

Bringing the Water Shortage Home

It has meant drought in some parts of the country, and nothing more than low-flow fixtures in others. The fact is, the nation's growing water crisis is changing the houses we build.

BY ROB YAGID

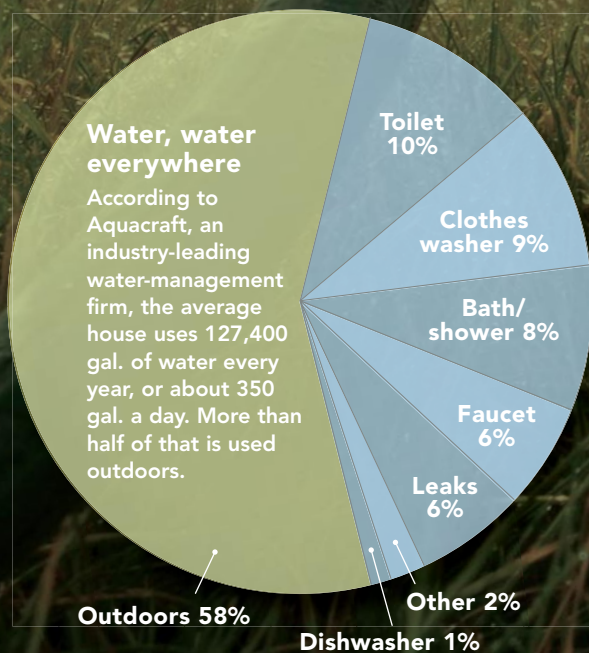
It's midspring, and bands of torrential rain have pounded New England for days now, refreshing the memories of the record flooding we experienced only a month ago. With each additional inch of rain, my understanding of what has been called a national water crisis becomes as muddled as the Rooster, the small stream down the street, which has risen and now swirls in a swollen murk that threatens to overflow its banks. Yet here I sit, a jaded Northeasterner poring over piles of research suggesting that we, as a country, face a water shortage never before experienced. Amid this deluge, I feel excluded.

It's exactly that, though—the failure to comprehend the status of clean water in the face of contradictory assumptions—that has stifled conservation efforts among homeowners, designers, builders, and legislators from coast to coast.

Clean water is indeed in limited supply in this country, yet it never ceases to flow from our taps, it remains cheap (for now), and it continues to be used in vast excess. However, population growth, pollution, industry, energy, and climate change are just a few of the factors jeopardizing our freshwater supply to levels that have experts scrambling. And while the domestic use of water by the residential housing market accounts for only a fraction of national consumption, it's no less significant.

Fortunately, the building industry has become progressive, perhaps more so than ever, in its approach to conservation. The legality of rainwater harvesting and gray-water reclamation has never been so widespread, ordinances on water use have become prolific, and manufacturers are continuously refining products to use less water and energy as consumers increasingly strive for greener homes that are more environmentally and economically sensitive.

Whatever your motivation may be, by designing, building, or retrofitting your house to use less water and to use water more efficiently, you can reduce



your freshwater consumption rate by nearly half. That savings has not only large- and small-scale ecological and sociological benefits, but it also has economic benefits.

A flood of numbers

According to Aquacraft, an industry-leading water-management firm, the average home uses 127,400 gal. of water every year, or roughly 350 gal. a day. EPA research shows that on average, we pay \$523 annually for that water. While that seems like a drop in the bucket compared to the 201 billion gal. a day consumed by thermoelectric power generation, our homes collectively withdraw roughly 29.4 billion gal. of freshwater a day from surface and groundwater reserves.

The effects of water usage are felt in infinite ways, from the alteration of wildlife habitats to the slow desertification of large tracts of landscape to growing supply shortages that can conceivably leave us without water when we want or need it most.

Water flows into our homes in one of two ways, either from a well or from a network of public supply lines. More and more of us are tied to the latter. The U.S. Geological Survey (USGS) conducts water-usage reports every five years. According to a recent report, only 14% of the population supplies its own water, mostly through wells. The remaining 86% of us receive water from the public supply, up from just 62% in 1950. In either instance, conservation should be thought of in identical terms because we're all, in essence, drinking from the same glass.

Where conservation makes the most sense

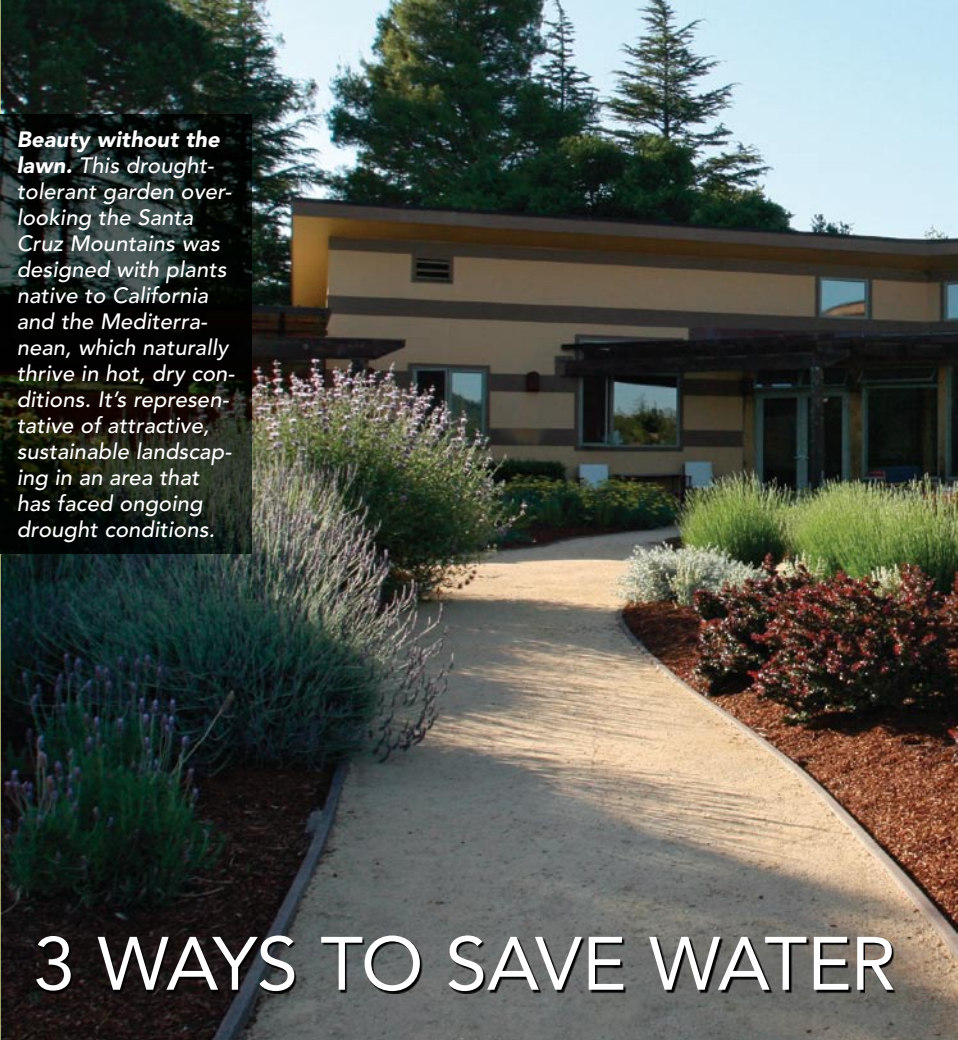
When we first began pumping groundwater for our own use, a natural cycle existed that helped to replenish water resources. Groundwater recharge, the hydrologic process of surface water filtering back down to the aquifer from which it came, helped to create a sustainable means of providing freshwater. That natural cycle, however, quickly became broken as freshwater demands skyrocketed and we began pumping into oblivion.

Robert Glennon, the author of the book *Water Follies: Groundwater Pumping and the Fate of America's Fresh Water* (Island Press, 2002), writes, "Throughout the country, water [table] levels are dropping as pumping exceeds recharge. Overdrafting or 'mining' of groundwater creates serious problems."

The problems, though deep and complex, are comprehensible. We, not the planet, face problems when we use a renewable resource faster than it can replenish itself. The overuse and contamination of our groundwater aquifers combined with large amounts of polluted fresh surface-water resources means conservation is a national concern, not a regional one, especially now that more and more of our water is being piped to our homes from great distances—in some cases hundreds of miles.

Even those few who pump water from a well and discharge effluent into a leach field have an impact on the

Beauty without the lawn. This drought-tolerant garden overlooking the Santa Cruz Mountains was designed with plants native to California and the Mediterranean, which naturally thrive in hot, dry conditions. It's representative of attractive, sustainable landscaping in an area that has faced ongoing drought conditions.



3 WAYS TO SAVE WATER

▲ XERISCAPE

On average, more than half of a house's freshwater consumption is devoted to lawn and garden irrigation. While rainwater-harvesting and gray-water reuse can reduce that amount, savvy landscape design can have an even more profound impact. Xeriscaping virtually eliminates the need for supplemental irrigation and should be practiced in the most water-deprived regions of the country. For instance, golf-course quality lawns just don't make sense in the Mojave Desert.

Find what grows naturally in your region, and base your landscape design around it, even letting nature reclaim portions of manicured lawn. In times when rain is limited, let your landscape go dormant instead of drowning it with sprinklers to maintain its color. You'll not only create a living area more reflective of your region, but you'll also reduce your water use, water bills, and maintenance expenses.

For more information, visit:

Fine Gardening www.finegardening.com



Top photo: Michelle Gervais. Bottom photo: Charles Miller.
Drawing facing page: Bob La Pointe.



OUTSIDE THE HOUSE

▼ USE GRAY WATER

A gray-water system uses wastewater from the bathtub, washing machine, dishwasher, and sinks to irrigate lawns or to flush toilets.

There are many gray-water systems available, some simple, some highly complex. Art Ludwig, a gray-water expert, suggests looking for the most simplified system the site can benefit from and to use gray water responsibly. Gray water shouldn't be used everywhere and should never be stored like rainwater. In 30 years of designing systems, he's never come across a site that didn't call for a custom design.

Also, by diverting gray water out of the septic, the system is less likely to become clogged, need maintenance, or fail prematurely.

For more information, visit:

Greywater Action
www.greywateraction.com

Oasis Design
www.oasisdesign.net

◀ HARVEST RAINWATER

Catching rainwater and storing it for future use is an almost ancient practice that makes sense now more than ever. According to the city of Austin, Texas—which offers rebates from \$30 to \$500 on the purchase of rainwater-harvesting systems—a 2500-sq.-ft. roof located in an area with roughly 32 in. of annual rainfall can collect nearly 45,000 gal. of water every year.

Most often, harvested rainwater is used for irrigation, but it also can be used to flush toilets. Systems vary in complexity and expense, but a simple rain barrel under a gutter is as complicated as rainwater harvesting needs to be. Even in areas that receive lots of rain, harvesting systems can reduce dependence on fresh groundwater or surface-water supplies during dry times of the year.

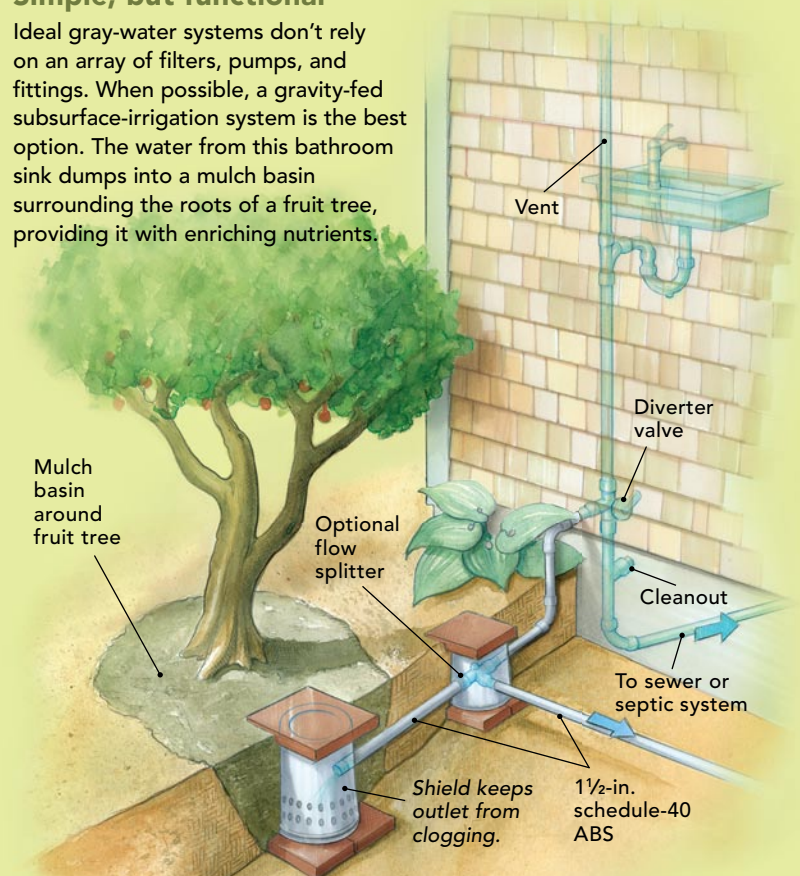
For more information, visit:

American Rainwater Catchment Systems Association www.arcsa.org

Harvest H2o www.harvesth2o.com

Simple, but functional

Ideal gray-water systems don't rely on an array of filters, pumps, and fittings. When possible, a gravity-fed subsurface-irrigation system is the best option. The water from this bathroom sink dumps into a mulch basin surrounding the roots of a fruit tree, providing it with enriching nutrients.



health and viability of the water resources that we all tap into. The EPA has reported that in the past five years, nearly every region of the United States has experienced water shortages and that within three years, 36 states are anticipating local, regional, or statewide water shortages even when under nondrought conditions.

Choose conservation methods wisely

Creating a house that uses water effectively hinges on two practical ideas: awareness and reuse.

Understanding how much water is entering and leaving a house—and where that water is coming from and going—often helps to reduce consumption. For instance, installing a water meter where it can be seen easily has proved to reduce household water use by roughly 15%.

Art Ludwig, an ecological systems designer who has consulted for the states of New York and New Mexico on water-reuse policy, has specialized in gray-water and rainwater-catchment systems since 1980. Either of these two features has the capacity to reduce greatly, if not eliminate, the need to use freshwater to irrigate outdoor landscapes and gardens. Ludwig uses two phrases to describe the best water-conservation methods. The first one, “Do what makes sense within the context,” means that not every conservation solution makes sense in every home and that homeowners must be willing to do site-specific research to achieve the most appropriate conservation methods. The second, “The ecologically best solution is often the economically best solution,” expresses Ludwig’s belief that water conservation doesn’t have to be expensive. In fact, Ludwig suggests being leery of any system with an exorbitant cost or that is overly complicated to integrate.

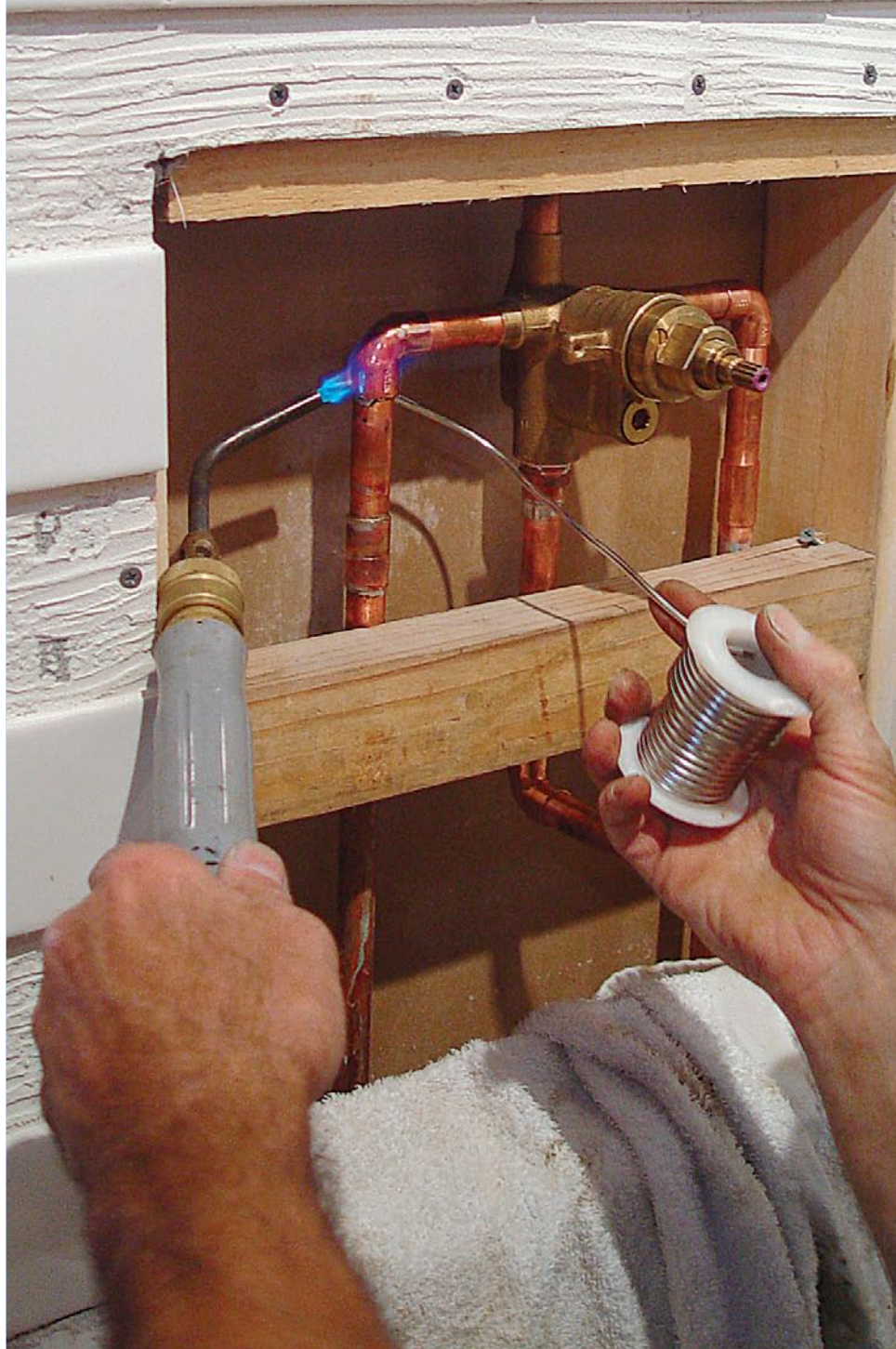
Know the law

For a long time, conservationists have blamed government for creating water laws in closed-door meetings where special interests held sway. Whether that has changed is uncertain, but progress is being made as more states are refining legislation to decrease water usage.

Historically, water laws have not always made the most sense, especially in the West. Until recently, water rights in states such as Colorado, Montana, and Utah made it illegal to have a rainwater-collection system on a home. Homeowners caught collecting rainwater could face steep fines because they had no rights to the water beneath their homes or the water falling from above them. However, these states—Utah being the latest—and others have recognized potential freshwater savings with simple cisterns and have passed bills allowing rainwater catchments for personal use. Even so, it’s important to check with your local jurisdiction before installing any rainwater-harvesting system or gray-water reuse system because implementation requirements vary from region to region. □

Rob Yagid is an associate editor.

3 WAYS TO SAVE WATER



▲ FIX LEAKS

Leaky faucets and fixtures may seem like just an annoyance, but they are a conservation concern. On average, 6% (nearly 10 gal.) of a household’s daily water use is attributable to leaks. That’s a modest rate compared to some homes that have been found to leak close to 100 gal. of water every day. Fixing a leak is usually relatively easy. Finding a leak sometimes isn’t, so inspect your plumbing, toilets, fixtures, and faucet valves regularly.

INSIDE THE HOUSE



INSTALL ► LOW-FLOW FIXTURES AND EFFICIENT APPLIANCES

If you live in a new house, chances are you have modern fixtures that use less water than those installed prior to 1992, when the Energy Policy and Conservation Act mandated more stringent flow rates on household fixtures. Ever since, manufacturers have been creating toilets, faucets, showerheads, dishwashers, and washing machines that use significantly less water.

By switching to low-flow fixtures and efficient appliances, a household can save thousands of gallons of freshwater every year. The decreased demand on mechanical systems, primarily the water heater, also means you'll save on energy bills. To be sure you're buying quality products, look for fixtures with the WaterSense label. WaterSense is a certification program backed by the EPA. To receive a WaterSense label, fixtures have to be independently tested to meet strict low-flow rates and performance standards.

For more information, visit:

American Standard
www.americanstandard.com
Delta www.deltafaucet.com
Moen www.moen.com
WaterSense www.epa.gov/watersense

Drips add up. The shower mixing valve is a common point of failure. If the leak drips once every second, you'll waste 8.64 gal. daily, 259 gal. monthly, and more than 3153 gal. annually. Information to manage the fix can be found in FHB #176 and online at FineHomebuilding.com.

Numbers don't lie. By installing a water meter in an obvious location in the house, such as near the kitchen sink or on water lines in the basement, water consumption no longer becomes speculative.



Less water, same performance. Modern low-flow fixtures, such as the faucet shown here, use water at a rate of only 2 to 2.5 gpm. However, California Green Building Standards—some of the most progressive in the country—call for faucets that use no more than 1.8 gpm.

▼ INSTALL A WATER METER

To increase your awareness of how much water your household uses daily, install a water-flow meter in an easily accessed part of your house, and check it often. A digital meter, such as those made by Great Plains Industries, costs several hundred dollars, but a traditional odometer-style meter works just as well and costs considerably less. This makes sense for homeowners either on a well or on a public supply because homeowners tied to municipal water don't always have easy access to their meter and often don't check their water bill on a daily or weekly basis.

For more information, visit:

DLG
www.jerman.com
Great Plains Industries
www.gpi.net

