

Acknowledgments

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Warning

The design and use of greywater systems carry legal, public health, horticultural, and ecological consequences. The author encourages people to follow common sense and local regulations for greywater treatment. Do not use greywater for food crops unless you take appropriate measures against the possibility of transmitting disease or chemical contamination. Do not greywater lawns by any means other than subsurface drip irrigation.

The information contained in this book is provided solely for the purpose of stimulating dialogue, is not intended to promote any violation of the law, and is true and complete to the best of the author's knowledge. The author disclaims any liability arising from use of this information.

Note on Spelling

"Greywater," "Grey Water," "Graywater," and "Gray Water" are *all* correct usage. We use "Greywater" except when we're citing someone else, when we use whatever they used.

**This book is dedicated to
the thousands of tinkerers around the
world who each day come up with
new ways of using greywater.**



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Appendix D: Greywater Laws

Greywater is regulated locally, usually by adoption of a regional model ordinance (such as those in this Appendix), with or without modification. Some locales such as Malibu, CA have crafted their own laws from scratch.

If this sounds like it could lead to a chaotic regulatory patchwork, you're right. There are literally thousands of different greywater regulatory authorities—every state, county, and city—and no one knows how many of them are regulating greywater independently, or what exactly they're doing. However, the main regulatory systems—those that cover the majority of people in the US—are known, and follow in these pages.

This section starts with the Arizona and New Mexico greywater laws, which are the best to date.

These are followed by a checklist of CPC/UPC greywater code requirements; then the annotated full text of the CPC/UPC greywater model code for most western states; and then the International Plumbing Code (IPC), the model code for many eastern states, which has a very brief and uninformative greywater section. Each section is followed by our suggested improvements.

Arizona Greywater Law

Greywater regulation in Arizona has the following brilliant aspects:

- ❖ Regulators apply oversight to greywater systems in rational proportion to their possible impacts, using a three-tiered system
- ❖ People with low-volume, low-risk systems don't have to apply for a permit to comply with the law
- ❖ The law gives performance goals, not proscribed design specifics
- ❖ They have a short, simply worded law and a longer explanatory booklet

This is *the* model to emulate—the Arizona method makes so much sense it is hard to justify regulating greywater any other way. New Mexico has passed a similar law, Texas a somewhat similar one, and other states are considering it.

The three tiers:

1. **Systems for less than 400 gpd that meet a list of reasonable requirements** (reprinted in the next column) are all covered under a general permit without the builder having to apply for anything. With this one stroke, Arizona has raised its compliance rate from near zero to perhaps 50%. And, homeowners are more likely to work toward compliance for the informal systems that still fall short of the low bar for this first regulatory tier. What's more, the door is now open for *professionals* to install simple systems.
2. **Systems that process over 400 gpd, don't meet the list of requirements, and/or commercial, multi-family, and institutional systems** require a standard permit under the second tier.
3. **Systems over 3,000 gpd**—the third tier—are given attention by regulators on an individual basis.

The entire Arizona law for tier-one systems follows on the next page.

Annotated Arizona Greywater Law
R18-9-711. Type 1 Reclaimed Water
General Permit for Gray Water

(Strike through denotes Oasis-suggested deletions, underline denotes additions)

[From definitions:] “Graywater” means wastewater that originates from residential clothes washers, bathtubs, showers, and sinks, but does not include wastewater from ~~kitchen sinks, dishwashers and toilets.~~

A. A Type 1 Reclaimed Water General Permit allows private residential direct reuse of gray water for a flow of less than 400 gallons per day if all the following conditions are met:

1. Human contact with gray water and soil irrigated by gray water is avoided;
2. Gray water originating from the residence is used and contained within the property boundary for household gardening, composting, lawn watering, or landscape irrigation;
3. Surface application of gray water is not used for irrigation of food plants, ~~except for citrus and nut trees,~~ which have an edible portion that comes in direct contact with greywater;
4. The gray water does not contain hazardous chemicals derived from activities such as cleaning car parts, washing greasy or oily rags, or disposing of waste solutions from home photo labs or similar hobbyist or home occupational activities;
5. The application of gray water is managed to minimize standing water on the surface, for example, by splitting the flow, moderate application rates, and generous mulching;
6. The gray water system is constructed so that if blockage, plugging, or backup of the system occurs, gray water can be directed into the sewage collection system or onsite wastewater treatment and disposal system, as applicable (except as provided for under 10, below). The gray water system may include a means of filtration to reduce plugging and extend system lifetime;
7. Any gray water storage tank is covered to restrict access and to eliminate habitat for mosquitoes or other vectors;
8. The gray water system is sited outside of a floodway;
9. The gray water system is operated to maintain a minimum vertical separation distance of at least five feet from the point of gray water application to the top of the seasonally high groundwater table;
10. For residences using an onsite wastewater treatment facility for black water treatment and disposal, the use of a gray water system does not change the design, capacity, or reserve area requirements for the onsite wastewater treatment facility at the residence, and ensures that the facility can handle the combined black water and gray water flow if the gray water system fails or is not fully used. Alternatively, the greywater system shall be designed with two valved zones, each of which can accommodate the full expected greywater volume. Providing the greywater system passes a flow test in each zone, the capacity of the on-site system may be reduced, or in the instance that an approved composting toilet system is present, eliminated;
11. Any pressure piping used in a gray water system that may be susceptible to cross connection with a potable water system clearly indicates that the piping does not carry potable water;
12. Gray water applied by surface irrigation does not contain water used to wash diapers or similarly soiled or infectious garments unless the gray water is disinfected before irrigation; and
13. Surface irrigation by gray water is only by flood or drip irrigation. Containment within horticultural basins or swales is encouraged for flood irrigation;
14. It is required that kitchen sink water be applied subsoil or contained within a rat-proof outlet shield;
15. Greywater diverter valves should be downstream from traps and vents in plumbing that leads to septic or sewer.

B. Prohibitions. The following are prohibited:

1. Gray water use for purposes other than irrigation, and
2. Spray irrigation.

C. Towns, cities, or counties may further limit the use of gray water described in this Section by rule or ordinance.

The main feedback to the Arizona Department of Environmental Quality (DEQ) has been from environmentalists upset that greywater plus composting toilets are not allowed.

The DEQ may revise the rules in the future to allow kitchen sink water. This would solve the composting toilet issue if item 10 was also revised so it didn't call for a full-sized septic.

There is much more on the Arizona law in our Greywater Policy Center, oasisdesign.net/greywater/law.

New Mexico Greywater Law

The New Mexico greywater law is similar to the Arizona version, though not quite as good. This is the meat of it, with our suggested improvements in underline and ~~strike thru~~:

Section 1. Section 74-6-2 NMSA 1978 (being Laws 1967, Chapter 190, Section 2, as amended) is Amended to Read:

...L. shall not require a permit for applying less than ~~two hundred fifty~~ four hundred gallons per day of private residential gray water originating from a residence for the resident's household gardening, composting or landscape irrigation if:

1. a constructed gray water distribution system provides for overflow and/or diversion into the sewage collection or on-site wastewater treatment and disposal system;
2. a gray water storage tank is covered to restrict access and to eliminate habitat for mosquitoes or other vectors;
3. a gray water system is sited outside of a floodway;
4. gray water is vertically separated at least five feet above the groundwater table;
5. gray water pressure piping is clearly identified as a nonpotable water conduit;
6. gray water is used on the site where it is generated and does not run off the property lines;
7. ponding is prohibited, application of gray water is managed to minimize standing water on the surface and standing water does not remain for more than twenty-four hours;
8. gray water is not sprayed; and
9. gray water use within municipalities or counties complies with all applicable municipal or county ordinances enacted pursuant to Chapter 3, Article 53 NMSA 1978

This law would benefit from the same improvements suggested for the Arizona law, previous page.

CPC/UPC Legal Requirements

Summary

See the annotated text of the California greywater law (following) for details (G-section references). Note that the CPC's Appendix G (applied in California and included here) differs from the UPC's Appendix G, which is what your inspector will find in his/her UPC code book. The letter designation also may change when the code is revised. This summary is based on 2000 codes. Our suggested changes follow the code.

(GW = greywater, GWS = greywater system)

- ❖ GW used only for subsurface landscape irrigation (G-1a)
- ❖ GWS now allowed for commercial / multifamily in CA (recent change) (G-1a)
- ❖ No connection to potable water system (G-1a)
- ❖ No GW surfacing (G-1a)
- ❖ UPC applies to GWS except as provided in Appendix G CPC (G-1a)
- ❖ No part of GWS may be on a lot other than the one which generated the GW (G-2c)
- ❖ Location of components must comply with minimum distances in Table G-1 (G-1c, G-1f, Table G-1)
- ❖ Plot plan to scale with all information in Section G-4 (a) required for submittal (summarized under first item of GW Measures Checklist, below, and in G-1d, G-4a)
- ❖ GW can't discharge where it could increase the likelihood of a landslide (G-4e)
- ❖ Other disposal system (septic, sewer not mentioned) can't be compromised or reduced in size on account of the GWS (G-1f)
- ❖ Installers must provide users with an operation and maintenance manual (G-1g). Manuals should be supplied with commercial systems. (For a non-manufactured system, perhaps a copy of *Create an Oasis*, or the California Department of Water Resources *Greywater Guide*,¹⁶ plus some comments on the particular installation would suffice.)
- ❖ GWS cannot accept GW from kitchen sink, dishwashers (check for possible change),¹⁶ or laundry water from soiled diapers (G-1h)
- ❖ A permit is required for constructing or altering a GWS (G-3)
- ❖ GW is to be distributed daily (G-7)

Some Things Not Legally Required

- ❖ Fixtures need not be individually divertable; every fixture hooked to the system can share one diverter valve
- ❖ A surge tank is not required
- ❖ Filtration is only legally required for subsurface drip

Needed Improvements to CPC/UPC Greywater Law

Assembly Bill 313 rectified many of the problems we'd identified with the CPC in earlier editions of this book, but the UPC still has most of these. There is still a long way to go with both laws.

These unrealistic greywater laws probably have *increased* the public health threat from greywater systems by lowering the legal compliance rate virtually to zero. Santa Barbara, for example, has issued approximately 10 permits for greywater systems since greywater use was legalized in 1989.¹⁹ This is in an area with 200,000 people, as many as 40% of whom were using greywater in the drought of the 1990s.²⁰ So many requirements are obviously overkill that the entire law, including some very sensible provisions, is dismissed by the public as a source of design guidance. A more reasonable regulatory stance would lead to greater participation and a reduction in risk from the perpetuation of unregulated systems. As California's law is being taken as a model for other states and countries, this is all the more vital.

The best action would be to abandon the current CPC/UPC laws and adopt an Arizona-style tiered approach. Failing this, the incremental improvements below would be steps in the right direction.

To campaign for better laws in California, direct your comments to the agency in charge, the State Department of Water Resources¹⁶—and be nice. These people have worked very hard to get this law in place against considerable resistance.

General Suggestions

- ❖ **Wherever appropriate, require achievement of performance goals** (e.g., ecologically and biologically safe treatment of wastewater), with explicit designs as options, rather than specifying mandatory techniques to be used.
- ❖ **Be more realistic about the quantitative health threat from greywater systems.** There is a long history of surface greywater reuse, with systems far, far less safe than those specified in the current law, which has not produced a single documented case of greywater-transmitted illness in the United States. In Australia, greywater is legally distributed through sprinklers with 6' throw. The City of Los Angeles Greywater Pilot Project²¹ showed that greywater makes a negligible contribution to the pathogens in soil, while dog feces, for example, contribute a significant amount of pathogens to the suburban environment. Even the worst illegal greywater systems don't stand out among myriad sources that besiege our bodies with pathogens in the course of ordinary life. *The actual health threat is plenty small enough to include ecological and practical considerations on equal footing with public health considerations.*
- ❖ **Consider exposure from required maintenance in comparing the relative health risk of systems.**
- ❖ **Local jurisdictions should consider the effect of high permit fees on participation in the legal process.** In our

area a greywater permit costs \$75, increasing the attractiveness of simple, illegal systems, which already have dramatically superior cost/benefit ratios to currently legal systems in most situations (and often cost less than \$75 total!).

- ❖ **Change plumbing code to require greywater and blackwater to be plumbed separately for all new construction of single family homes on ¼ acre or more.** The lines should be joined after all the fixtures and vents and at or after a convenient future greywater diversion point.

Specific Suggestions

- ❖ **G-1-a Allow commercial and multifamily systems in the UPC** (this change has already been made in the CPC). This is a serious problem with the current law.
- ❖ **G-1-f Allow reduction in size or elimination of septic/sewer system if the alternative waste disposal system is capable of handling all wastes as well or better,** at the discretion of the Administrative Authority. There are sites and regions where currently mandated treatment technologies cause more ecological and health problems than proven alternatives. Regulators are allowing this in practice, and they should have clear guidelines.
- ❖ **G-2 Redefine kitchen sink and dishwasher effluent as "difficult-to-handle greywater" (rather than blackwater)** and allow its use at the discretion of the Administrative Authority, if the hardware is demonstrably able to handle it. This high-solids water is a (resolvable) hardware design problem, not a soil or public health problem (Branched Drains to subsoil infiltrators can handle kitchen sink water, for example—or raw sewage, for that matter).
- ❖ **G-7 Allow greywater systems in areas with high groundwater** at the discretion of the Administrative Authority. A proper greywater system design can provide better treatment and protect groundwater better than currently mandated systems. A specific provision requiring that a given amount of soil separate greywater from aquifers in Karst formations would be reasonable.
- ❖ **G-7 Eliminate from the UPC the requirement for three irrigation zones** which are each capable of accepting the entire greywater flow, if there is a disposal alternative. This ill-thought-through requirement, which has already been struck from the CPC, eliminates the possibility of meeting all the irrigation needs of an area with greywater, whether it makes sense or not. It effectively mandates the installation of a redundant freshwater irrigation system, which severely undermines the economics of some systems, particularly commercial or multifamily systems. This requirement drove the regulators' favorite manufacturer (AGWA) out of business. High-end greywater systems are capable of distributing freshwater as needed for supplemental irrigation without wasteful hardware duplication. This is a serious problem with the current law.
- ❖ **G-7, G-8, Table G-2, Table G-3 Explicitly allow reduction in system design loads with water-conserving fixtures.** Projects with aggressive conservation shouldn't be penalized by having to install the same size system

as the worst water hogs. The current language allows local discretion in this area but the possibility is not obvious.

- ❖ **G-8-b Allow greywater systems across a wider range of percolation rates.** Greywater systems are safer at high percolation rates than septic systems.
- ❖ **G-9-e Delete the requirement for a gravity drain for surge tanks from the UPC,** as has been done with the CPC. This is a serious problem with the current law. A gravity drain is a nice convenience but it is a practical impossibility for many installations. Note that current law does not require a gravity drain for underground greywater surge tanks, septic tanks, or sewage ejector pump tanks.
- ❖ **G-9-h Require below-grade tanks to be anchored against popping to the surface** if conditions indicate this may be a problem. Unlike septic tanks, greywater surge tanks are often empty and experience tremendous buoyant lift under saturated soil conditions. This would protect consumers.
- ❖ **G-11-a-2 Modify the requirement that “system design shall be such that emitter flow variation shall not exceed plus or minus 10%”** with the phrase “in instances where greater variation could result in flows high enough to produce per emitter ponding in the soil in question.”
- ❖ **G-11-a-6 Change wording from “pressure at pump shall not exceed 20 psi” to “pressure at any emission device shall not exceed 20 psi.”** The current wording effectively precludes irrigation with adequate pressure at a location significantly higher than the pump.
- ❖ **G-11-a-5, G-11-b-2 Explicitly allow greywater to be distributed and emitted through lines covered by mulch** at the discretion of the Administrative Authority. This would be a great step forward.
- ❖ **G-11-b-1 Allow smaller diameter pipe, half-pipes in Mini-Leachfields.**
- ❖ **Table G-1 Allow installations on steeper slopes** where environmental conditions are such that the water will not surface.
- ❖ **Table G-2 Take into account the higher LTAR of mulch basins by halving the required infiltration area for systems that use them.**
- ❖ **Explicitly describe Branched Drain to Mulch Basins, Infiltration Beds, Leaching Chambers, and Box Troughs** (see *Create an Oasis*) as allowed system examples.
- ❖ **Figures: Show a greywater surge tank (usually a 55 gal drum) rather than a sewage ejector pump tank** in UPC figures. Include a note that the running trap is only required in the rare instance that the fixtures lack traps.
- ❖ **Eliminate the requirement for backwater valves.**
- ❖ **Allow greywater surge tank to be vented back through the house vents** (as is done with all septic tanks and sewers) as an alternative to a vent at the tank.

Needed Improvements to IPC Greywater Law

The IPC is the model code for most of the eastern United States. These comments are based on the 2000 IPC, Appendix C, p. 101.

General Suggestions

- ❖ **The regulation should lay out broad goals such as health protection and leave it at that.** This would be in keeping with the minimalist, “let the designer figure it out” philosophy of the IPC (the whole of which is less than a third the length of the UPC, with only one page on greywater). Most of the trouble with the IPC is in the form of broad prohibitions.
- ❖ **Starting from scratch** with Arizona-style wording would be the easiest way to accomplish this.

Specific Suggestions

- ❖ **c101.1 Differentiate between allowable uses for treated and untreated greywater.** As it stands, reuse for toilet flushing is allowed with disinfection only, which may not be satisfactory if BOD remains high—toilet tanks may become foul and anaerobic with stored, putrefying water. Treated greywater could be reused for other non-potable uses beside those listed, laundry for example. It is not necessary to treat greywater for irrigation in most cases.
- ❖ **Irrigation should be specifically allowed,** not just as an exception.
- ❖ **c101.2 Expand greywater definition to include all domestic wastewater other than toilet water.** Exclusion of kitchen sink water leaves this particular wastewater flow in awkward limbo in facilities with a greywater system and composting toilets. Instead, give performance requirements for dealing with high-suspended-solids, high-BOD water.
- ❖ **c101.4 The reservoir should be optional,** as storing greywater is not required for all system types and is generally undesirable. The “not less than 50 gal” and “not more than 72 hours retention” requirements are potentially at odds with each other. 24 hours maximum retention is a better design goal, with the tank size left up to the designer.
- ❖ **c101.6 Disinfection should not be required for irrigation reuse.**
- ❖ **c101.7 Make-up water should be optional** depending on the application. Toilet flushing requires make-up water for public health, irrigation does not.
- ❖ **c101.8 Overflow pipe should be the same size or greater than the influent pipe.** Allow connection to an alternate overflow, in order to allow facilities with well made, high capacity composting toilets and greywater systems without a sewer/septic hookup. Allow septic systems to be downsized when a greywater system is safely processing most of the effluent.