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?

www.greywateraction.org
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.

www.greywateraction.org
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.

www.greywateraction.org
“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)

www.greywateraction.org
Greywater Systems can be **Simple** or **High-Tech**

*Image Water Sprout*

www.greywateraction.org
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
Laundry-to-Landscape System

- Sewer connection
- Greywater goes to landscape
- Diverter valve
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

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.

www.greywateraction.org
Pumped System

- A diverter valve directs GW to a tank
- Unfiltered GW is pumped out to the landscape with 1” tubing and ½” outlets
- System requires an outlet and uses electricity
- Requires a rigorous permitting process
Pump and Filter System for Drip Irrigation

(Filter must be cleaned manually and require frequent maintenance)

Example of drip irrigation

Image: Leigh Jerrard

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

Images: Watersprout.org
Whole House Systems

WaterReNu “IrriGRAY”

Grey-Flow PS

Nexus E-Water
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 in 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.

www.greywateraction.org
Free downloadable manual from sfwater.org
Ask This Old House Video

How to Install a Graywater Irrigation System - This Old House

https://www.youtube.com/watch?v=oNNnhCJGY38
Q&A Forum

Question Categories

- 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)
  - Urine to gardening (0)

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1 vote
What are good types of plants to irrigate with greywater?
- Greywater reuse - general
- plants

2 answers
I've read that wetland plants are important to use with greywater systems, but I don't really want...

Sage-CC asked 3 months ago Last active 2 months ago

Washing machine converter for the UK
- Laundry-to-landscape systems
For more information visit greywateraction.org

Resources:

- *San Francisco Graywater Design Guidelines for Outdoor Irrigation* (downloadable manual- sfwater.org/graywater)
- 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
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