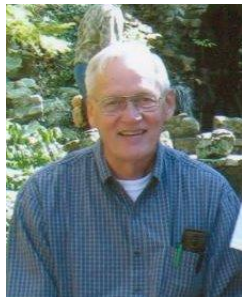


RESIDENTIAL GRAY WATER SYSTEMS

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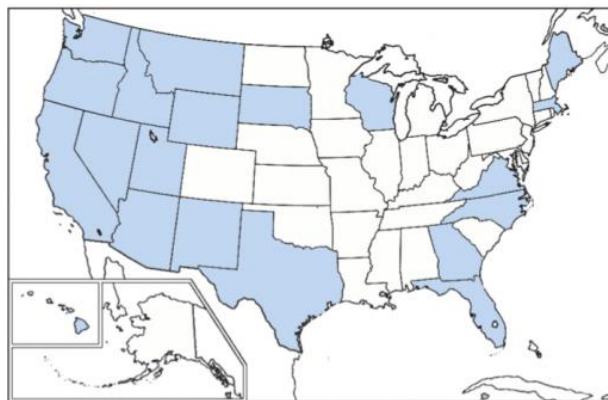


The previous article described some actions that the County or State could take to conserve our water resources. One action that would be practical for individual homeowners to take is the use of gray water. Gray water is water from washing machines, showers, bathtubs, and bathroom sinks. When properly utilized, it can be used for landscape irrigation or toilet flushing. Waste water from toilets (and usually kitchen sinks) is considered black water and must go into a sanitary sewer system.

Maryland is encouraging the reuse of partially treated waste water in commercial or public facilities, especially for things such as golf courses, other types of irrigation, power generation, and toilet flushing. Presently, about 2% of water from Maryland's waste water treatment plants is used in this manner. In its "Zero Waste Maryland" plan (http://www.mde.state.md.us/programs/Marylander/Documents/Zero_Waste_Plan_Draft_12.15.14.pdf) the state has the goal of increasing that in steps to 40% by 2040. This magnitude of reuse already occurs in some other states. Florida, for example, reused 45% of its wastewater in 2012.

However, there is no mention in the plan of systems that could be used by individual homeowners. In many states, simpler systems, not requiring any treatment, are used by homeowners. It is recognized that the adoption of such systems will involve educating the public, but we can take advantage of the experiences of our western states. Figure 1, from www.graywateraction.org shows the states that allow residential graywater systems. As would be expected, the western states, where water is scarcer, have figured out how to provide the regulations, guidance, and education needed to support the use of these systems.

Figure 1.



■ States that allow graywater reuse

□ States that lack a graywater regulation or do not allow graywater reuse

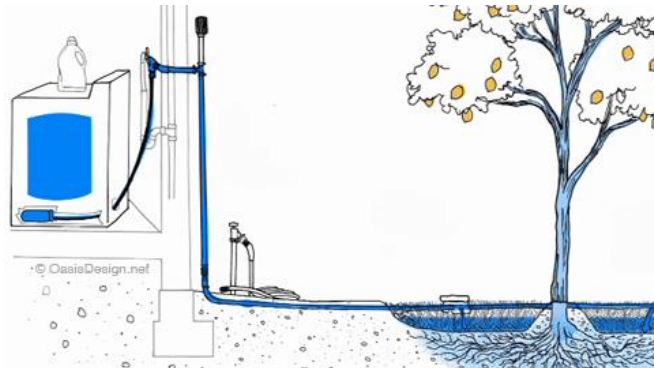
Image from "Treatment, Public Health, and Regulatory Issues Associated with GW Reuse" By Sybil Sharvelle et. al. for WERF

Certain precautions are generally required when using gray water. It should not be stored over 24 hours because it does contain some pathogens that would grow and the water would become stagnant and dangerous to use. It should not be sprinkled on lawns because some of the pathogens would become airborne and could be breathed in. In fact, it should not be accessible to people or pets at all when used for irrigation. This means it should only be used for subsurface irrigation, and the irrigated plants should have a bed of gravel and/or wood chips next to them or surrounding them to absorb the gray water. There should also be a way to bypass the irrigation system if there is too much water such as after a recent rain, or during the winter, or when using bleach or washing diapers. Ecologically friendly soap should be used.

There are some simple systems that meet the above requirements and involve only simple additions to existing plumbing. The one shown in Figure 2 is from www.oasisdesign.net and is called a "Laundry to

Landscape" system. It will be discussed here to highlight some of the issues in its use, both technical and regulatory. It utilizes the pump of the washing machine to get the gray water to the plants. Only one tree is shown, but several branches can be used to water a number of trees, shrubs, or other plants. It includes a valve to send the water to the sanitary sewer system when necessary.

Figure 2.



As an average, about 30% of residential water use is outside. About 25% of the indoor water usage is for washing clothes, so a laundry to landscape system could reduce our water usage considerably. It would also allow the irrigation water to soak back into the ground to help replenish the water in our aquifers rather than be treated as sewage and eventually pumped back into our rivers and bay where it becomes brackish and not reusable.

www.oasisdesign.net and www.graywateraction.org have detailed guidance for these and other systems.

Of the states that do allow graywater reuse, some do not require permits for simple systems. In general, if

it involves any connection to the existing plumbing, a permit is required, but this may not include the discharge hose from a washing machine. So the "laundry to landscape" system might be the most likely system to be allowed without a permit. In many states, there were many illegal residential systems before state regulations adopted reasonable regulations and started promoting the use of graywater.

In that regard, Maryland has some catching up to do. The legality of such systems in Maryland is confusing. The Code of Maryland Regulations (COMAR) requires graywater to go into the sanitary sewer system. A few years ago, CEPA advocated that simple graywater systems be allowed and a bill was presented to the House of Delegates to that effect, but it was not passed. In retrospect, it did not consider all the implications involved, and MDE opposed the bill, saying that there were already regulations for the discharge of "sewage" for subsurface disposal. This is technically true because if a county adopts the International Plumbing Code (IPC), as Anne Arundel and other Maryland counties have done, it supersedes the COMAR. Anne Arundel uses the 2012 version of the IPC which includes a chapter on graywater. The systems it covers are more complicated than the simple Laundry to Landscape system, involving storage tanks, filters, and large "absorption systems" to avoid surfacing of graywater. The "absorption systems" sound more like the requirements for regular residential septic fields. They involve seepage trenches at least 2 feet deep, with buried distribution pipes, and at least 6" of gravel. These compare to simple mulch beds described as part of a Laundry to Landscape system by Oasis Design or Graywater Action. Not much is said about the depth of the mulch pits, but the "San Francisco Graywater Design Manual for Outdoor Irrigation" specifies 6 to 12 inches deep. The IPC requires a perk test to determine the size of the absorption system. Oasis Design and Graywater Action also say a perk test should be done, but in some states (such as California) where a permit is not required, the homeowner can do his own simple perk test, such as described in the San Francisco manual.

I recently emailed Anne Arundel County Inspection and Permits to ask what their requirements are for graywater systems. They indicated that they go by the 2012 International Plumbing Code, which was described earlier, but they will soon adopt the 2015 Code. The 2012 Code requires a perk test, which normally involves the Health Department. I emailed them asking who had to do the perk test. The answer was that graywater is treated the same as other waste water and must enter the sewer system.

The systems described by Oasis Design and Graywater Action have benefitted from many years of experience in our Western states, and we feel it is time for Maryland to start the process of taking advantage of what they, and the Europeans for that matter, have learned about greywater.

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