



Greywater Webinar Series 2015

Oct 14th- Greywater 101
Presentation by Laura Allen



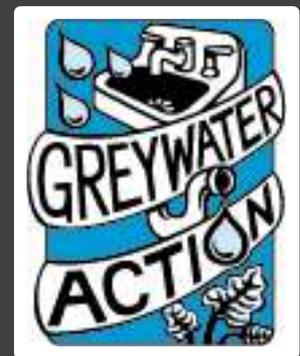
Oct 28th- Plumbing 101 for Greywater Installers

Nov. 18th- Design Your Own L2L System

Dec. 12th- Gravity-Flow, Branched Drain Systems and Greywater Irrigation in Arid Climates

Dec 16th- Southern CA Fruit Trees 101- How to Irrigate Your Home Orchard with Greywater

Greywater 101



Presentation by Laura Allen
from Greywater Action



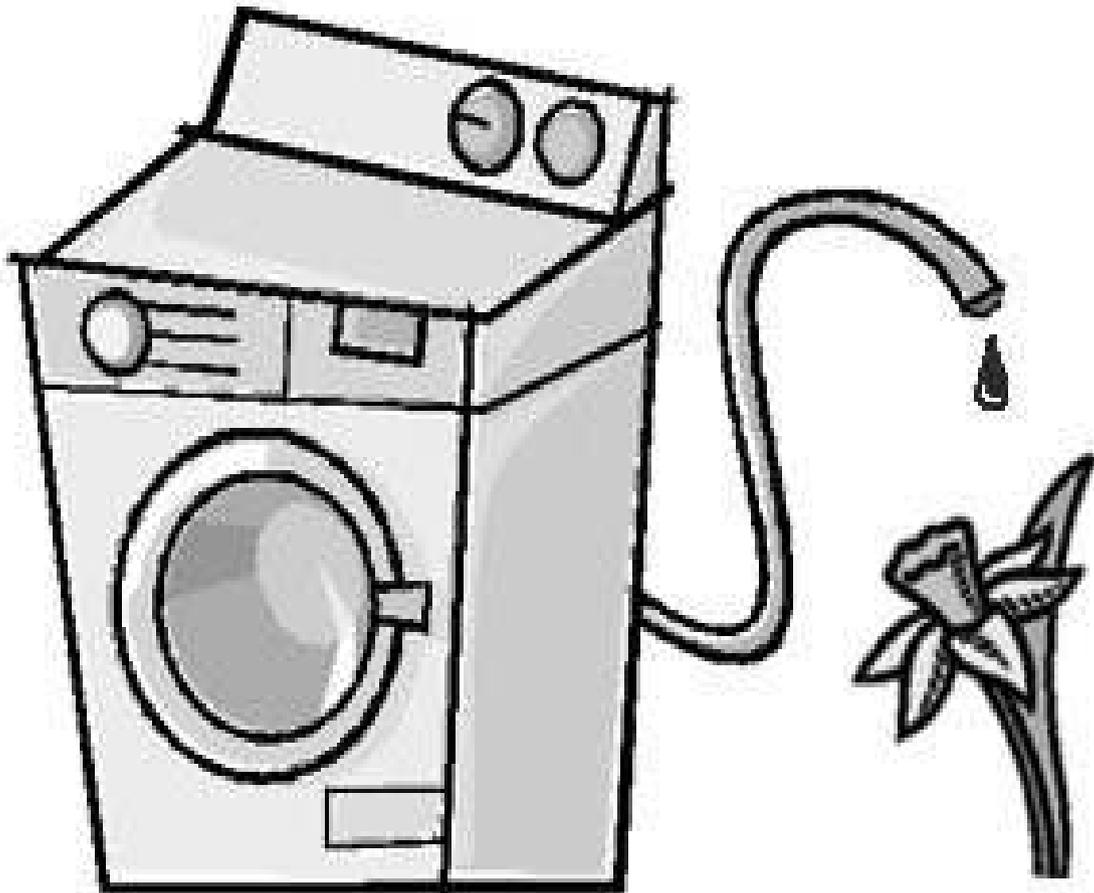
Outline of Presentation

- Introduction
- General greywater considerations
- Common types of greywater systems
- Design considerations
- Resources

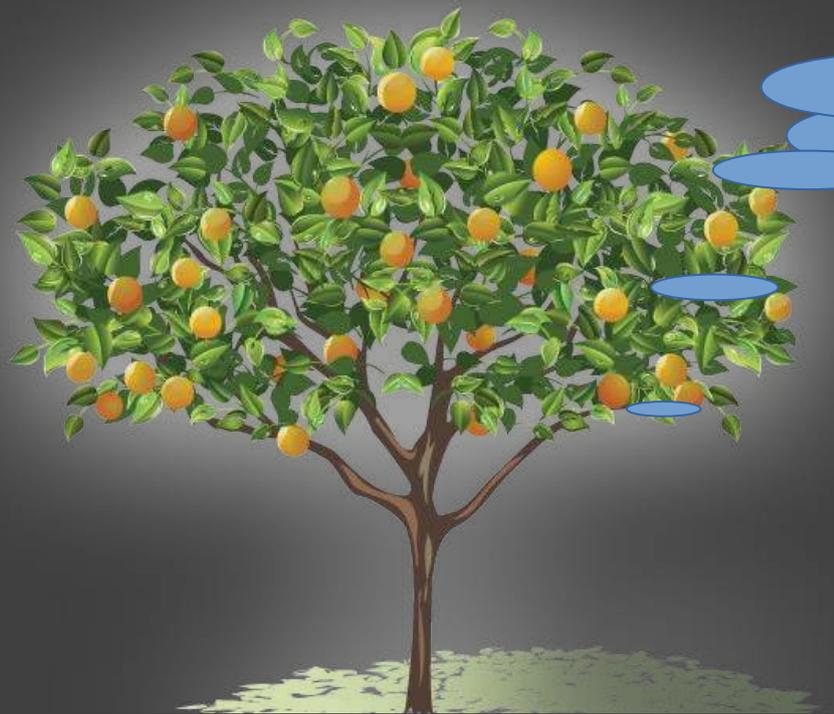




**HOW MUCH
WATER
DO YOU USE
EACH DAY?**



About **50%** of residential water is used for irrigation



I don't need clean drinking water!

Greywater Reuse

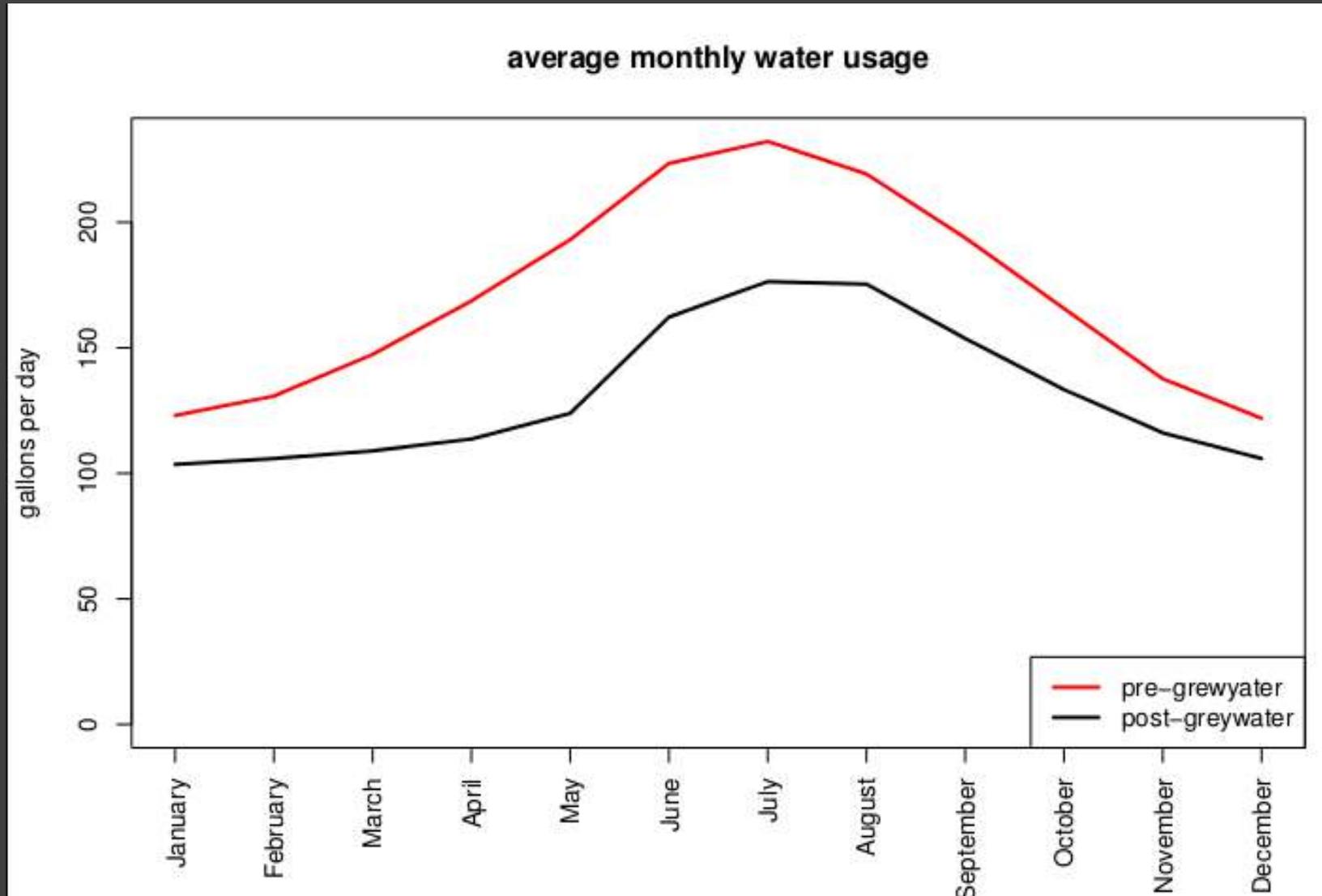
16-40% reduction in water use



► House using greywater for irrigation with simple laundry-to-landscape and gravity-fed systems

© Steve Sanford from The Water-Wise Home

Avg. household savings of 15,000/year (GWA Study)



Californian's produce around
1 billion gallons of greywater
every day



Greywater is water from:

#1 Washing machines

- Top loading machine:
30-50 gallons/load
- Front loading machine:
12-25 gallons/load
- Top efficient:
15-25 gallons/load



Greywater is water from:

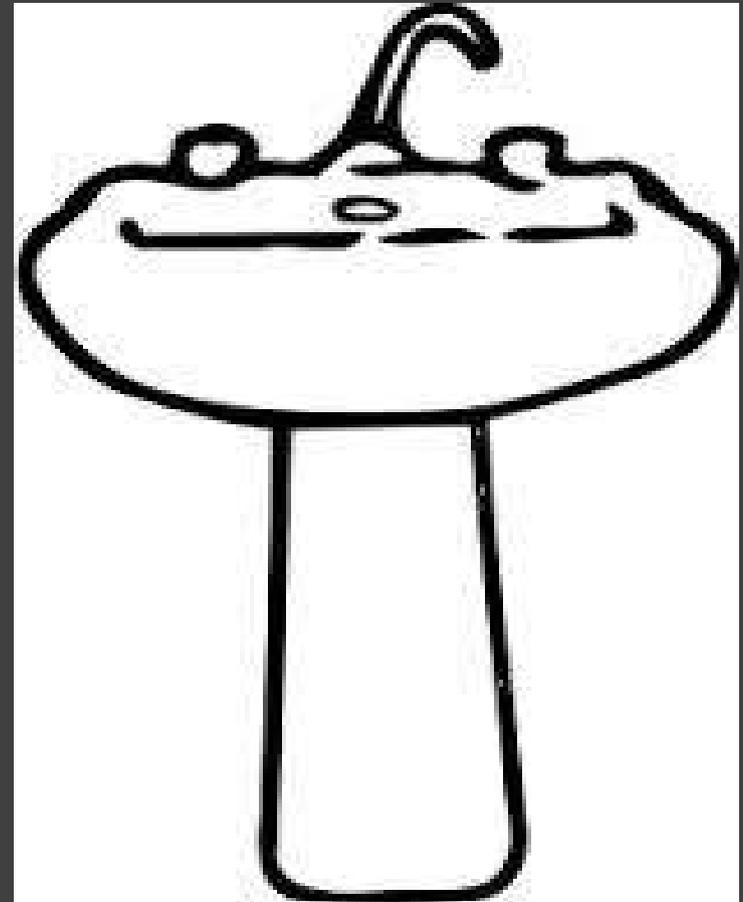
#2 Showers and baths



Greywater is water from:

#3 Sinks

(Kitchen sink water is not currently considered greywater in California and is difficult to legally reuse)



Greywater is **never** from toilets!



A brief history of the **legality** of greywater:

Before 2009:

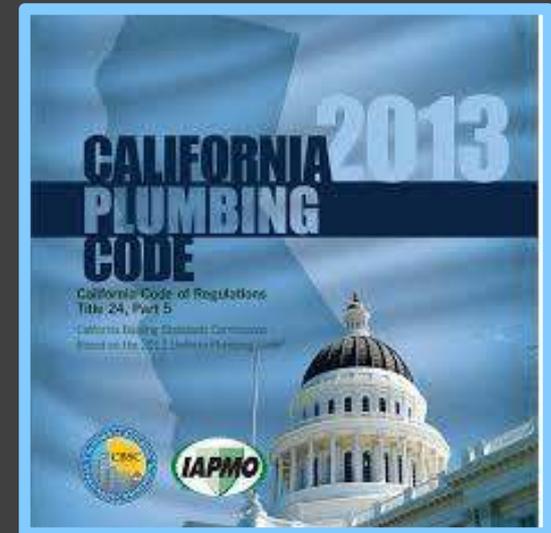
- It was not possible to install a legal system, there were 1.6 million illegal systems in California.

After 2009:

- It is possible to install several types of systems legally, some don't require a permit.

Is greywater legal? **Yes!**

Greywater is regulated by **Chapter 16** of the California Plumbing Code.



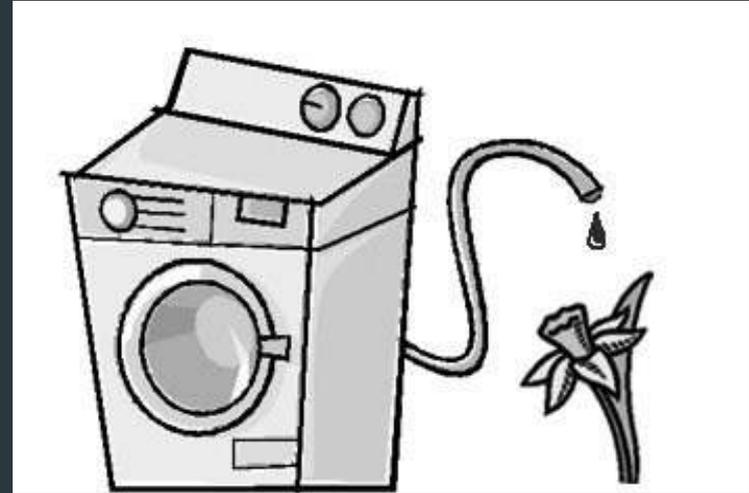
Benefits of Greywater

- Save water
- Save time
- Save energy
- Fosters a connection to our landscapes
- What else?



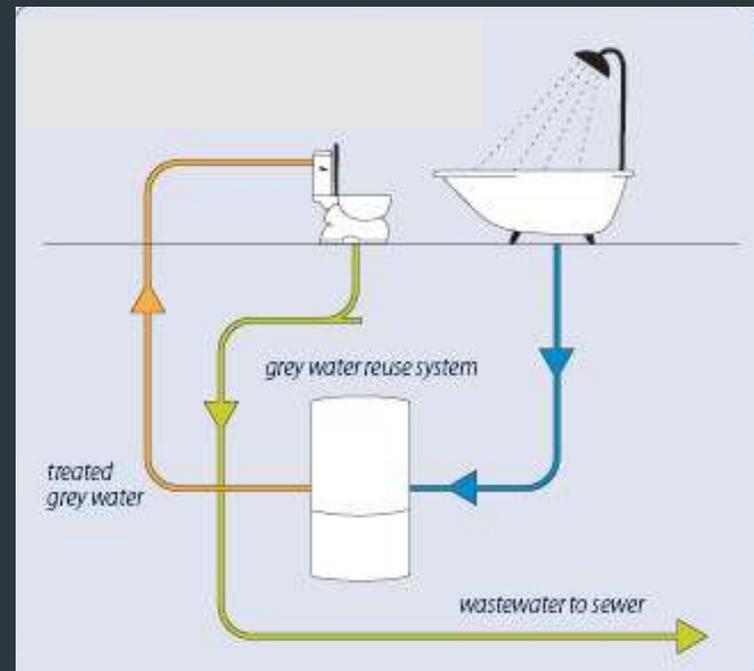
How can you use greywater?

#1 For outdoor irrigation



#2 To flush toilets

These systems require filtration, disinfection, and frequent maintenance. They are difficult to obtain permits for.



Use Plant Friendly Products

These products don't contain SALT, BORON, or CHLORINE.

For example: ECOS, Biopac, Trader Joes, Oasis, Vaska, Aubrey Organics, hydrogen peroxide bleach.

Don't use sodium based water softened water.



Greywater is NOT Potable

It's important that:

- Greywater doesn't pool up.
- People don't have direct contact with the water.
- Greywater doesn't run off or enter a storm drain, creek, river, etc..
- Greywater is not used to irrigate root crops.



“Mulch”

Wood chips filter and absorb greywater before it soaks into the soil.



“Mulch Basin”

A shallow basin filled with mulch (wood chips).

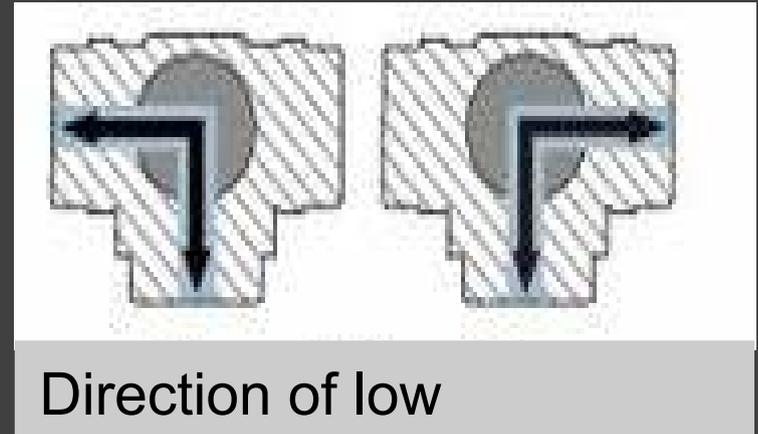
The basin spreads greywater out, provides surge capacity, and prevents pooling or runoff .



This man is filling the basin with wood chips.

“Diverter Valve”

The valves allows us to control the flow of greywater (either to the landscape, or to the sewer/septic)



A Bucket



- Collect cold water as shower heats up
- Dishpan in sink to collect wash water
- Use for irrigation
- Use to “bucket” flush toilet (pour into toilet bowl)

Greywater Systems can be Simple or High-Tech

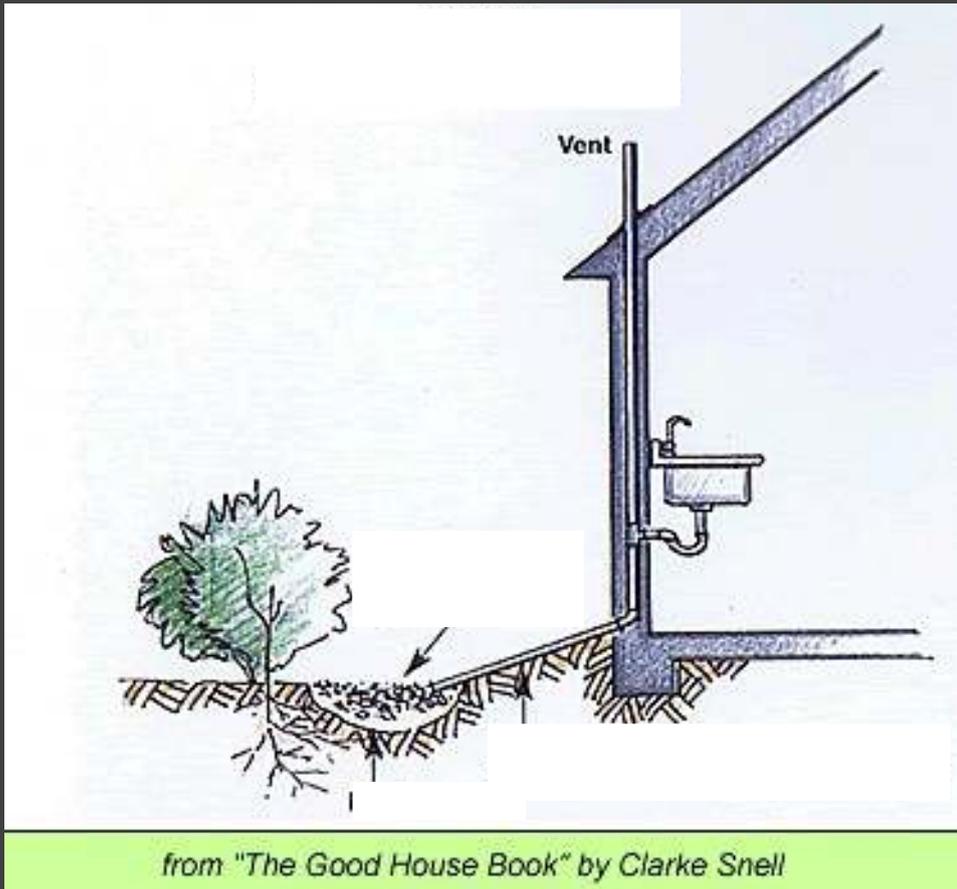


Image Water Sprout

Simple Systems Irrigate Larger Plants

- Trees
- Bushes
- Vines
- Larger annuals and perennials



...but not lawns or small plants

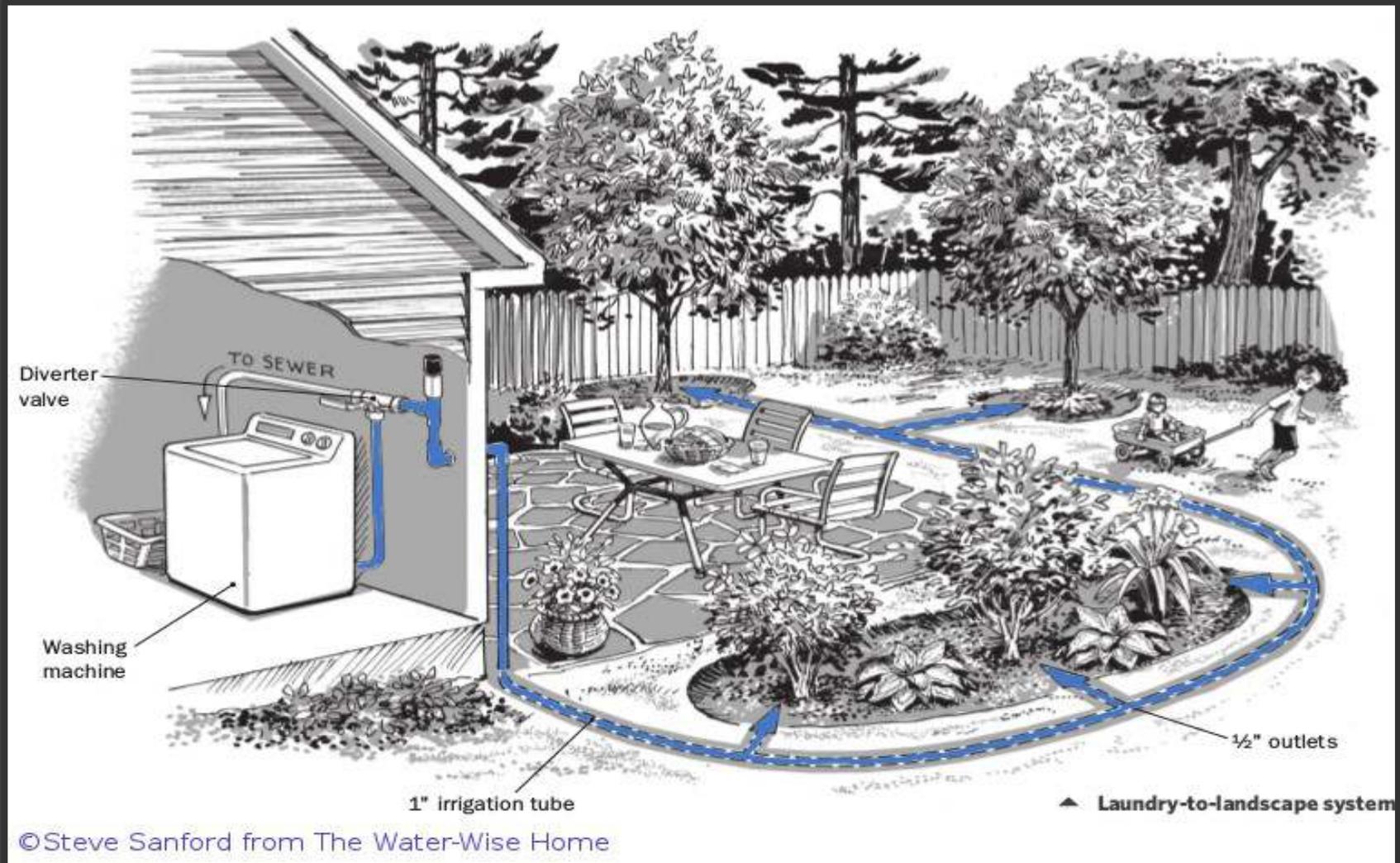


Irrigating these types of plants requires a **more complex** type of system.

Simple System: Laundry-to-Landscape (L2L)

A **washing machine system** that doesn't alter the plumbing and doesn't require a permit (if basic guidelines are followed).

Simple System: Laundry-to-Landscape (L2L)



Costs: \$150-\$250 parts, \$700-\$2,500 professional installation 30

Laundry-to-Landscape System



Sewer connection

Greywater goes to landscape

Diverter valve







Image: Leigh Jerrard

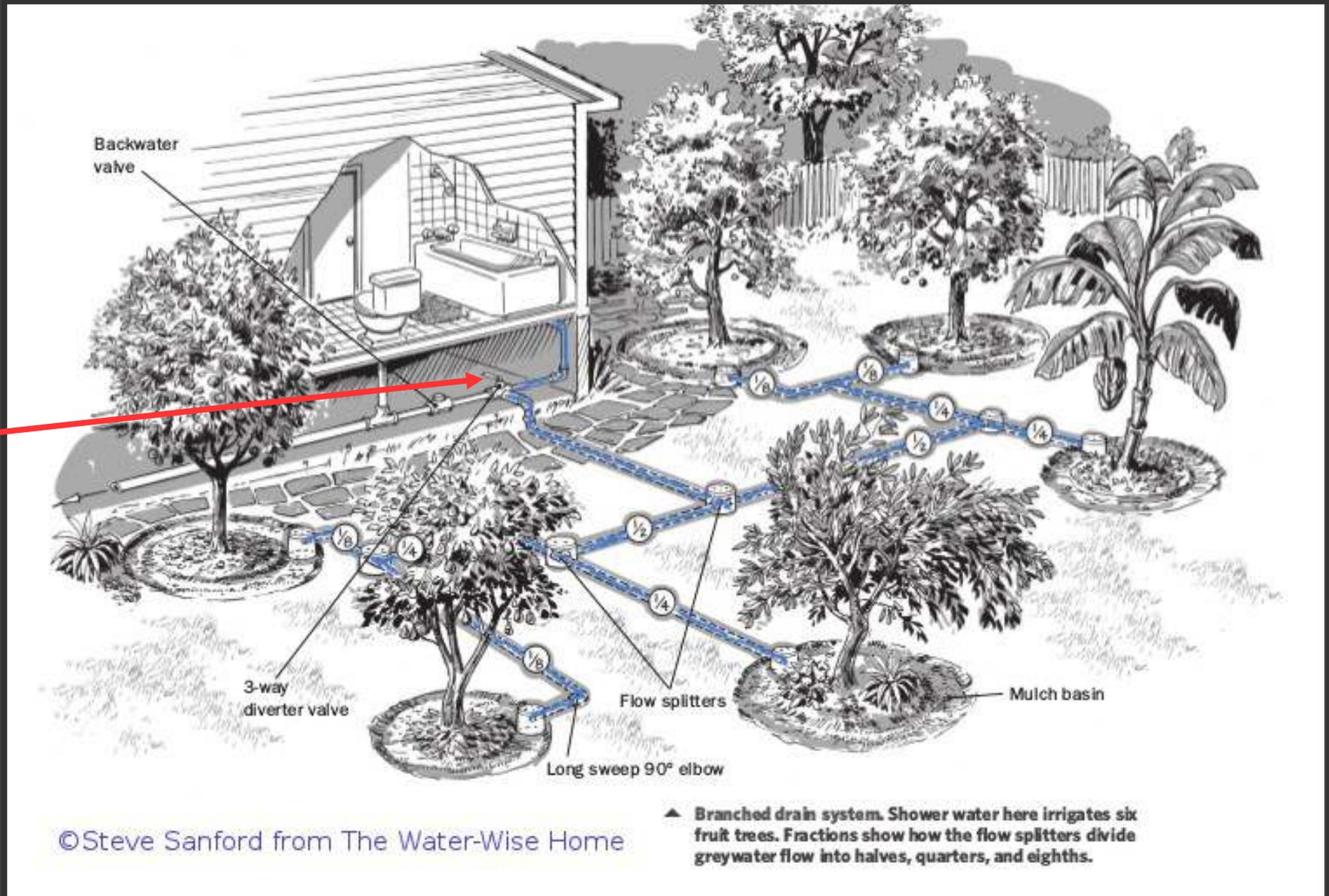


Image: Greg Bullock

Branched Drain: **A Gravity System**

- To install this system you must be able to access the drainage plumbing
- It requires a permit
- The landscape must be lower than the greywater pipes

Branched Drain: A Gravity System



Costs: \$250-\$500 parts, \$800-\$4,000 professional installation (permit fees cost more)

A Diverter Valve Controls GW Flow



To Landscape

From Fixture

To Sewer



A motor (called an actuator) can be added, enabling the valve to be controlled by a switch inside the house.

Branched Drain System



Setbacks from buildings and property lines



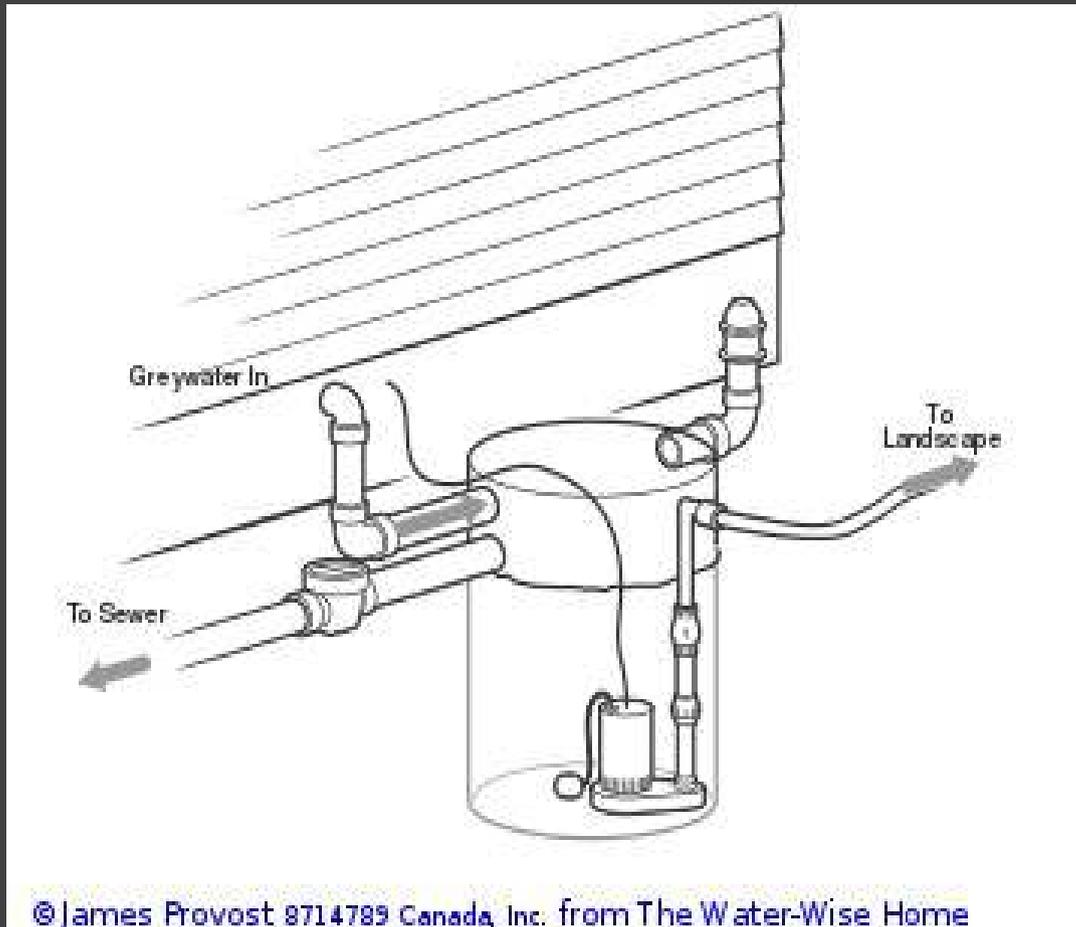
Greywater outlet is under a solid shield and flows into a mulch basin. Size of basin depends on soil type and amount of water.

Completed System and 1 Year Later



Images: Josh Lowe

Pumped System



- A diverter valve directs GW to a tank
- Unfiltered GW is pumped out to the landscape with 1" tubing and 1/2" outlets
- System requires an outlet and uses electricity
- Requires a rigorous permitting process



Photo: Leigh Jerrard

Pump and Filter System for Drip Irrigation



(Filters must be cleaned manually and require frequent maintenance)

Image: Leigh Jerrard



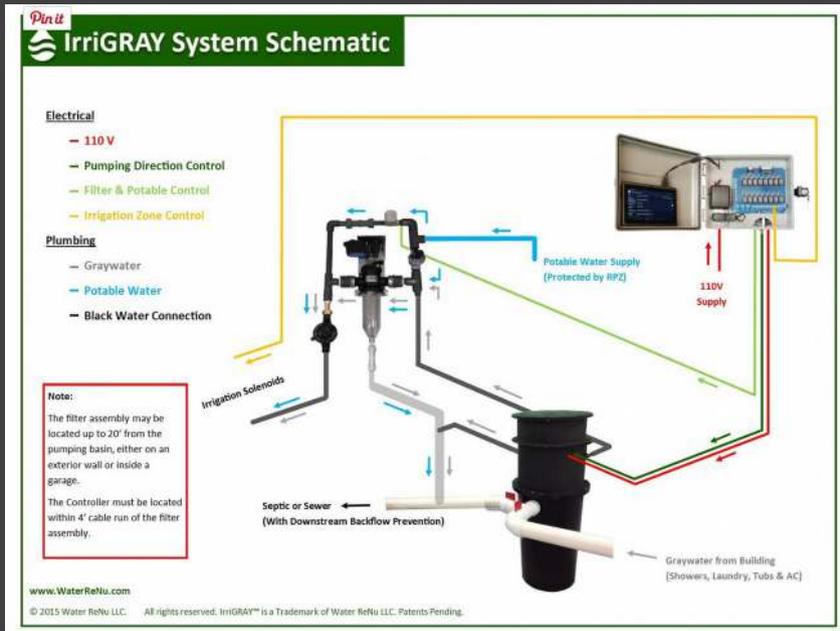
Example of drip irrigation

Note: Filtered GW requires special drip tubing and is not compatible with most standard drip systems.

High-End Residential



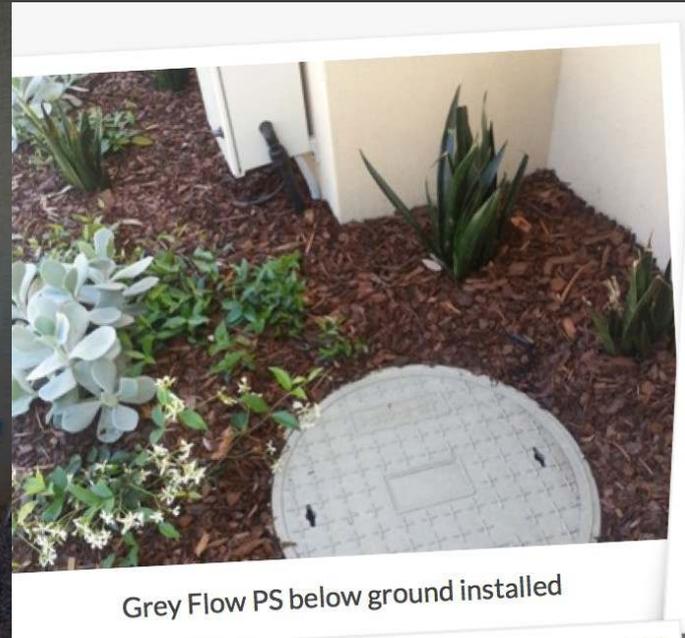
Whole House Systems



WaterReNu "IrriGRAY"



Nexus E-Water



Grey Flow PS below ground installed

Grey-Flow PS

Commercial Scale Greywater System

NRDC Headquarters- ReWater System



Pre- Legal Kitchen Sinks (CA)



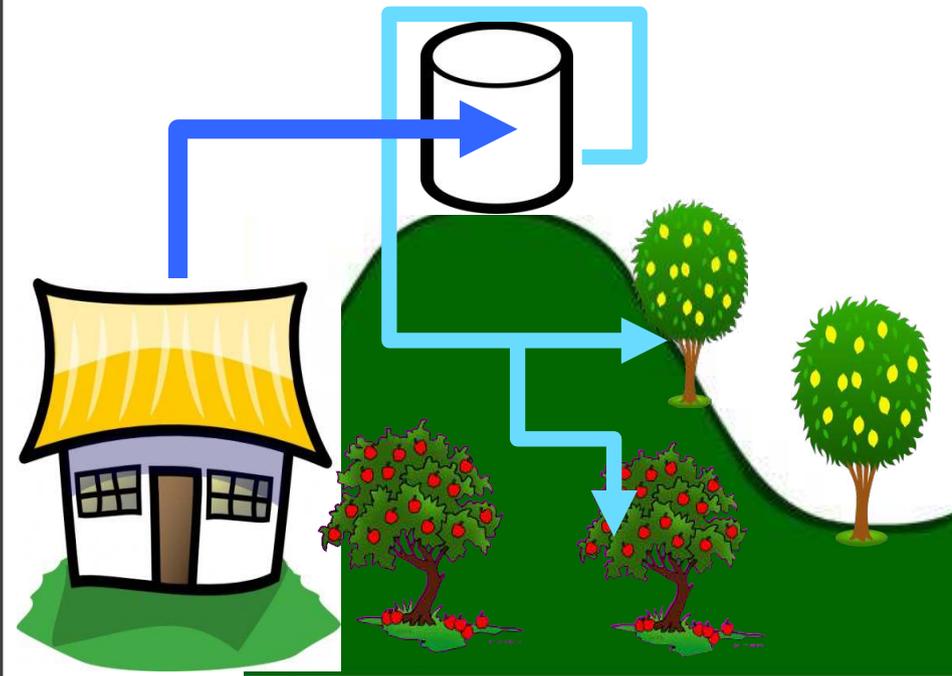
Common Errors

"I'm going to pump my greywater to the top of my property and store it a large tank, then gravity flow it down the hill to irrigate through drip irrigation system".

#1 Storage tank

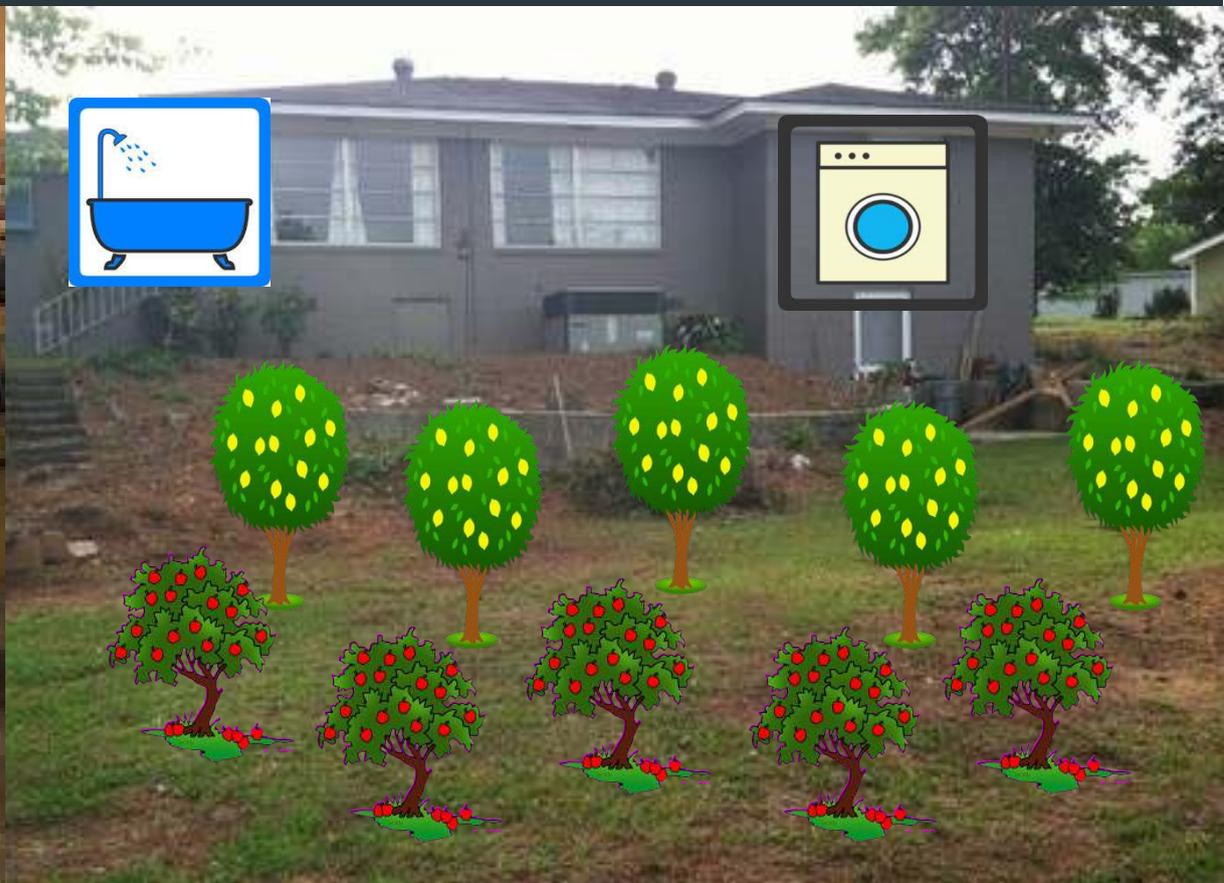
#2 Overuse of pumps

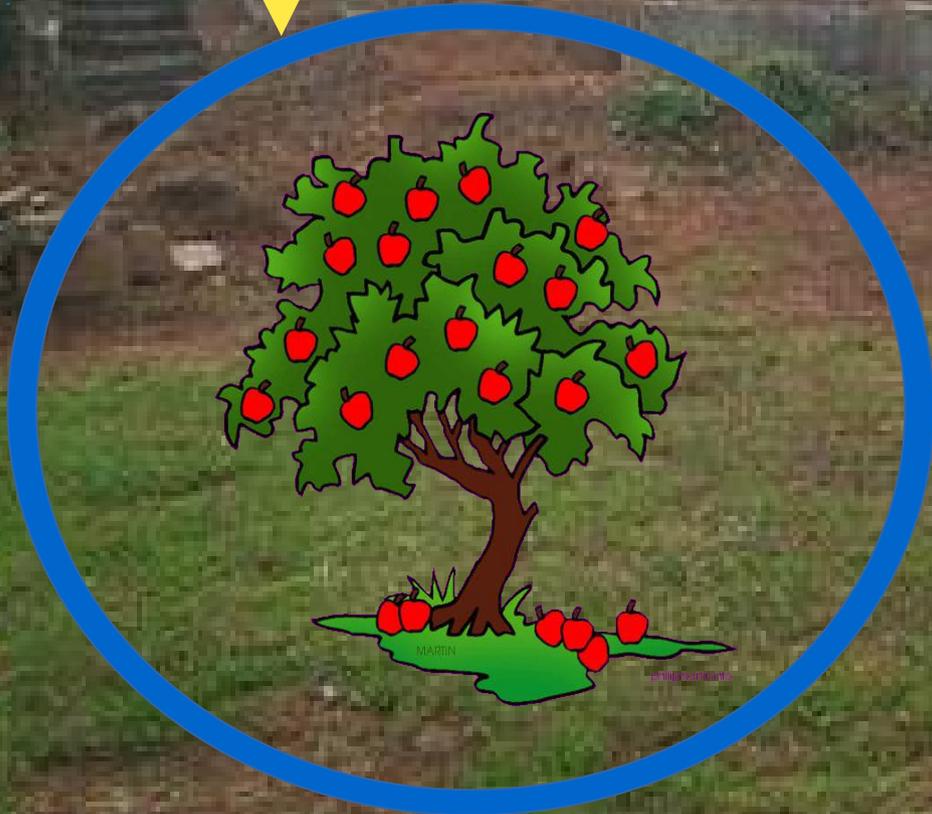
#3 Misuse of filters



What **system** would you recommend here?

“My yard slopes downhill. All the plumbing is accessible in my 3 foot high crawl space. I want to irrigate 10 fruit trees.”





Design Considerations

- **WHAT** sources of greywater can you access?
- **HOW** much greywater does your home produce?
- **WHAT** plants will you irrigate?
 - Match the amount of GW with their weekly irrigation needs. Remember to “hydro-zone”! (Keep plants with similar water needs together.)
- **CHOOSE** a system to meet your needs.



▶ House using greywater for irrigation with simple laundry-to-landscape and gravity-fed systems

© Steve Sanford from The Water-Wise Home

For more information visit: greywateraction.org



Subscribe  Search ...

HOME ABOUT US **GREY WATER REUSE** RAIN WATER HARVESTING COMPOSTING TOILETS EN ESPAÑOL FORUM

ABOUT

UPCOMING EVENTS

(Los Angeles) Create your own Water-Wise Home & Garden Fest
September 25 @ 5:00 pm

Cancelled (Ventura) Design your own laundry-to-landscape greywater system
September 26 @ 10:00 am - 12:00 pm

(Berkeley) Greywater Action: Get Started with Greywater Systems

GREY WATER FAQ

SYSTEM EXAMPLES

RESOURCES

CODES AND POLICY

HIRE AN INSTALLER

Directory lists people and companies who've attended Greywater Action's 5 day training for installers and existing water businesses in your area, please visit this link for advice.

Greywater Action Association: A minimum of 2 years of experience in the installation of greywater systems in their local area as well as to ease permitting barriers.

Level 2 Installers: These people have completed Greywater Action's 5 day "Greywater System Design and Installation" course, and have installed at least two systems on their own, submitting photos and documentation of the systems to Greywater Action.

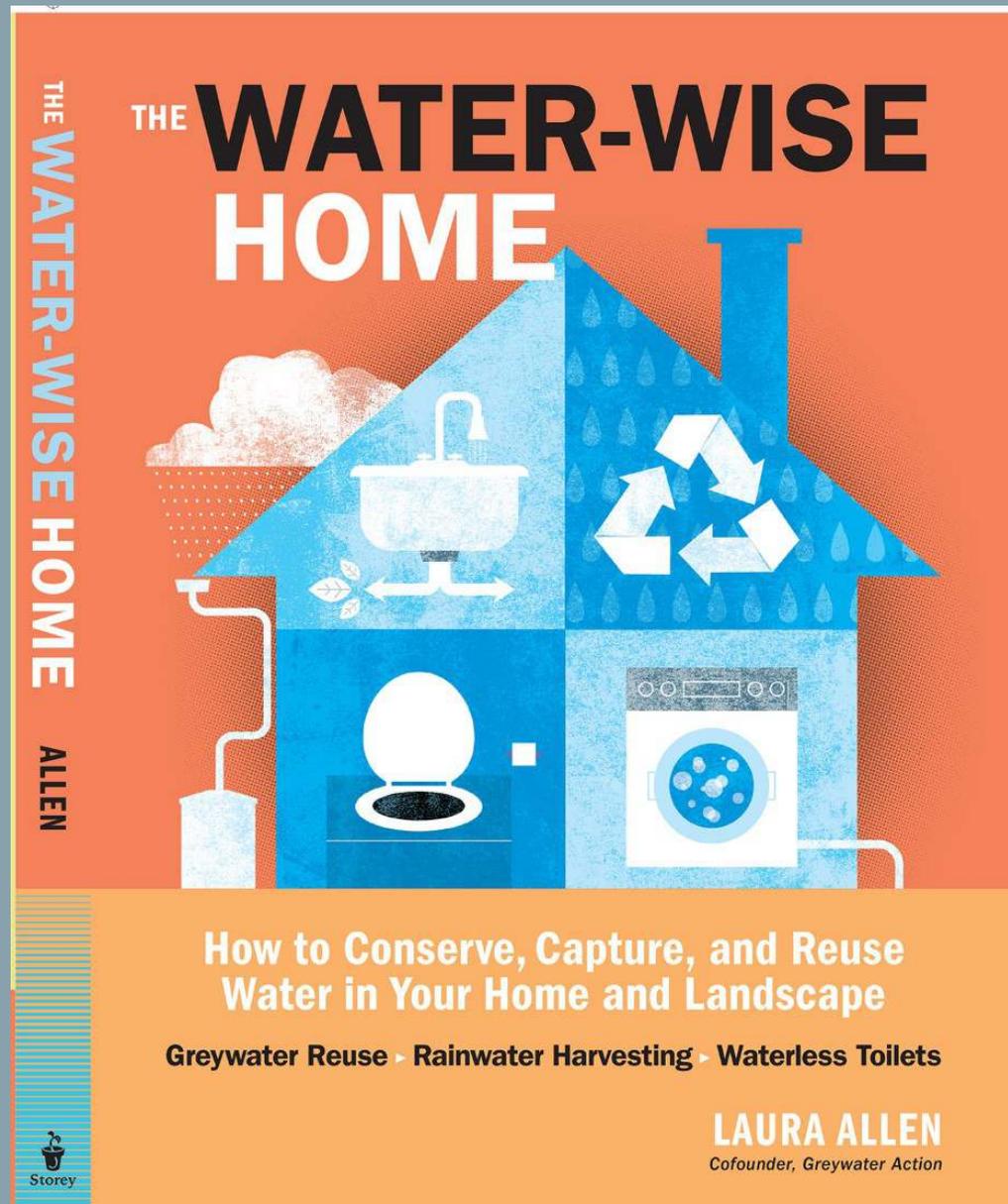
Level 1 Installers: These people have completed Greywater Action's 5 day "Greywater System Design and Installation" course. They have completed a certification examination with a score of 80% or higher, and also successfully installed a greywater system in a small group.

Find an installer to Hire here

Free downloadable manual from sfwater.org



How-To Book



Ask This Old House Video

The image is a screenshot of a YouTube video player. At the top, the browser's address bar shows the URL: <https://www.youtube.com/watch?v=oNNnhCJGY38>. Below the address bar is the YouTube logo and a search bar. The video player itself shows a title card with the 'This Old House' logo in a blue box. Below the logo, the text reads: 'HOW TO INSTALL A GRAYWATER IRRIGATION SYSTEM with plumbing and heating expert Richard Trethewey'. A small 'This Old House' logo is in the bottom right corner of the video frame. The video player controls at the bottom show a progress bar at 0:00 / 5:46, along with play, volume, and settings icons. Below the video player, the video title 'How to Install a Graywater Irrigation System - This Old House' is displayed. Underneath the title is the channel name 'This Old House' with a verified checkmark, a 'Subscribe' button, and the subscriber count '118,564'. To the right of the subscribe button, the view count '15,948' is shown. At the very bottom, there are icons for 'Add to', 'Share', and 'More'.

Q&A Forum

The screenshot shows the website greywateraction.org/questions/?sort=random. The header features a navigation menu with items: HOME, ABOUT US, GREYWATER REUSE, RAINWATER HARVESTING, COMPOSTING TOILETS, EN ESPAÑOL, and FORUM. The 'FORUM' link is circled in red. Below the navigation is a search bar and a 'Subscribe' button. The main content area is titled 'QUESTION CATEGORIES' and lists several categories with their respective counts:

- Composting toilets- general (0)**
 - Composting toilet codes/permits (0)
 - Urine diversion and use (0)
- Greywater reuse- general (26)**
 - Branched drain systems (1)
 - Greywater codes/permits (1)
 - Greywater plumbing (4)
 - Indoor GW reuse (toilet flushing) (0)
 - Laundry-to-landscape systems (4)
 - Manufactured greywater systems (0)
 - Soaps and products (2)
- Rainwater harvesting- general (2)**

Below the categories is a search bar, a 'Select category' dropdown, and an 'Ask Question' button. The main forum content displays a list of questions:

- 1 vote** | **What are good types of plants to irrigate with greywater?**
 - Greywater reuse- general | plants
 - I've read that wetland plants are important to use with greywater systems, but I don't really wan...
 - Sage-CC asked 3 months ago | last active 2 months ago
- 0 votes** | **Washing machine converter for the UK**
 - Laundry-to-landscape systems
- 1** (partially visible)

For more information visit

greywateraction.org

Resources:

- *San Francisco Graywater Design Guidelines for Outdoor Irrigation* (downloadable manual- sfwater.org/graywater)
- *The Water-Wise Home* by Laura Allen. How-to book with instructions for greywater irrigation systems.
- Ask This Old House episode “*Graywater, Small Engines*”
- Materials from local irrigation stores (ask them) or on-line at CleanWater Components
- Greywater Action's Q&A forum



Questions?

www.greywateraction.org

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