

Re SB 1258: Discard the UPC model, use the state-of-the-art AZ/ NM/ TX tiered approach to greywater regulation

Dear Mr. Rowland,

February 24th, 2009

I am an ecological systems designer, and the author of three books on greywater.

It seems that the main stated argument against California greywater standards following the lead of Arizona, New Mexico and Texas into the 21st century is public health concern. But...

1) **Greywater has hundreds of times fewer pathogens than combined sewage. Logically, greywater systems could be hundreds of times less effective at sequestering pathogens from people and still be no more dangerous than septic or sewer systems.** (average of values from calculations, U of AZ study--see <http://oasisdesign.net/greywater/law/california/index.htm#references> for complete list of citations and calculations)

2) **The past several decades of greywater prohibition have inadvertently resulted in the construction of a rather large number of unpermitted systems. The quantity of those systems is vast (eight million in the US, 1.7 million in California)** and the experience long term, going back to the founding of the country. (Soap and Detergent Manufacturer's Association Graywater Awareness and Usage Study, a nationally representative sample of 61,377 households; 13.9% of which were using greywater in CA, the highest proportion of any state).

This has in effect served as a large-scale, long term, and fairly conclusive experiment on the epidemiological danger from unregulated greywater reuse.

There have been approximately a **billion greywater system-user-years of exposure in the US** since 1950, plus exposure to guests and neighbors. If one greywater user in 100,000 got sick and mentioned why, there would be 10,000 incidents on record.

In fact, **there is no record of a single documented instance of greywater-transmitted illness in the US**, according to the CDC. (By comparison, approximately 20,000 people were struck by lightning over the same time period).

It is certain that greywater risk is non-zero. It is possible that the risk from the average greywater system could be low enough to be unnoticeable in the background risk, yet still be of concern in the aggregate.

However, with such a vast quantity of systems, **there must be outlier systems that are several standard deviations riskier than the average that still number in the thousands. If even these have escaped notice, the implication is that the inherent risk must be very low indeed.** (One unfortunate Californian has been struck by lightning on seven occasions. That there is no analog for greywater incidents is quite instructive).

Of the 12 illnesses identified by WERF as potentially greywater-transmittable, 9 are reported to the CDC by legal mandate. Reportable illnesses have been tracked by all levels of our public health system since 1925. This serves as a more tightly run subset of the general greywater experiment. **There are over 100,000 instances of these 9 reportable sicknesses, per year, or several million total. If greywater were a significant transmission path, tens of thousands of alarms in the reportable illness system would have put public health officials on the track decades ago.**

The absence of reports of greywater-transmitted illness fits with the simple logic of point 1, and lends support to the Arizona/ New Mexico/ Texas regulatory approach. This holds that permits and inspections are not necessary for simple greywater systems (the people of California seem to agree: only one system in eight thousand is permitted).

Unless HCD can:

A) Prove that greywater systems are dangerous, in light of a billion system-user-years of real-world experience to the contrary


B) Prove that tight regulation (which deters licensed professionals but not homeowners) is better for public health than realistic guidelines that professionals would follow to improve the state's stock of systems

C) Produce a risk assessment that shows that in a world which may be out of usable water within our lifetimes, rigorous permitting of greywater systems is a priority use of regulatory and citizen resources

please shift from the failed UPC-style approach to the state-of-the-art Arizona/ New Mexico/ Texas tiered approach to greywater regulation.

A slightly improved version of the Arizona code that is a suitable starting point for new California tier 1 standards can be found at: <http://www.oasisdesign.net/greywater/law/#model>.

Sincerely,

A handwritten signature in black ink, appearing to read 'ART LUDWIG', with a stylized flourish extending to the right.

Art Ludwig
Ecological Designer

California Greywater Policy Data and Calculations

Feb 24, 2009. Check <http://oasisdesign.net/greywater/law/california/index.htm#references> for updates to this spreadsheet.

Datum	What	Date	Source	URL, comment
Greywater system exposure in California				
36,553,215	Population of California	2007	US census bureau	http://quickfacts.census.gov/qfd/states/06000.html
13.9%	Households with greywater systems	1999	Soap and Detergent Manufacturer's Association Graywater	http://www.sdascience.org/docs/Graywater_Habits_&_Pract
5,080,897	Greywater users	2009	Calculation; population * percent greywater users	extrapolation from 1999
2.87	People per household	2000	US census bureau	http://quickfacts.census.gov/qfd/states/06000.html
1,770,347	Greywater systems	2009	Calculation; greywater users / people per household	(this assumes the proportion of greywater use has not changed from 1999)

System user years-CA		<i>Note: This is a back of the envelope-type calculation; the point is still valid if it is off by a factor of two or four</i>		
5,080,897	Greywater users	2009	from above	
10.0%	Households with greywater systems	1950	Estimate; in general, older infrastructure has more greywater use, approaching 100% with rural 70+ year old buildings	
10,586,223	Population of California	1950	US Census Bureau	www.census.gov/dmd/www/resapport/states/california.pdf
1,058,622	Greywater users	1950	Calculation; population * percent greywater users	
3,069,760	Average number of greywater users	1949-2009	average of 2009 and 1950 greywater users	
60	Years from 1949-2009		calculation	
184,185,576	System-user-years of greywater exposure, not counting neighbors		calculation; average greywater users * years	

Greywater system exposure in United States				
303,824,640	Population of US	2008	CIA estimate	https://www.cia.gov/library/publications/the-world-factbook/p
7.0%	Households with greywater systems	1999	Soap and Detergent Manufacturer's Association Graywater	http://www.sdascience.org/index.php?option=com_content&
21,267,725	Greywater users	2009	Calculation; population * percent greywater users	extrapolation from 1999
2.59	People per household	2000	US census bureau	http://quickfacts.census.gov/qfd/states/06000.html
8,211,477	Greywater systems	2009	Calculation; greywater users / people per household	extrapolation from 1999

System user years-US		<i>Note: This is a back of the envelope-type calculation; the point is still valid if it is off by a factor of two or four</i>		
21,267,725	Greywater users	2009	from above	
10.0%	Households with greywater systems	1950	Estimate; in general, older infrastructure has more greywater use, approaching 100% with rural 70+ year old buildings	
152,271,417	Population of US	1950	NPG historical data	http://www.npg.org/facts/us_historical_pops.htm
15,227,142	Historic greywater users	1950	Calculation; population * percent greywater users	
18,247,433	Average number of greywater users	1949-2009	average of 2009 and 1950 greywater users	
60	Years from 1949-2009		calculation	
1,094,845,995	System-user-years of greywater exposure, not counting neighbors		calculation; average greywater users * years	

Reports of graywater-transmitted illness in US				
0	Reports of greywater-transmitted illness		18 years of greywater policy discussion, Letter from CDC	
400	People struck by lightning in the US, per year	2008	NOAA lightning safety	http://www.lightningsafety.noaa.gov/medical.htm
344	People drowned in bathtubs	2005	National safety council	http://www.nsc.org/research/odds.aspx

Greywater system permit compliance rate in California				
1,770,347	Greywater systems	2009	from above, extrapolation from 1999	(this assumes the proportion of greywater use has not changed from 1999)
200	Permitted greywater systems	1992-2009	ReWater Systems, 70±, Bill Wilson + Kevin 20±, Ted Adams, 5± Art Ludwig, 2±...rest are a guess. I'd say lower bound is	
8,852	Ratio of unpermitted to permitted systems		calculation	
0.011%	Percent of permitted systems		calculation	

Reportable GW Diseases, Potential & Reported	Disease	Total Cases in 2007	Est. 60 Years Cumulative Cases	Cases Linked to Graywater
	Cholera	7	288	0
	Cryptosporidiosis	11,170	502,650	0
	E. coli, Shiga toxin-producing (STEC)	4,847	218,115	0
	Giardiasis	19,417	873,765	0
	Hepatitis A	2,979	134,055	0
	Legionellosis	2,716	122,220	0
	Salmonellosis	47,995	2,159,775	0
	Shigellosis	19,758	889,110	0
	Vibriosis (non-cholera Vibrio species infections) §	447	20,115	0
	Totals	123,713	4,920,093	0

