Water Efficient Landscape Design

Source: www.TurfMagazine.com

From financial pundits to environmentalists, most seem to agree that water, particularly in its use, management, and distribution, is the new gold. Water scarcity is the fourth global risk in terms of impact to society, reports the World Economic Forum. While the situation can be one of life and death in Sub-Saharan Africa, the United States is not immune to water issues. Just ask those in Flint, MI or California.

(Photo: Getty Images)

Unfortunately, the problem isn't likely to go away anytime soon and will likely become more widespread. The Union of Concerned Scientists predicts that while some wet and warmer areas may experience heavier precipitation in the future, the periods between rains are likely to become longer, warmer, and drier. Scientists also expect the amount of land affected by drought to increase by mid-century—and water resources in affected areas to decline as much as 30%. In other words, dry areas will get drier.

With landscape irrigation accounting for most of the nearly nine billion gallons of water used by U.S. residences outdoor daily, it surpasses the amount of water used for showering and washing clothes combined, according to the U.S. EPA's WaterSense program. And in a facility, landscaping water usage can easily account for 20% or more of water consumption, according to the

Whole Building Design Guide (WBDG), a program of the National Institute of Building Sciences. Thus, landscapes, especially those with thirsty turfgrass, are increasingly becoming a key target for water conservation.

California Water Laws

None of this is news to Californian landscapers who experienced the worst drought in the state's history from December 2011 to March 2017. Moderate drought persisted until a wet winter this year alleviated conditions, though some parts of Southern California were still deemed "abnormally dry" as recently as this past March. By April of 2015, in reaction to the ongoing drought, former Governor Jerry Brown had imposed a 25% reduction in water usage, stating "The idea of your nice little green lawn getting watered every day, those days are past."

As a result, in July of 2015, the California Water Commission issued an updated Model Water Efficient Landscape Ordinance (MWELO), designed to help reduce the amount of water used for landscape irrigation. Under the 2015 rules, which still apply today:

- Turfgrass is limited to 25% of all landscaped areas in newly constructed homes with more than 500 square feet of landscaped area.
- Renovations to existing outdoor areas with more than 2,500 square feet of landscaping must also comply to regulations.
- Grass is "effectively" banned in landscapes of new commercial, industrial, and institutional buildings.
- Efficient sprinkler nozzles must be used in irrigation systems; turf in street medians is mostly banned; and the use of recycled water is encouraged.

"This is another giant leap forward in responsible water use," Esther Margulies, an instructor in the landscape architecture program at USC, told the LA Times in a July 15 article at the time. "This means people will have to get to know their California-friendly plants. They're going to have to think more specifically about the open space around their houses.… There's no debate: The lawn will continue to shrink."

Last year, California took it farther, with tough, new permanent water conservation rules. SB606 and AB1668 require water districts to set targets for water use by 2022, including a daily allowance of 55 gallons per person for indoor water use, and outdoor water allowances based on regional differences in climate. "In preparation for the next drought and our changing environment, we must use our precious resources wisely," Brown said in a statement. So though California's immediate water crisis may have had a reprieve, authorities know that challenges lie ahead, especially with a growing population.

MWELO Basics

Existing laws, evolving ones, and differences within local jurisdictions have made water usage and management a key consideration for California landscape contractors. As the rest of the nation faces increasing pressure to preserve

resources, what can we learn from California laws and practices?

For one, the California Landscape Contractors Association (CLCA) has embraced what it calls the “new normal.” Practices within the new normal include:

- reduced outdoor irrigation;
- abatement of dry-season runoff;
- rainwater capture and storage;
- stormwater reduction and capture;
- reduced pesticide application and runoff;
- reduced greenwaste;
- reduced energy use and greenhouse
- gas emissions; and
- provision of food and habitat for beneficial insects and wildlife.

How is this achieved? Under MWELO, it starts with a signed “Landscape Documentation Package” at the design phase. “Whatever the landscape type or style, CLCA members know the key to landscape water conservation is water-efficient design, installation, and management. A water-efficient landscape design ideally includes a Grading Plan, Landscape Plan, and Irrigation plan as described in the state’s MWELO. This design should be accompanied by a Water Budget,” says CLCA.

So yes, on a basic level, reduce turfgrass and plant natives, but you also need to do the math. The Water Budget involves calculating such data as the Maximum Applied Water Allowance (MAWA) and the Estimated Total Water Use (ETWU). Even plant selection under MWELO is a calculation based on the plant’s water needs relative to ETo, the evapotranspiration (ET) rate for a cool season lawn. (MWELO requires that the water budget for a landscape equals not more than 55% of ETo for most residential projects.)

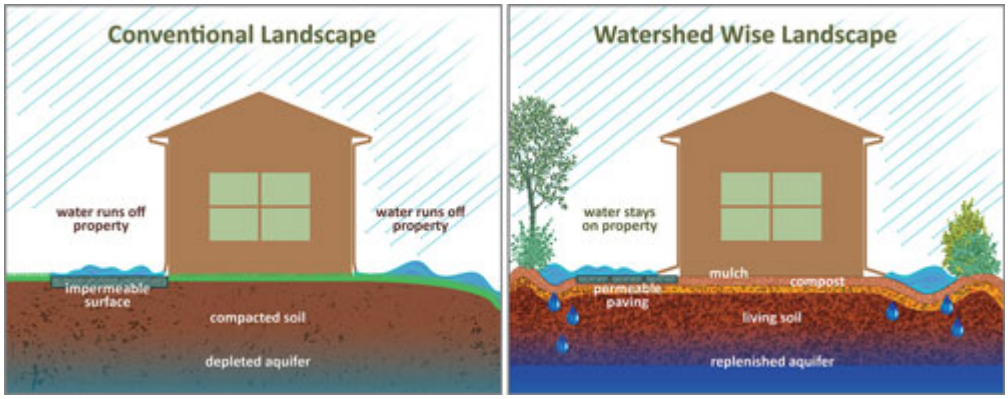
If this all sounds a bit confusing, it’s why groups such as CLCA offer courses on Mastering Model Water Efficient Landscapes (MWEL) as well as a CLCA Certified Water Manager program. The good news is that water use and efficiencies, once an educated guessing game, are becoming quantifiable.

The Watershed Approach

And more landscape water-related bills are still under discussion. SB 780: Water Conservation in Landscaping Act deals largely with promoting a concept gaining momentum in California—the Watershed Approach to landscaping. It’s a developing model that considers every garden, regardless of size or location, as though it were a mini-watershed. In a healthy balanced watershed, rainwater passes through plants and soil before moving into local waterways or returning to the sky. The plants and soil make a huge sponge and filter for the rainwater, holding onto or cleaning all the water that falls onto it.

The Watershed Approach was developed by G3, Green Gardens Group in Los Angeles, CA, a group of landscape professionals dedicated to creating, promoting, and educating about sustainable landscapes. In fact, G3’s development of the Watershed Wise Landscape Professional (WWLP) designation earned EPA’s 2017 WaterSense Professional Certifying Organization Partner of

the Year.



The Watershed Wise approach asserts that every landscape can be a mini-watershed. Four principles of Watershed Wise landscapes are: 1) Grow healthy living soil to create a sponge. 2) Passively capture rainwater as a resource. 3) Select climate-appropriate plants. 4) Use highly-efficient supplemental irrigation, only when necessary. (Images: ©G3, Alex Stevens, 2018)

Pamela Berstler, CEO and co-founder of G3 and a former licensed landscape design/build contractor, has also received personal accolades for her work in sustainable landscaping and the Watershed Approach.

“The fundamental rule for CA landscapers is: thou shalt not waste water. MWELO addresses the efficiency of the landscape system’s use of [irrigation]… we’re waking up to the idea that water budgeting is the only way we can achieve conservation,” says Berstler. But what’s not addressed in MWELO, she says, is how the landscape holds and retains rainwater. “We do active rainwater harvesting for later use through cisterns and rain barrels, but we realized that a landscape itself can give us a greater capacity for passive capture. And we end up solving common problems like polluted runoff… the landscape itself is the cistern…that is a shift for a lot of people.”

These are four key elements to the Watershed Approach: 1) Build healthy, living soil; 2) Capture rainwater as a resource; 3) Select local, climate-appropriate plants and 4) Use highly efficient irrigation only when necessary. Here are some basics.

1. **Soil.** Build up carbon in the soil with compost or worm casings, and mulch heavily with mixed leaf and wood mulch. Nurturing microbes, fungi, and macroarthopods will create spongey soil to absorb rainwater.
2. **Capture rainwater.** Every hard surface generates valuable rainwater for a landscape. For instance, a 1,000 square foot roof provides 620 gallons of water for every 1″ of rain. By using meandering landscape depressions (under 12″ in many cases) filled with mulch or other organic material, water is channeled through the landscape and filtered to the actual root zone of plants. This contouring helps retain and maximize rainwater rather than having it runoff to the street. “There should be no such thing as a flat yard,” says Berstler. “This is how it works out in nature.”
3. **Select native plants.** While this principle is well known, the

aforementioned MWELO calculations for plant factors grounds the idea in specific numbers for a water budget.

4. **Highly efficient irrigation, only when necessary**. Try not to use supplemental water for irrigation, but when necessary, use drip or rotating sprinkler nozzles and smart (or WaterSense labeled) controllers with rain or soil moisture sensors. Run times and pressure should be optimized. Reduce water waste (dry weather runoff and overspray) by observing when water runs off the property and adjusting the irrigation controller to cycle multiple short run times with 30 to 60 minute soak times between.

Permeable surfaces, aerating soil, and rain gardens are also effective practices within the Watershed Approach. Recycling graywater (the relatively clean waste water from baths, sinks, washing machines, and other appliances) is also being talked about in California, and while Berstler embraces this as a highly efficient means of supplemental irrigation, she emphasizes that the Watershed Approach is really about trying to avoid the need for extra water in the landscape.

And it seems to be catching on. Watershed Approach principles have been adopted into guidelines to qualify for turf replacement rebates through the Metropolitan Water District (www.bewaterwise.com), says Berstler. While turf replacement is key in California, Berstler points out that the Watershed Approach is not necessarily anti-turf. “There are many climates where turf is appropriate. The Watershed Approach is a set of principles, not a dogma. It needs to be appropriate for every place,” she says.

In the meantime, sustainable and water wise landscape education within California and beyond is ongoing. “Most people appreciate the beauty of a landscape, but an understanding of it as a piece of the environment is sometimes missing,” says Berstler. “Landscaping is becoming a thinking person’s business and that excites me.”

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