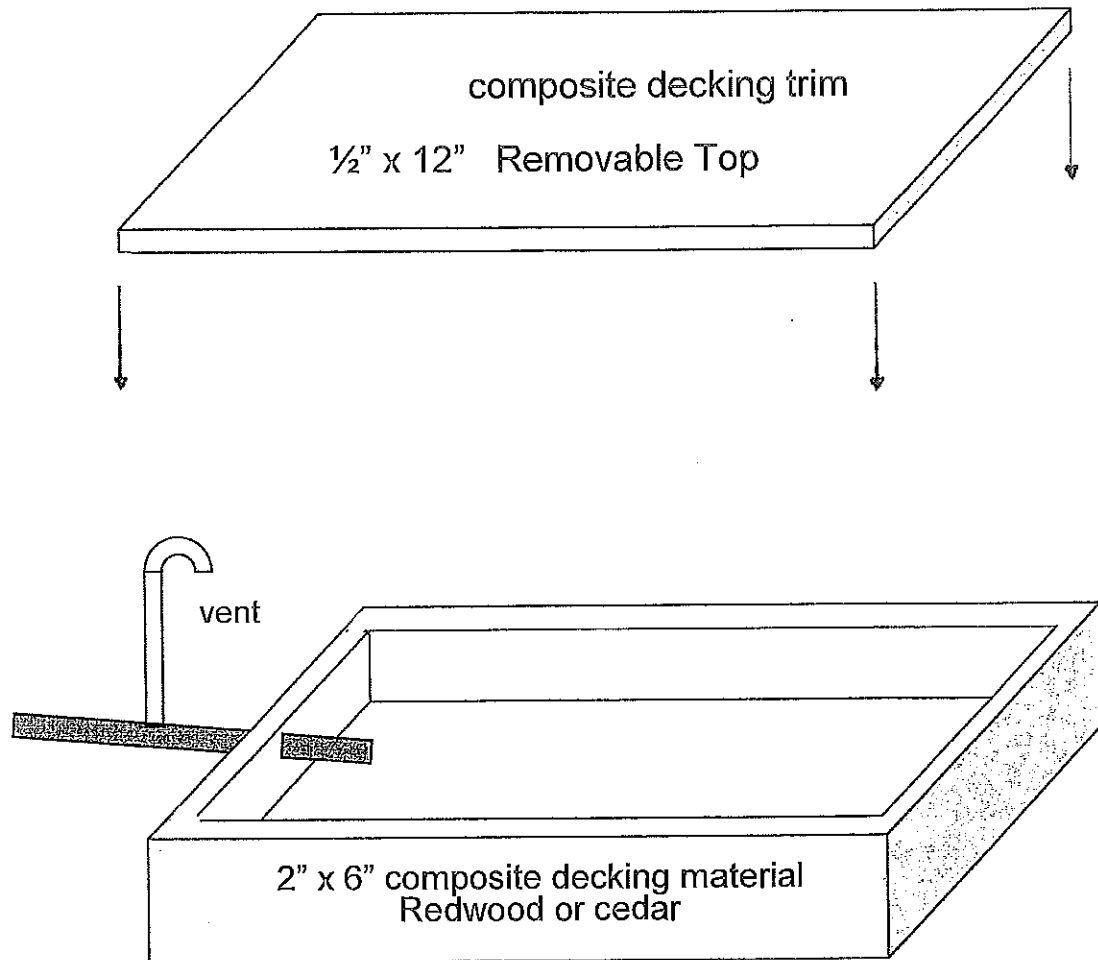
## Ideas for Bottomless, Vented Containers



Note: These containers can be placed at the base of trees as a water source.

Note: The size of the container is determined by the water source. The container should be large enough to hold slightly more water than will usually be sent to the container.

## Ideas for Bottomless Box Container

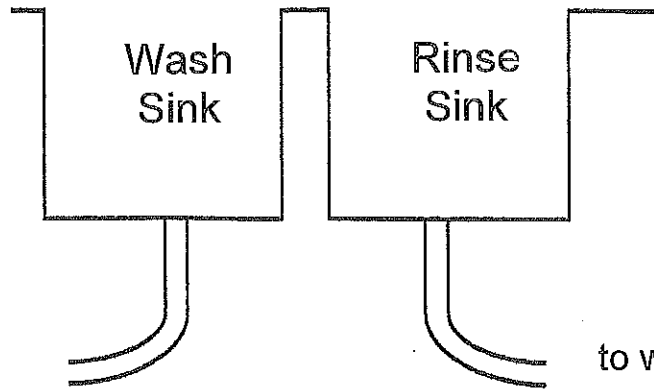


Box can be buried or sit on the surface of the ground.

Note: Plants can be placed around the perimeter of the box.

## Double Kitchen Sink Arrangement

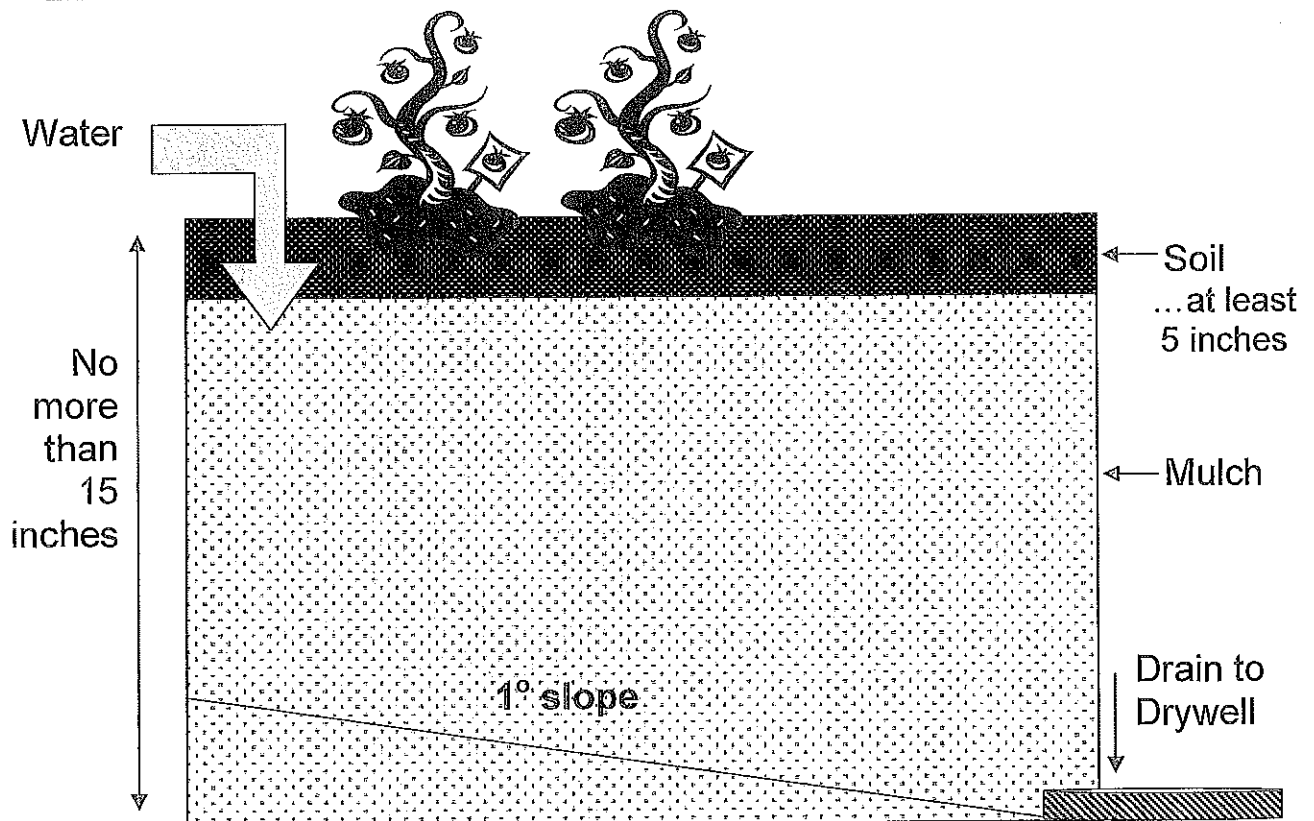
Clorox and  
harsh  
chemicals can  
be used in the  
wash sink →

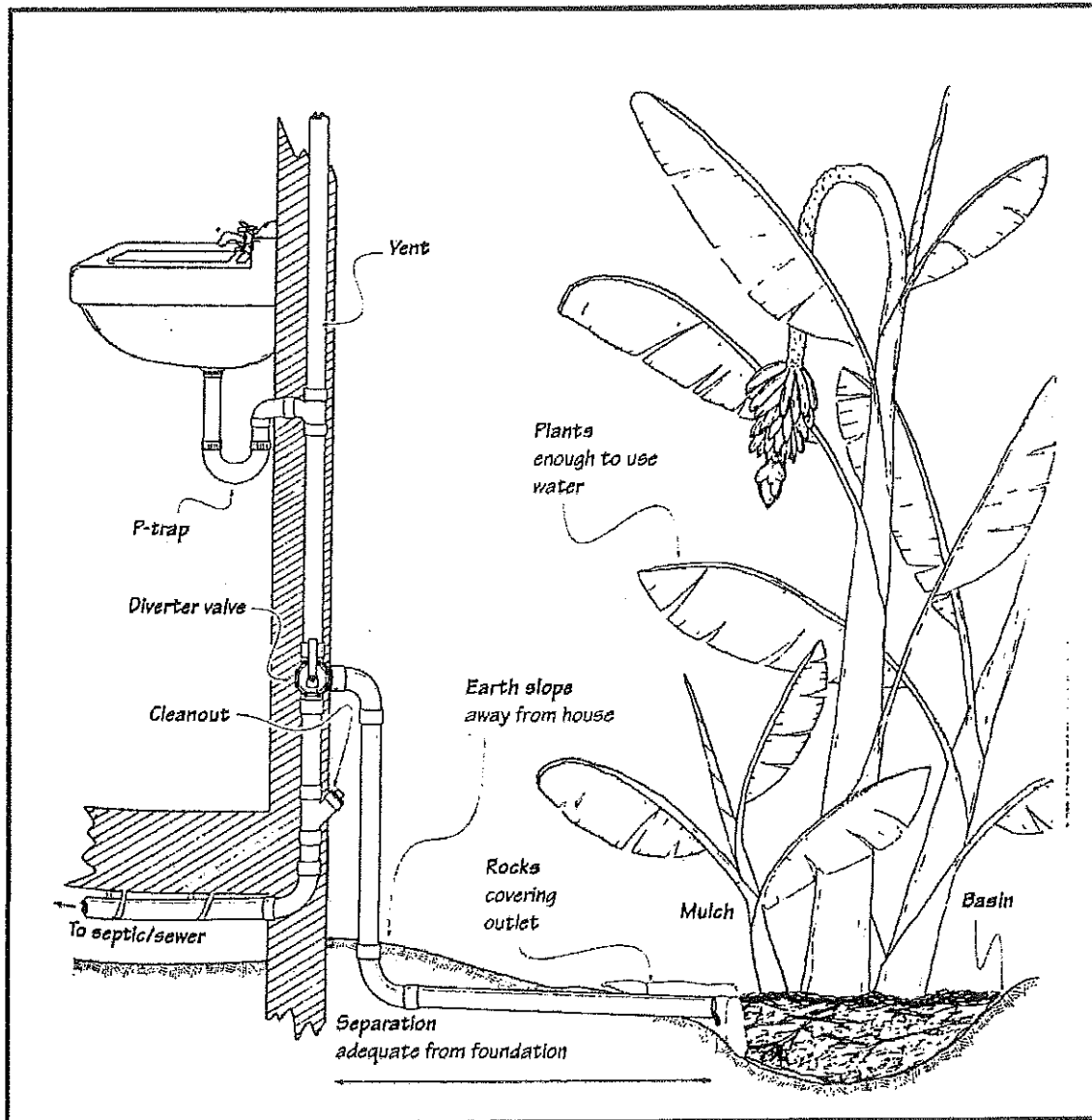


to black-water  
drywell or  
surface mound

to water trees & plants

## Ideas for a Mulched Bed System





BACKHOME MAGAZINE MAR/APRIL 2007

The Drain-to-Mulch Basin option is a simple system that's built off existing plumbing and ensures a high level of treatment.



## Cleaning Products That Can Be Used in Gray Water Systems

A person learns to be very careful about what types of chemicals and cleansers he puts down the drain. You cannot put anything in the water that kills bacteria. Even mouthwash can cause problems. Here is a list of products that work well with a gray water system. The list is from *Saving Water in the Home and Garden*, [see Recommended Reading]

### Biocompatible Household Products:

#### Hand Soap

- Bon Ami Cleaning Cake (Faultless Starch / Bon Ami Co.)
- Caswell-Massey Pure Castile Soap (Caswell-Massey Co.)
- Kirk's Hardwater Castile Soap (Proctor & Gamble)
- Ivory Soap (Proctor & Gamble)
- Natural Glycerin Hand Soap (Williams-Sonoma)
- White King Natural Soap (White King Co.)

#### Laundry Detergent and Starch

- Ivory Snow Flakes (Proctor & Gamble)
- Faultless Starch (Faultless Starch / Bon Ami Co.)

#### Cleanser

- Bon Ami Kitchen and Bath Cleanser (Faultless Starch / Bon Ami Co.)
- Granny's Old-Fashioned Cleanser (Granny's Old Fashioned Products)

## More Cleaning Solutions for Gray Water Systems

Here are laundry detergent choices:

1. Alfa Kleen (detergent)
2. Bold (detergent)
3. Ecover
4. ERA Plus
5. Oasis (800-225-2855 / [www.bio-pac.com](http://www.bio-pac.com))
6. Shaklee
7. Yes
8. Enviro Rite Laundry Detergent (888-350-8551 / [www.envirorite.com](http://www.envirorite.com))

Note: Because they are used in such small amounts, most liquid bath products, shampoos and dish soaps pose little harm to plants irrigated with gray water.  
(*Mother Earth News*, August/September 2004, p. 104)

Note: Avoid Clorox - it kills good bacteria as well as bad.

Note: Avoid mouthwash or anything antiseptic.

Note: Avoid anti-bacterial soaps.

## Soaps, Detergents, and Gray Water

From *Rainwater Harvesting for Drylands and Beyond*, vol. 2, ©2009

Cleaning products labeled “biodegradable” or “natural” or even “eco-friendly” may not be gray water compatible—meaning suitable for the plants and soils of your gray water-irrigated landscape.

### Gray Water Compatible Products

I prefer to use Oasis brand or Bio-Pac concentrated liquid laundry detergent and dishwashing soap; both are gray water compatible (see [www.bio-pac.com](http://www.bio-pac.com)). I dilute 1 part Oasis brand dishwashing soap with 8 parts water to use as a hand and body soap. For shampoo, I use Aubrey Organics brand shampoos after scanning labels to be sure there are no sodium products in the ingredients.

Traditional liquid soaps made from potassium-based ingredients such as Dr. Bonner’s liquid soaps and handcrafted liquid soaps are gray water compatible as long as they don’t contain harmful additives such as sodium salts. You can contact soap makers and ask about their ingredients.

### Products and Ingredients to Avoid

- ⊗ hard chemicals such as chlorine and drain cleaners
- ⊗ bleaches and fabric softeners
- ⊗ detergents with whiteners, softeners, and enzymes
- ⊗ bar soaps and powdered laundry detergents that typically use sodium-based products as filler materials. Sodium salts can harm plants and soils. Accumulation of salts is of special concern in drylands where soils tend to be alkaline and naturally high in salts. It is wise to occasionally flush dryland soils with rainwater or other non-salty water.
- ⊗ borax and other cleansers and products made with boron. Boron is needed by plants, but only in extremely small amounts
- ⊗ soaps and detergents with the following ingredients: peroxygen, sodium perborate, sodium tryochlorite, petroleum distillate, alkylbenzene, salt
- ⊗ disinfectants

The above list of products and ingredients was compiled from State of California, Department of Water Resources ([www.owue.water.ca.gov](http://www.owue.water.ca.gov)) publication *Graywater Guide: Using Graywater in Your Landscape*.

My website includes a page on gray water harvesting with more information on soaps and detergents, recommended brands, and laundry cleaning tips ([www.HarvestingRainwater.com](http://www.HarvestingRainwater.com)).

## Recommended Reading

*Know Your Graywater*, David Del Porto and Carol Steinfeld. Center for Ecological Pollution Prevention, P.O. Box 1330, Concord, MA 01742, 1999.

*Running Dry*, Addikson and Sellick. Stein and Day Publishing, 1983.

*The Composting Toilet System Book*, "What About Graywater?", pp. 182,223.

*Saving Water in the Home and Garden*, Jonathan Erickson. Tab Books, McGray-Hill, 1993.

*Earthship III*, p. 58-66.

Mother Earth News, "Tap Into Water Savings", Claire Anderson. August/September 2004, pp. 100-106.

Art Ludwig, [www.oasisdesign.net](http://www.oasisdesign.net)

*Water Storage*, Art Ludwig

Harvest H2O.com (founded by Doug Pushard)

*Rainwater Harvesting for Drylands and Beyond*, vol. 1 and 2. Water-Harvesting earthworks by Brad Lancaster, 2009. Rainsource Press, Tucson, AZ [www.HarvestingRainwater.com](http://www.HarvestingRainwater.com)