

Greywater – Making sense of a grey area

Why is there so much confusion about what is good practice and whether there really are any dangers with greywater? In this article, which first appeared in the Sapphire Coast Producers' Association's magazine - 'The Producer' - Liz Worth tries to work out what the options are and whether government bureaucracy is setting unreasonable standards.

When I started looking into greywater for this article I thought I understood what greywater was – household waste water from bathrooms, laundries and kitchen, but not from toilets. Talking about greywater quickly became confusing. Some folk described flushing toilets with greywater and others said it can only be used for sub-surface irrigation. Who to believe? Then the light bulb finally went on. The difference is the level of treatment the greywater goes through before being reused.

Then, of course, it quickly got more confusing as different sources of greywater can be treated differently.

Why Consider Reusing Greywater?

According to the Australian Greenhouse Office reusing waste water outdoors can reduce your household's potable water use by 30 to 50 percent. Sydney Water estimated that the average water use for a Sydney garden was about 70,000 litres per annum rising to a whopping 500,000 litres for the heaviest users. How much water you can save will depend on how much water you use in your garden now.

If you are looking to reduce water use it may be simpler to put your effort into moving to AAA-rated shower heads and changing your household's water using habits.

Greywater Contaminants

Greywater from showers and baths is usually relatively large quantities of water with relatively small amounts of dirt and cleaning products. This makes bath and shower water the cleanest type of greywater coming out of the house. It still contains some bacteria and other contaminants.

Laundries and hand basins produce greywater with higher levels of contamination. As well as higher bacterial loads they also have higher nutrient loads. Surprisingly, phosphorus is a significant component of toothpaste. It is also a large component of many laundry powders.

The highest bacterial load comes from kitchen sinks. The kitchen waste water also carries a significant grease component. Even if you don't pour cooking fat down your drain the small amounts left on dishes to be washed up adds up over time.

The myriad different greywater systems are all intended to deal with the issues of contamination in greywater. So while there are potential issues with greywater they can be overcome with reasonable practices.

Environmental Issues with Greywater

Lanfax Laboratories have carried out a number of tests on the environmental effects of laundry detergents. One of their demonstrations of the effect of laundry detergents on soil is presented at www.lanfaxlabs.com.au/laundry.htm (scroll down to the heading 'Effects of Laundry Detergent on Soil'). Five common soils representing sands, loams and clays were treated with waste water from a typical full washing machine load. An identical column of soil was set up and treated with rainwater. The effect of laundry wash water compared to rain water is clear in the photo on the website.

On his website, Dr Robert Patterson of Lanfax Labs describes what happens as “simple - the detergent causes the soil to disperse (separate into individual particles) which then block the soil pores. Since the soil is a natural filter system, the pores become blocked and the filter no longer functions. Water percolation slows considerably and the water no longer wets below the surface.”

As well as impacting soil structure greywater carries significant quantities of nutrients that during periods of heavy rains can be washed into water courses and contribute to algal bloom problems. There may also be issues of social amenity if smells caused by bacteria in the waste water have a chance to multiply. Both these issues are generally avoided by appropriate sub-surface application and/or treatment before being reused.

Health Issues with Greywater

Greywater is both contaminated with micro-organisms and polluted with chemicals and particulates. Although generally not as contaminated as raw sewage, greywater still presents a risk to public health. It becomes difficult to assess whether a slightly increased number of minor illnesses in a household is due to a practice of allowing children and pets to play on lawn where laundry wash water has been flooded or due to some other cause. This means that anecdotal stories from friends and neighbours about how great their unapproved greywater system is should be treated with some caution. It seems that the key to healthy use of untreated greywater is to always apply it subsurface where direct contact with humans is not possible.

Options for Treating Greywater

It is becoming much easier to install a legal greywater system. There have been changes to the Drainage Code to allow the installation of diversion devices for greywater from the bathroom without any requirement for approval as long as it is being used for sub-surface irrigation only. This is the simplest way to use greywater. No treatment is required. Greywater is not being stored for later use.

Some minimal treatment is required to reuse laundry and kitchen greywater. As soon as any treatment, even

simple filtering, is included in a greywater system it requires approval. This isn't as scary as it sounds. In the case of the Bega Valley Shire Council (BVSC) a simple phone call to discuss what you intend to do may be all that is required to get you going. The BVSC is currently encouraging households with existing septic systems to do voluntary upgrades by adding a greywater system. This means they are not charging administration fees at the moment.

Filtering your greywater with a simple biological filter made from pine bark is one method the BVSC considers appropriate when the resulting water is reused sub-surface with an application area sized to your water use, geology, vegetation and climate. BVSC can help with advice to make it easier for you work these out for your situation.

In order to reuse your greywater for above ground watering or toilet flushing a much higher level of treatment and disinfection is required. If these are your aims then getting appropriate and detailed advice will be critical to ensuring your system is safe, effective and is able to gain the appropriate approvals.

There are a number of commercially available greywater treatment systems that have the required approvals from NSW Health. It is also possible to build your own system and get the required approvals for it.

Plumbing Issues

Sub-surface means running the water through buried dripper hose or running it into absorption trenches. As greywater contains both microorganisms and nutrients for their growth, biofilms of microorganisms may develop on the inside of pipes and drippers used to distribute greywater. Biofilms may reduce the effectiveness of the distribution system and may even clog the distribution system when pieces of biofilm slough off. Unless the correct dispersal piping system is chosen it is possible for plant roots to grow inside the pipes and cause blockages.

Interestingly it is the biofilm in biological filters like the pine bark based one that does most of the work. The trick is to have most of it done in the treatment tank,

leaving the dispersal pipes relatively free of bio-film slough.

There are a range of plumbing issues that need to be considered when designing a greywater system, for example in some cases a vent will be required to ensure air locks don't occur and block the greywater system.

Living with Greywater

How you manage your greywater system is as important as what your system looks like. Choosing low or no phosphorous laundry powders, not pouring waste chemicals or oils down sinks and other simple household practices will have a big impact on the performance of your system. Other choices you can make are whether to include laundry or kitchen waste water in your reuse greywater. If, for example, there are babies and small children in the household not using laundry water might make a significant difference to the bacterial load in the greywater.

Make sensible choices about where to apply the greywater in your garden. Ensure that greywater cannot contaminate fruit and vegetables that are commonly eaten raw. Also don't forget to have a plan of how you will handle the greywater if the system breaks and for that time in the future when we cycle out of drought patterns and have huge downpours of rain.

Further Information

Bega Valley Shire Council
Advice and approvals for Bega Valley residents.
www.begavalley.nsw.gov.au
ph: 02 6499 2222

Adobe Worms & Loos
Supplier of composting toilets and greywater systems
www.wormsloos.com.au
ph: 02 6494 1051

Lanfax Laboratories
Laundry products research results
www.lanfaxlabs.com.au
ph: 02 6775 1157

ReWater
Water reuse in the horticultural industry.
www.recycledwater.com.au