



GREY WATER

STORY AND PHOTOS **RUTH CZERMAK**

Ruth is the principal designer at **Botanical Traditions**, a landscape design office which specialises in sustainable landscape design. All information is of a general nature only and specific advice should be obtained from your local EPA, council and licensed plumber.

Australia is in the grip of an unprecedented water shortage. Across the country, dams and rivers are running dry, cities and towns face restrictions and farmers confront an uncertain future.

Obviously, the fundamental challenge of maintaining a reliable water supply is to use a lot less water, and to use what there is more efficiently. Various government measures to secure water supplies for the future are underway or have been announced, but many individuals are taking the responsibility for reducing their total water consumption now, rather than later.

Media coverage of water issues has created interest in alternative sources of water for garden irrigation and toilet flushing. As professionals we should encourage the use of alternative water sources for purposes which it is suited, but also need to ensure we are fully informed and do not gloss over any health or environmental risks associated with those alternative water sources.

Greywater is one such alternative water source. It forms a large portion of wastewater and can be either light greywater from the shower, bathroom sink and laundry, or dark greywater from the kitchen. It is estimated that an average household produces around 450L a day of greywater.

Greywater use is regulated by different organisations depending on your state or territory. There are only two regulations common to the whole of Australia. Firstly, a licensed plumber must carry out work that involves alterations to your sewer, secondly, diverting greywater away from the sewer system may

require permission from your local water authority. Each state and territory has different regulations on whether you can store greywater and for how long, the allowable dispersal mechanisms and the legal uses of greywater.

To add confusion to the matter there are many greywater systems for sale – both with and without EPA approval. These systems can be broadly classified as either simple diverter systems – which divert greywater from the sewer system without any treatment or treatment systems – those that divert greywater through a number of intermediate steps to improve the quality of the water.

In Victoria untreated greywater can be diverted from the house and used for subsurface garden irrigation. It must be used as it is produced, should not be applied in any manner which allows ponding and cannot be stored for longer than 24 hours. Legally, it cannot be used in above ground irrigation systems (microsprays, pop-up or shrub sprays), or in the house (including toilet flushing).

Greywater treated to a 'Class A' standard can be stored indefinitely and used in all types of irrigation system as well as for flushing toilets. 'Class A' greywater can easily be used to irrigate in multi-zone, fully automatic irrigation systems which means you can irrigate as needed, rather than lightly, many times a day which occurs with simple diverter systems. The treated greywater can also be used to flush the toilet, something we hardly need to be doing with drinking quality water.

The decision to use a greywater diverter system or a greywater treatment system is based on budget constraints, the proposed use of the greywater, existing pipework and space limitations. In Victoria, the supply and installation of a good quality simple diverter system starts at around \$1,250 while a greywater treatment system starts at \$12,000. There will also be on going up keep – householders will need to clean out filters on a regular basis and an annual maintenance visit.

Contaminants in greywater consist of salts, detergents, soaps, petrochemicals, oil, bacteria, fungi and viruses. The quality of the greywater depends on the source of the greywater and any treatment that it goes through. To improve the quality of greywater at the source, water that has been used in the kitchen, to wash soiled nappies or pets should not be diverted through a greywater system.

I will focus on the two contaminants in greywater that cause problems in the garden - Salts and detergents.

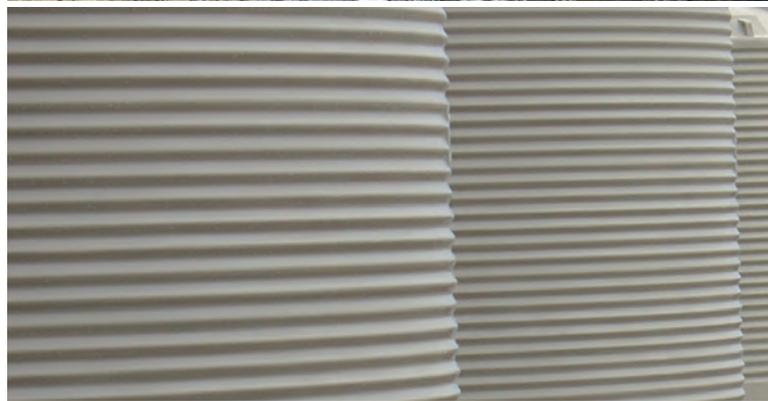
Most of the Salts in greywater originate in laundry detergents. These are often alkaline and high in sodium and phosphorus. Phosphorus is a major water way polluter and a cause of algal blooms, it can also be detrimental to some native plants grown on particular soils types. In Australia we have a labeling system for laundry detergent, 'NP' means no phosphorus is included in the product and 'P' means that the level of phosphorus in the product is below the maximum phosphorus level set by an agreed Australian standard.

Continual garden re-use of laundry water containing high levels of sodium and phosphorus can lead to Salt accumulations in re-use areas. In clay soils where greywater is used for extended periods of time the Salts will build up very quickly and not leach away. Alternating untreated greywater with rainwater will help to reduce the chance of Salt build-up in the soil.

A good rule of thumb to determine if people should consider changing laundry products is to look at the phosphorus rating and then dissolve some in a small amount of warm water. If sediment settles as the water cools consider changing to a different product. The sediment will block subsurface irrigation hoses and air voids in soil. Soap also causes problems as it is made up of caustic products and either animal or plant fat/oil. When it cools it has the potential to congeal in irrigation lines and the soil making it water repellant.

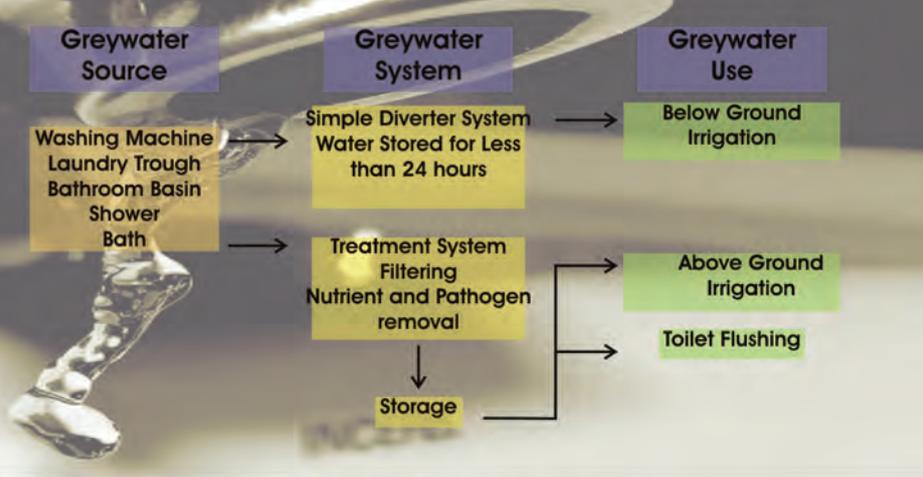
If the pH of the greywater is very acidic or alkaline it will impact on the absorption of nutrients by plants. In alkaline situations phosphorus and boron become so easily absorbed by plants that they take up toxic amounts, while other nutrients such as iron and nitrogen, although in the soil can not be utilised. You can test the pH of greywater by using an aquarium dye based pH test kit.

Another common problem is the use of antibacterial and antifungal cleaners, these should not be diverted to the garden, as they will kill beneficial soil bacteria and fungi. A complex relationship exists between soil fungi and bacteria, nutrient availability and soil structure. Chlorine in bleach is another problem as it is a general biocide. An environmentally friendly option to using chlorine bleach is to use hydrogen peroxide, which breaks down quickly to hydrogen and water in the environment.



Below ground greywater treatment system. The Super Natural Grey unit was installed in the 12 unit Westswyck development in Melbourne by Sustainable Plumbing Solutions (top) Tanks (above) Greywater tap (left) Sink (below)





Greywater flow chart

It is important to remember that the leaves of plants are coated with waxes which prevent the plants cells from drying out. Plants control moisture loss through stomata - the plants are able to control the opening and closing of these pores in response to the environment. If greywater containing detergents are applied to leaves and the protective wax layer is dissolved the plant is unable to retain water within the leaves. These leaves will dehydrate and die and in extreme situations so will the plant. Greywater containing detergents applied to water phobic soil changes the surface tension and allows water to penetrate such soils.

Recycling household greywater for use in the garden is an excellent way of saving water and your conscience! Unlike

rainwater, which is seasonally available, greywater is available every time you shower or wash. However, care should be taken to fully educate clients on the installation costs, maintenance costs and potential lifestyle changes they may need to make.

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For further Information on Laundry Detergents

<http://www.lanfaxlabs.com.au/laundry.htm>

For further information regarding phosphorus and native Plants See DPI Note 'Phosphorus toxicity in native and proteaceous plants' David Beardsell, Knoxfield January, 1998, AG0253



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