



How to Landscape to Save Water

**TREE CITY USA®
BULLETIN**

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Watering trees, proper pruning, and responsible pest control have long been among the basic tenets of good urban forestry. But with the demand for water soaring and supplies shrinking, it is essential that property owners and municipalities find new ways to conserve water while at the same time maintaining healthy trees and other vegetation.

“Water, water everywhere,” wrote the poet Samuel Taylor Coleridge. In fact, 70 percent of the world’s surface is covered with it. “But not a drop to drink,” he continued.

While our current situation is not quite that dire, it is worth noting that only about 1 percent of all Earth’s water is fresh water. Much of it is also unevenly distributed to places like the Rocky Mountains or Great Lakes. Add our growing population, industry’s insatiable appetite, recurring droughts, receding water tables, pollution, and global climate change, and the message should be clear that water conservation is now more important than ever.

An excellent opportunity for conserving water is right in everyone’s backyards. During the summer months, outdoor water commonly accounts for 40-60 percent of residential water consumption in the western United States and as much as 80 percent on hot, dry days. In the East, the statistics can be just as dramatic when the rains stop and summer days heat up.

With so much water being used on lawns, gardens, and shade trees, landscape watering becomes an obvious target for saving water. The good news is that there are proven ways to conserve water without turning the yard into a concrete slab. It can be done through the purposeful selection of trees, shrubs, and flowers, careful design or the modification of existing landscaping, and the installation of water-saving irrigation devices.

For the home, business, church, school, or other private or public place, the suggestions in this bulletin can save 40 percent or more of the water you are now using to beautify your home and community.



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Eight Steps to Water Conservation

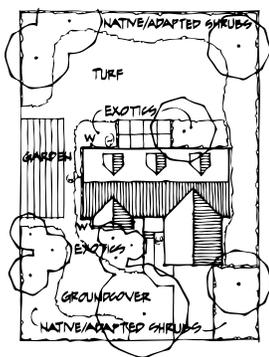
In 1981 a new word was coined in the Denver area that can serve as a guide to saving water while still maintaining trees and other plants in the landscape. The word is xeriscape, derived from the Greek, xeros, meaning dry. Actually, a xeriscape is not dry, but by applying the fundamental concepts of xeriscaping, you can dramatically cut the amount of water needed for a beautiful and functional landscape.

1 PLAN AND DESIGN TO SAVE WATER

Start with graph paper and sketch in your house, property lines, water faucets, existing trees, and other permanent features.

On established property, look for ways to modify the landscape to take advantage of the tips offered in this bulletin. If developing a new landscape, be sure your design includes:

- Large deciduous trees placed to maximize summer shade on hot sides of the house. Combined with ground cover plantings, this can reduce surface temperatures 20 degrees.
- A dense windbreak to cut down on drying winds, if room allows.
- Microclimate zones, grouping vegetation based on water needs. For example, concentrate lawn areas (high water demand) only where needed. Create zones such as rock gardens, native shrubs, or drought-tolerant wildflowers (low water demand) on southern exposures and little-used areas. The zone concept helps shrink the area requiring water and allows you to concentrate water where it is most needed.



2 REDUCE LAWN AREA

Lawn has been called a “botanical absurdity.” Mowing and maintaining pure turf is a constant fight against nature and natural succession. This warfare requires water, fertilizer, weed-killing chemicals, lawnmower gas and oil, and large quantities of time. By reducing lawn area to what is actually needed for recreation or landscape enhancement, you can liberate your weekend, save money, and help protect the environment.

To reduce lawn:

- Expand patio space. Use brick or deck to allow air and water to reach the root zone of trees.
- Use mulch around trees and to gracefully extend the edges of shrub and tree zones into former lawn space.
- Develop wildflower zones and plant ground cover between trees and on steeper slopes (see references on page 8).
- Plant more shade trees and a shrub area for wildlife (see *Bulletin No. 13*).
- Consider a backyard orchard or dwarf fruit trees to combine beauty with the benefits of homegrown fruit.
- Use blue spruce, arborvitae, hackberry, or other drought-resistant trees to form a wide, living fence. Add rows for extra width.
- Use large, open spaces to grow high-speed trees like paulownia, hybrid poplars, or willows for fuelwood cuttings. Stump sprouts will provide numerous crops without replanting.

WHAT TO DO WITH OLD SOD ...

When you finally take action to get rid of water- and gas-guzzling grass, here are three ways to save the soil and recycle the grassy biomass:



1 Chop it up and add it to your compost pile.



2 Turn it upside down and stack it until the grass decomposes.



3 Turn it upside down and leave it in place as mulch.

NOTE: When removing sod, do not dig too deep or tree roots may be damaged.



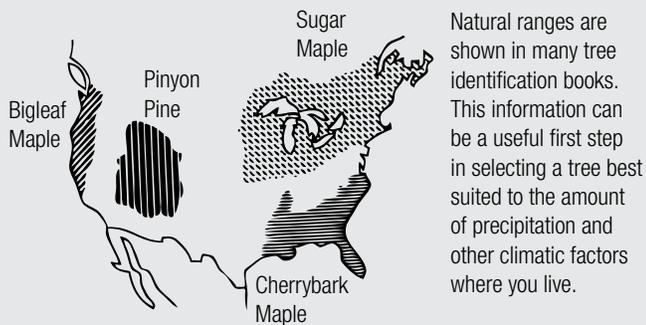


3 SELECT THE RIGHT VEGETATION

A tree, shrub, or other plant that is naturally adapted to your soil and climate will need less supplemental watering and care. When deciding what to plant, consider native species that already grow within a quarter- or half-mile of your property. These species will be suited to your altitude, latitude, and annual temperature extremes. In the Great Plains and Southwest, suitable native shade trees are quite limited. Here, as well as in other regions, non-native species can be selected that have proved to adapt well to the soil, climate, and microclimates of local planting sites. In fact, these exotics often have characteristics that are more attractive to homeowners than trees growing naturally in the vicinity. For a list of species recommended for your area, contact the Lady Bird Johnson Wildflower Center (4801 LaCrosse Ave., Austin, TX 78739) or visit wildflower.org.

When using a non-native species, check with local experts on its performance in your area over the past 15 years or more. Some introduced species do well at first, then develop pests or other problems that are expensive and disappointing.

When planting grass in dry regions, find alternatives to the beautiful but ever-thirsty bluegrass. Tall fescues are often suggested as substitutes.



Natural ranges are shown in many tree identification books. This information can be a useful first step in selecting a tree best suited to the amount of precipitation and other climatic factors where you live.

4 WORK WITH YOUR SOIL

Test the pH of your soil and be sure that the species you plant or retain are suited to that level. It is impractical to try altering the pH of soil enough to affect tree growth.

To increase the ability of soil to absorb and store water:

- Prevent compaction and aerate regularly.
- Till in several inches of compost, being mindful of roots.
- For mulch, use organic materials such as leaves, grass clippings, or wood chips. They slowly decompose and help build a more sponge-like soil structure.
- Limit the input of manufactured chemicals.

5 USE MULCHES

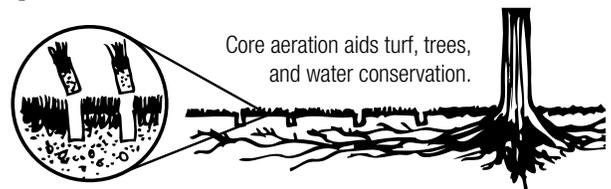
Mulch is a soil covering usually used for weed control and to protect the base of trees from lawnmowers and weed cutters. However, it is also a real friend to the waterwise. Whether the mulch is an inorganic covering, such as black plastic, or an organic material, such as wood chips or pine needles, mulch conserves water in at least four ways:

- Reducing lawn space.
- Retaining soil moisture.
- Preventing the growth of grass, weeds, or other vegetation that would compete with tree roots for soil moisture.
- Decomposing, slowly helping to build soil structure that is better aerated and more sponge-like.

6 PROVIDE REGULAR LANDSCAPE MAINTENANCE

Maintaining your landscape regularly can save water several ways:

- Core aeration, sometimes called core cultivation, is the removal of small plugs of grass and topsoil. This is done with a machine that is available from many rental companies or through lawn care and landscaping services. This annual lawn treatment can shrink your water bill as much as 50 percent by allowing water to penetrate sod and thatch. It allows you to water more efficiently by allowing water to reach not only the grass roots, but the feeder roots of trees that invariably spread beneath the lawn.



- When using a sprinkler system, water between midnight and 10 a.m. to help prevent diseases and to reduce evaporation.
- Don't over-fertilize. Excess growth demands excess water. Find out from a county agent or other expert who does not sell fertilizer the minimum number of times you need to fertilize, the most effective times of year, and the minimum application per square foot.
- Control weeds. They rob moisture from the soil.
- Set your mower high. Taller grass helps reduce moisture evaporation by shading the ground and it develops deeper roots. It can even help keep weeds under control.
- Check your irrigation system frequently.

7 RETAIN AND USE WATER ONSITE

Use rain barrels to collect water from the roof and use it for watering garden plots. You can also direct rainwater from downspouts and condensate from air conditioners and dehumidifiers to trees and shrubs. Small swales can be used to slow rainwater runoff and allow percolation into the soil for use by nearby vegetation.

8 IF YOU MUST APPLY WATER, INSTALL DRIP IRRIGATION

Drip, or trickle, irrigation once was complicated and unreliable. Today, this technology is readily available for home use and has reached a state of high-level performance.

In dry regions or areas subject to drought, it is the best possible method for watering trees and shrubs because it enables you to provide the exact amount of water needed by each plant and to place the water directly on the root zone. Systems can be installed either beneath the ground or on the surface. They range in size from those used to water a few backyard trees to those used for irrigating orchards, windbreaks, or Christmas tree plantations.

All it takes to get started in drip irrigation is a kit available at most garden stores. It is a good idea to start small, then expand as you become more familiar with the equipment and the water needs of your trees. But considering the advantages over more traditional methods of watering, it is definitely a good idea to get started.

ADVANTAGES OF DRIP IRRIGATION

SPRINKLER IRRIGATION delivers water indiscriminately, much of it lost through evaporation and runoff.

DRIP IRRIGATION saves water by delivering it directly to the soil of the root zone.



FOR SHADE TREES:

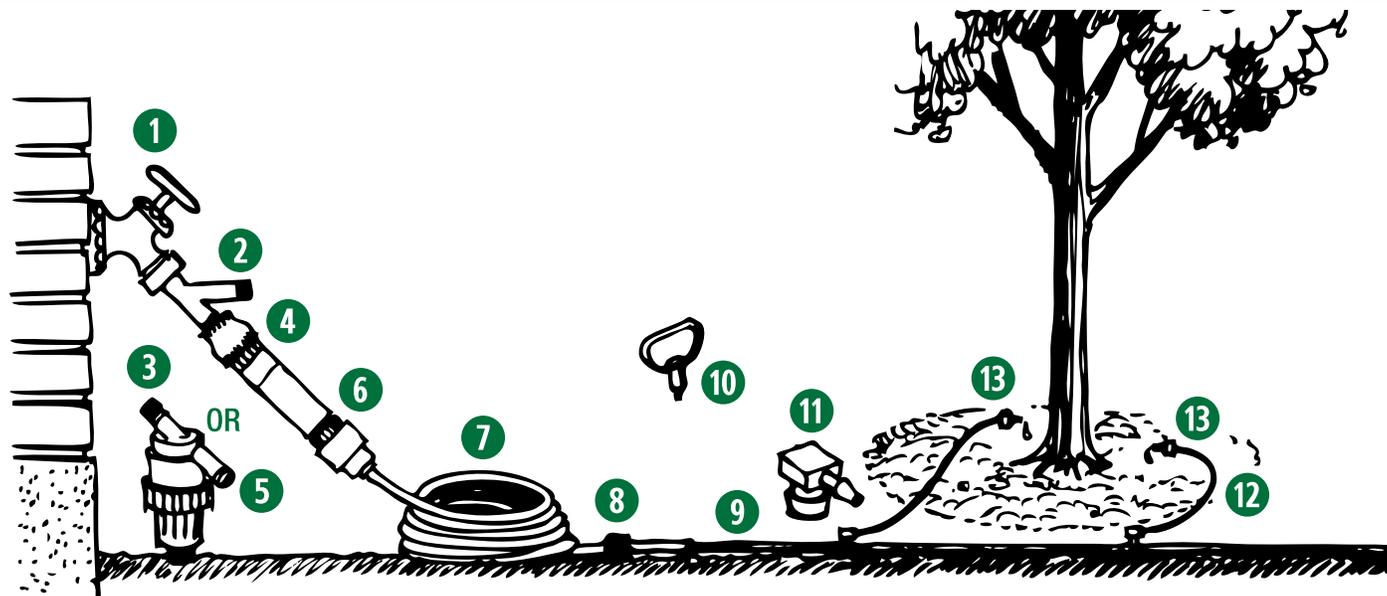
- Cuts water use by up to 70 percent because less is lost to runoff, evaporation, sidewalks, weed patches, and other non-target areas.
- Saves on water bills.
- Reaches trees or shrubs in odd locations that may be missed by sprinklers.
- Saves the time and effort of watering with a hose or bucket. You can turn the system on and off manually, use a timer set at regular intervals, or connect the timer to soil moisture sensors for full automation.
- Controls the exact amount of water applied so that each plant receives only the amount it needs for optimum growth.
- Reduces stress caused by wet and dry cycles or soil temperature fluctuations.
- Decreases the amount of fertilization used by up to one-half through pin-point application. If needed, fertilizer can easily be added directly into the system.
- Reduces the amount of mortality among newly planted trees and shrubs.
- Helps prevent disease by not wetting the leaves.
- Eliminates erosion in hilly terrain and water loss in windy weather.
- Continues to irrigate without disrupting work or other activities.

ADDITIONAL BENEFITS FOR FRUIT TREES:



- New trees grow faster and bear fruit one to two years sooner.
- Fruit is uniformly larger.
- Alternate-year bearing tendencies are reduced, resulting in more consistently high yields.
- In commercial operations, it can often pay for itself in as little as one or two years.

A Basic Drip Irrigation System



- 1 Connect your system to any **OUTDOOR FAUCET**. Knowing the delivery rate of the emitters (13), the water needs of your trees, and the kind of soil you have (clay requires more watering time than loam or sandy soil), you can open the valve for the necessary length of time during dry periods. Automatic timers can be inserted here.
- 2 A **HOSE Y** provides an outlet for a second irrigation supply line or a hose for other uses.
- 3 A **VACUUM BREAKER** prevents water from backing up into the home drinking water.
- 4 **FILTERS** are essential for screening out dirt particles that can clog tubes or the tiny openings of emitters. Filters vary widely in sophistication, but all must be maintained carefully. This is the heart of trouble-free operation.
- 5 Units are available that allow the continual or periodic **FEEDING OF FERTILIZER** in just the right amounts.
- 6 Most drip systems operate best at pressures between 15 and 40 psi, whereas most residential water systems are built for 55 psi or more. The **PRESSURE REGULATOR** makes the two systems compatible.
- 7 & 8 **ORDINARY GARDEN HOSE** (7) can be used to span the distance from water source to the irrigation site. An **ADAPTER** (8) then connects the hose to the polyethylene pipe (supply line). Or you can begin directly with the polyethylene pipe.
- 9 For home use, a ½"-¾" **SUPPLY LINE** is typical. Polyethylene is reasonably flexible, so you can arrange it to advantage among your trees. T- and Y-shaped connectors allow for an infinite variety of arrangements.
- 10 A **HOLE PUNCH** allows you to put the small, lateral tubes exactly where they are needed.

- 11 **EMITTERS** are tiny devices that portion out the water at a slow, known rate. Usually this is between ½ and 1 gallon per hour. There are many kinds of emitters. One is the point source emitter (illustrated above) that drips or trickles. Another kind is a miniature sprayer that is elevated on a stake and covers a wider area with water. This one is best suited to watering ground covers.



For trouble-free operation, be sure to use emitters that are self-flushing to prevent clogging and pressure-compensating so the rate of drip does not vary due to distance from the water source.

- 12 **SMALL-DIAMETER TUBING**, sometimes called spaghetti tubing, distributes water from the main supply line to the exact spot where it is needed. These tubes can be eliminated if the main supply line passes over the point of watering. In this case, water can be allowed to trickle directly from the emitter.
- 13 A **BUG PROTECTION CAP** keeps out intruders that can cause clogging.

TIPS TO PREVENT PROBLEMS

- Until you are skilled in the use of drip irrigation, leave buried lines and emitters to the professionals.
- Hide lines and emitters in vegetation and under mulch to prevent vandalism, accidental damage, or tripping.
- Check emitters frequently and maintain the filter as directed by the manufacturer.
- Buy for quality. Cutting corners with drip irrigation equipment does not pay in the long run.

Xeriscape and the Community Forestry Program

A COMMUNITY DEMONSTRATION AREA

You can't fight city hall. Nor can you easily avoid it if you are a property owner, especially a new one. What better place, then, to contact the key people who would benefit from education about landscaping to save water.

This is exactly what has been done in Fort Collins, Colorado. The city has placed a living demonstration of xeriscape concepts right next to the city hall and its parking lot.

The Fort Collins Xeriscape Demonstration Garden is divided into six zones. These range from a very low water to a moderate water shrub zone and a low water turf zone of buffalo grass to the upper extreme of water usage, a plot of bluegrass. Walkways wind through the garden, guiding visitors past attractive interpretive signs. Scattered trees complement the setting.

The interpretive signs in each zone graphically explain the relationship between water use and the species growing there. The signs also discuss mulches, soil improvement, and irrigation principles. In addition, visitors can obtain attractive literature and a plant checklist to reinforce what they have learned and to take home as a reference.

The entire project is intended to help conserve water. At the same time, it encourages landowners to plant trees and landscape their properties so that Fort Collins can retain its reputation as a progressive and beautiful foothills community where trees are an important part of life.

This desert xeriscape in the Southwest conserves water while still producing the benefits of trees and shrubs.



Trees, shrubs, and turf are harmoniously combined to provide an attractive demonstration site next to the Fort Collins City Hall.



The interpretive signs are silk-screened on 30-by-18-inch panels. Illustrations and text are used to help viewers understand the xeriscape principles being demonstrated and to identify woody plants. Three-inch, grey micarta labels on stands supplement the interpretive signs by identifying herbaceous plant materials.



A sign plan is important to ensure readability, durability, consistency, and aesthetic harmony with the surroundings. Silk-screened clear Lucite panels mounted on bronze anodized aluminum legs serve these purposes well in Fort Collins.



PROMOTING THE XERISCAPE CONCEPT

Many concepts worthy of public attention and adoption flounder and are lost in the sea of great ideas. This fate is often simply because the idea lacked a name that captured attention and was easy to remember. For the cause of water conservation, xeriscape has solved that problem. It is unique and — once explained — is reasonably descriptive and easy to remember.

The word “xeriscape” and its symbol are registered trademarks owned by the Office of Water Conservation, Denver Water. All are the results of a cooperative effort in the early 1980s by the Front Range Xeriscape Task Force. This forward-thinking group consisted of representatives of the Denver Water Department and Colorado’s green industry.

With temporary grant funds, a National Xeriscape Council worked for several years to spread the message of using xeriscape concepts to conserve water. A central part of the message was — and still is — that there are ways to promote water conservation while at the same time encouraging property owners to have lush, creative landscapes. Today, many states and more than 80 municipalities have water conservation boards or other organizations that promote xeriscaping. Today, a coalition of organizations in Colorado has created the Colorado WaterWise Council. Its mission is to publish educational materials, sponsor training seminars, and generally promote the efficient use of the state’s water. The careful selection of trees and other vegetation plays an important role in this effort. For more information, visit arborday.org/bulletins.



GOING NATIVE

A key to conserving water and having healthy landscape plants is the use of native species. However, it is often difficult for landowners to know where they can obtain appropriate planting stock. Literature produced locally about xeriscapes can provide an important service by including the addresses of regional nurseries that specialize in native plants and a list of pertinent organizations, such as native plant societies. A college botany department, arboretum, or The Lady Bird Johnson Wildflower Center (see page 3) are good starting points for finding out if such organizations are active in your area.

One of the most ambitious advocates of native trees is the California Oak Foundation (californiaoaks.org). Founded in 1988, this organization wages an active campaign to prevent the destruction of California’s distinctive oak heritage. At the same time, it encourages collecting acorns and planting more oaks. The results will not only perpetuate these native trees in an increasingly artificial environment, but they should also go a long way toward reducing the demand for water caused by the need to keep exotic species alive in places for which they are ill-suited.

END NOTE

Research is finding that some water-saving landscapes are actually using more water than traditional sites. Remember — *people waste water; plants don’t*. Know the water needs of your trees and turf, and please don’t over-water.

A CHECKLIST FOR EVALUATING POTENTIAL XERISCAPE DEMONSTRATION SITES

- ☹ Adequate size is necessary. The minimum amount of space needed for a properly developed xeriscape demonstration area is approximately one-half acre.
- ☹ The site should be under long-term control by the municipality or other sponsor and dedicated to long-term use as a demonstration area. This is the only way to justify the expense of developing a demonstration area and the labor provided by volunteers working on the project.
- ☹ A focal point and high visibility are important, such as location next to a city hall or other large structure. This makes a statement about leadership and the importance of water conservation in the community and helps demonstrate that a xeriscape can provide green, attractive landscaping.
- ☹ Potential for vandalism must be weighed. Remote or unfenced areas are more subject to vandalism than most high-visibility sites.
- ☹ Accessibility is a must, including adequate parking, appropriate paths for the physically challenged, and space for speaking to visiting groups.
- ☹ Existing landscaping and surroundings must be considered. What will need to be altered and will this cause added expense or public relations problems? Can construction take place without disruption to other uses of the area?

Beauty or a Beast?

Good intentions sometimes end up going to extremes. Landscaping to save water is a good example. Owners of some homes and businesses turn their landscapes into pavement or barren rockscapes. Others let the turf burn out and vegetation wither from lack of care. Water conservation does not mean non-use. Through careful plant selection and occasional watering as needed, the best of both worlds is possible — reduced water use and enhanced beauty. An example of this can be seen in the xeriscape garden shown below. Greens, yellow, pinks, and white brighten the landscape throughout summer with water being applied only occasionally.

In all cases, the benefits that come from plants should be weighed against the savings that might come from zero watering. Beauty and air quality contribute enough social and economic benefits to always ensure a place for plants in our urban environments.



Landscaping to save water does not mean the exclusion of plant life or the complete lack of watering to supplement rain. Shown here is the wide variety of plants that brighten the landscape in an area of low-water use at the University of Idaho Arboretum and Botanical Garden. The arboretum's website includes 13 pages of plants suitable for xeriscape gardens in the region.

PHOTOS COURTESY OF: Tim Buchanan, Fort Collins City Forester (page 6), Nick Camp (page 8)

FOR MORE INFORMATION ...

For sources of current information about saving water through the wise use of landscaping, please visit arborday.org/bulletins. Additional copies of this and other bulletins can be purchased with the order form on this page or by going to the shopping site at arborday.org.

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- Standard 1: A Tree Board or Department
- Standard 2: A Tree Care Ordinance
- Standard 3: A Community Forestry Program with an Annual Budget of at Least \$2 Per Capita
- Standard 4: An Arbor Day Observance and Proclamation

Each recognized community receives a Tree City USA flag, plaque, and community entrance signs. Towns and cities of every size can qualify. Tree City USA application forms are available from your state forester, the Arbor Day Foundation at arborday.org/treecity, or your state forestry agency.

