7 Basic Steps FOR CREATING & MAINTAINING WATER EFFICIENT Landscapes

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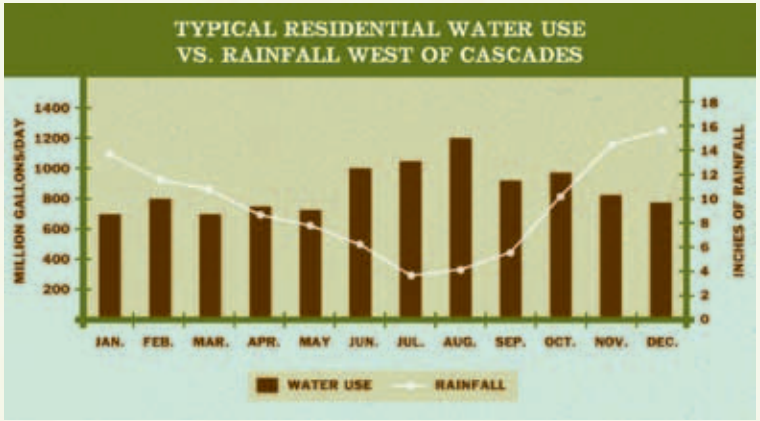
Here in the Portland metro area, water use can double or triple due to outdoor watering. This can be a problem because of the limited storage of our reservoirs and the typical lack of summer rainfall in the Pacific Northwest. By reducing summer water use, utilities can potentially delay building new storage facilities and transmission lines, and developing new sources of drinking water – all costly investments for communities.



There are many steps we all can take to make sure we are managing and maintaining our landscapes efficiently. This booklet outlines a variety of ways to use water wisely, while also achieving beautiful and unique landscape and garden options.

THE 7 Basic Steps

The seven steps listed in this booklet can help you create a water-efficient landscape. Individually, none of these steps are new or revolutionary, but when these seven basic steps are incorporated into one holistic method, the result is a landscaping approach that combines the necessary elements to achieve a beautiful and water-efficient landscape.

1

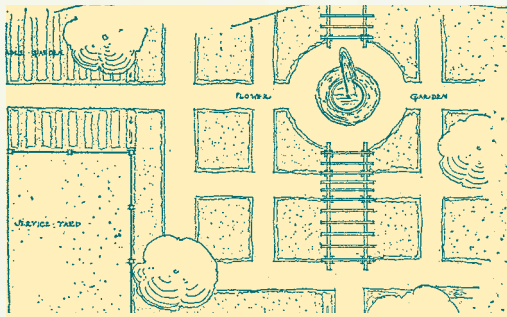
Plan and Design

Begin by creating a master plan. Your plan can range from a drawn sketch to a professional survey. A thoughtful design can allow you to install your landscape in phases and avoid costly mistakes.

Your yard is made up of numerous microclimates. A microclimate is an area with specific growing conditions, such as sun exposure, humidity, soil type, and wind direction that affect how well plants will grow. It is important to note these areas in your plan, as they will help you design your landscape and select appropriate plants for each area.

You may want to begin by dividing your yard into four different light exposures – north, south, east, and west. What kind of light is available during various parts of the day – bright sunlight, filtered sunlight, or shade? Remember, morning sunlight is cooler than afternoon sunlight.

Next, be sure to include the location of existing structures, trees, shrubs, streets, and important views you want to keep (or eliminate). You can then identify specific types of plants and hardscape you would like to incorporate in your landscape. Alternatively, based on light exposures, you can be more general in your approach: consider placing a tree that thrives in partial shade in the northwest corner of your yard and shrubs that love the sun in the southern part of your landscape.



If you need help with your landscape layout, consult a landscape professional who can provide advice, critique your plan, or develop a design plan for you.

2

Compost and Cultivate

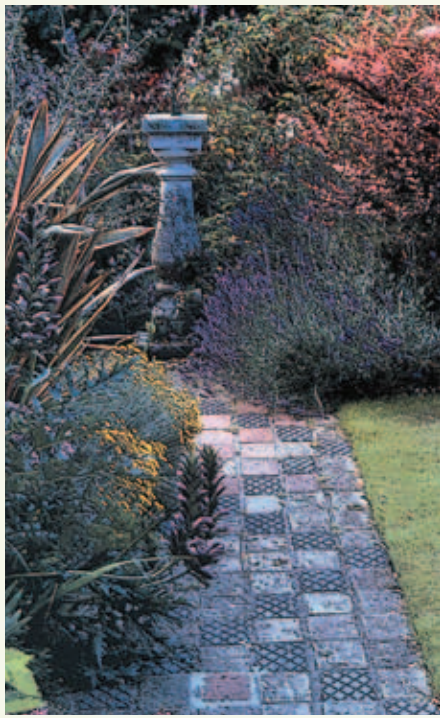
Soil amendments are very important to water-efficient landscaping. Understanding the basic characteristics of your soil is important for plant selection and watering practices. Soils in the Portland metro area are typically comprised of clay or sandy loam. Clay soils are fine-textured soils and may include mixtures of clay, silt, and sand. Generally, the finer the soil texture the slower the water will penetrate, which can result in a wetter soil that will remain moist long after being soaked. If extreme, this can cause rotting problems for some plants as well as increased run-off (water running off the surface because it is being applied faster than the soil can absorb).

Adding organic soil amendments, such as compost, will improve the absorption rate of clay soils and the water-holding capacity of sandy soils. Compost can easily be created at home by using food scraps, plant clippings, and leaves. Similarly, you can grasscycle or mulch mow your lawn to add nutrients and organic matter into your lawn's soil. Either way, organic amendments provides nutrients for your plants and increases the water–holding capabilities of your soil, reducing the need to water and fertilize. Testing your soil with a do-it-yourself kit or through a local lab will help identify specific improvements you can make to your soil for what you want to grow.

3

Create Functional Lawn Area

Lawn requires more water and maintenance than most other plants. Evaluate your need for grassy areas to ensure that they are practical and functional for your specific requirements. If you have more lawn area than you think you will need, or are capable of maintaining, these lawn areas can be reduced by creating more low-water use plantings or a hardscape. Alternatively, new varieties of lawn are being developed that, once established, require less upkeep and watering than standard varieties. The Turf Grass Water Conservation Alliance (http://www.tgwca.org) is an independent foundation that tests and certifies grass mixture varieties that can survive under reduced or limited water. You can also ask your lawn and garden specialist for recommendations.



Consider lawn alternatives such as ecolawns, groundcovers, and low water-use plants for areas where there are steep slopes and/or irregular shaped spaces as these areas can be difficult to water and maintain.

Hardscapes are also great ways to enhance your yard and reduce the need for watering. Hardscapes are the "hard," non-plant elements of your landscape. Examples of hardscapes include patios, decks, fire pits, walkways, steps, arbors, and fences.

4

Put The Right Plant In The Right Place

Different plants need different amounts of water, sun, and shade to survive. Since some areas of your yard may be hotter and drier, or wetter and cooler, than other spaces, these areas should be planted with plants that share similar water, sun, and shade needs - e.g. don't place a rose with a cactus. Placing the right plant in the right place will reduce the amount of water required, as well as the time and effort needed to maintain your garden.

In the Pacific Northwest, we have a spectacular variety of native and non-native plants that grow well in our local climate and soil conditions. For more information on identifying proper plant selections, the USDA hardiness zone rating system was developed to help you match plants with appropriate growing conditions. The Willamette Valley, including the Portland metropolitan area, is rated Zones 8a and 8b. This same area is rated zone 6 in the Sunset Western Garden Book. Plants rated for these zones are hardy enough to survive winter temperatures as low as 10-20 degrees Fahrenheit.

If you're not sure about what kind of plants you want in your garden, the following information about native plants, perennials, and ornamental grasses will help you choose the right plant for the right place.

Native Plants

Native plants are plants that originate in a specific ecoregion and that naturally grow well in that area's soils, climate, and geology. Adding native plants to a garden can provide habitat for local wildlife and enhance the native character of the Northwest. Once established, native plants are low maintenance, require little to no pesticides or fertilizers, and survive well on available water if planted in conditions similar to their native habitat.

Lupine

Purple Coneflower

Perennials

Perennials are plants that come back year after year without replanting. There are many different perennials to choose from that can be grown in a variety of microclimates. Once established, and if planted in the right place, many perennials will require little supplemental water and maintenance. Whatever landscape conditions you have, a variety of perennials are available to provide a profusion of colors and textures. As with many new plantings, it's important to water these plants for the first year or two until plants are established.

Ornamental Grasses

Historically, grasses have provided food and shelter throughout the world, but they are growing in popularity as landscape plants. Many are drought-tolerant and ideal for water-efficient landscapes. Throughout their growing season, their changing color, size, and form provide landscapes with different colors and textures. They also make good groundcover or background plants. They can soften hardscapes such as sidewalks and retaining walls, and some varieties can provide privacy and wind protection. Grasses can grow in wet soils or dry soils, in full sun or part shade.

Japanese Blood Grass

There are many unique and interesting ornamental grasses, native plants, and perennials available in the Northwest. Take time to evaluate your landscape needs and choose appropriate plants for the microclimates in your yard. Check with your local garden center staff if you have questions about plants that will do well in your landscape's conditions. The Great Plant Picks website (www.greatplantpicks.org) is another resource that you may find useful.

5
Water Wisely

The greatest waste of water is watering too much, too often.

The type of sprinkler system you select, the time and frequency you dedicate to watering, and the attention paid to your soil and plant's needs will help you water more efficiently and will result in healthier plants.

Be sure to water early in the morning (before 10 a.m) or later in the evening (after 6 p.m.) when temperatures are cooler, the air is calmer, and evaporation is minimized. If watering in the evening, be sure to avoid water left standing on plants overnight as this can promote mold and disease.

Another key to watering efficiently is to regularly adjust your watering schedule as the weather changes.

Test your plant's water needs by checking the soil on the surface and in the root zones of your plants. Push a screwdriver into the soil, dig a small hole, or use a soil probe to determine soil moisture content near the plant roots. It is important to note that water needs vary from plant to plant, so check with your local garden center or landscape professional on your vegetable, perennial, shrub, or tree's specific watering needs.

Soil Probe

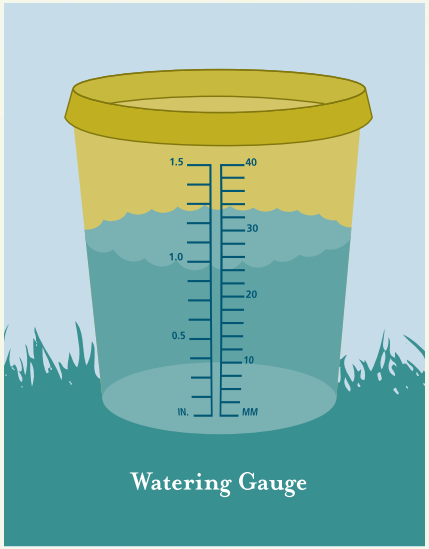
Watering Your Lawn

As a rule of thumb, an established lawn requires about 1 inch of water per week – more during the peak of summer and less during spring and fall. You can tell if your grass needs water through a few simple steps: **1.**) observe its color – grass will turn from bright green to dull blue or grey-green if it needs more water, **2.**) if the grass no longer springs back from your weight and you leave foot prints when walking across it, then it needs water.

To figure out how to measure 1 inch of water with your sprinkler system, try this:

1. Place two watering gauges at two different places within your sprinkler's spray range. Then run your sprinkler for 15 minutes. *(You may also use a tuna can and a ruler to conduct this test)*

2. Find the average amount of water *(in inches)* collected in your gauges. To do this, measure the amount of water in each gauge. Add these amounts together and divide by two. This is the average amount of water your sprinkler puts out in 15 minutes.



Watering Gauge

(This will provide you with a good guideline amount. For increased accuracy, repeat steps 1 & 2 several times, placing the gauges at different distances from your sprinkler.)

3. Use this chart to see how much time it will take you to water one inch.

AVERAGE WATER DEPTH AFTER 15 MINUTES	TOTAL MINUTES NEEDED TO WATER 1 INCH
1/8"	120
1/4"	60
1/2"	30
3/4"	20
1"	15

4. Set your watering schedule. We recommend watering 2 times per week, either before 10 a.m or after 6 p.m when temperatures are cooler.

For example, if after 15 minutes your gauges have ½ an inch of water in them, you will need to water a total of 30 minutes per week to get the recommended 1 inch.

Water Schedule Example

	M	T	W	T	F	S	S
Minutes			15			15	

If run-off occurs, you will need to run your sprinkler for a shorter time period so that you are applying only the amount of water that your soil can absorb. Use watering gauges to figure out how much water your system distributes during this time, and then figure out how many times you will have to water each week to put down the recommended 1 inch per week.

For example, if it takes your sprinkler 40 minutes to water an inch but run off starts occurring after 20 minutes you might opt to water for 20 minutes at 6 a.m., let the water soak into your soil, and then water again for 20 minutes at 8 a.m.

This part of creating your watering schedule may take some trial and error to get it right, so keep repeating this process described in the above example until you have applied water for the total number of minutes you have scheduled without experiencing run off.

Aeration and dethatching can also significantly increase the soil's ability to accept water. Aeration involves making holes in the lawn by "coring" which involves extracting plugs of soil. Regularly aerating your soil in the spring or fall (or both, if possible) can help correct excessive soil compaction which can cause water runoff. Aeration can also promote moisture infiltration into the soil, more efficient use of fertilizers, and enhanced root growth. Deeper root systems provide better insulation from summer hot spells and thus require less frequent watering. Many landscape companies offer an aeration service or you can rent or buy aeration tools to do it yourself. Check with your local nursery or a lawn care professional for more information.

Thatch is comprised of grass stems and roots and other organic matter. Generally, microorganisms will eat the organic matter and provide food for the individual grass plants, but sometimes lawn ecosystems can get out of balance due to too much or too little water or too much fertilizer. This can cause the decay process to decrease resulting in additional thatch build up.

When a thatch layer starts getting thicker than ½ inch, it may be necessary to remove some of it to improve the condition of the lawn. Dethatching a lawn can be as simple (and laborious) as vigorously raking the lawn or more complex, like vertical mowing. Vertical mowing dethatchers mow the grass vertically with spinning blades, cutting and pulling up thatch to the surface.

Take The Next Step:

If you have an automatic sprinkler system, you will need to program your watering schedule into your sprinkler's controller. Then you can use the Consortium's Weekly Watering Number to fine tune your system's settings throughout the growing season (The Weekly Watering Number is the amount of water in inches that your lawn will need each week from April-September. This information can be found at: **www.conserveh2o.org/outdoors.**

Sprinkler Systems

When choosing a sprinkler system, select efficient equipment that uniformly delivers large drops of water as close to the ground as possible and to the areas you need to water rather than a system that randomly sprays water. For lawns, choose small rotors over spray heads as they will put water down in a more uniform manner in a way that the soil can absorb it without running off quickly.

A well designed sprinkler system will help you use water more efficiently and avoid water waste as long as you regularly check that your system is properly programmed, scheduled, and maintained. Knowing how much water your plants need, and periodically monitoring and maintaining your sprinkler system are the keys to saving both water (about 30%) and money.

In Oregon, all landscape sprinkler systems are required to have backflow protection installed between the water source and the sprinkler equipment. Backflow protection prevents contamination of the potable water system from pollutants that may exist in the sprinkler system. Contact your local water provider for specific information regarding backflow rules and regulations.

In some situations filters may be necessary for sprinkler systems, especially drip systems to keep particles from clogging up the equipment. Pressure regulators are also generally necessary for drip systems since they function better at lower pressure (15-30 psi) than the pressure coming from the source (40-60psi). A timer or controller is required if you wish to automatically operate your sprinkler system.

Methods Of Watering

Passive Water Harvesting: This method takes advantage of our abundant rainfall by diverting stormwater run-off into a designated area in your landscape called a "rain garden." During the rainy season, water is distributed over the rain garden's soil surface by gravity and allowed to slowly infiltrate into the soil. Plant rain gardens with native plants that naturally can withstand flooding part of the year and a period of "drought" during the drier summer months. Downsides of this method are the vast amounts of water lost to evaporation and a potential for insect infestation - depending upon the volume that is used and the length of time it takes to infiltrate into soil. Rain gardens should only be installed in areas not prone to landslides. Inquire with your local storm water management agency for more information regarding proper placement and downspout disconnect policies.

Hand or Container: Water is applied either by container or hose to plants as needed individually. This can be a time intensive, but efficient method for watering as long as you monitor your water use and application rates. It may not be practical for large landscapes due to the volume of water which must be transported and/or placed onto the plant material for each watering period.

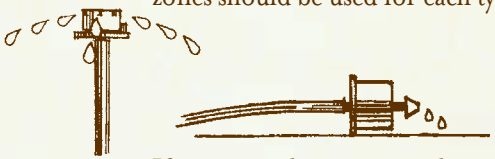
Sprinkler: In this method, water is sprayed over large areas of plantings simultaneously either by a single sprinkler attached to a hose or a sophisticated underground system. Some sprinklers may have timers or controllers to regulate time and length of watering cycles. Downsides to this method include the potential for water to be applied at far greater frequency, volume, or rate than required and/or than soils can readily infiltrate. Maintenance issues such as malfunctioning sprinkler heads, leaks, or other problems that may lead to waste.

- **Pop-Up Spray Systems** - Among traditional automatic spray systems are pop-up spray heads that can be adjusted to spray areas ranging in size from less than quarter circle to a full circle. The disadvantage of spray heads is that they are often less efficient than rotor or drip systems, because they put water down on the ground faster than it can be absorbed. All heads should be of the same type and produced by the same manufacturer to get a more uniform distribution of water and simplify maintenance.

- **Rotor System** - Rotor systems are generally more efficient than spray heads because they apply water at a much slower rate, allowing the soil to absorb moisture more efficiently. New rotor systems are specifically designed to apply water at less than half-an-inch per hour and with a radius of less than 15 feet. Application patterns and each sprinkler head's radius are adjustable making it possible to conform to irregularly-shaped areas.

Drip System - Drip is potentially the best and most water-efficient way to water trees, shrubs, perennials, groundcovers, and vegetable gardens. This is because drip uses a fraction of the water that overhead spray devices use. It does this by applying water slowly and directly to plants at ground level thereby minimizing water loss through evaporation and allowing the soil to absorb the water.

Drip systems are comprised of drip tubing that is laid throughout a planting bed and feeds water directly to the base of the plants through emitters. There are many different types of drip emitters, including drippers, bubblers, soakers (inline emitters), and micro-sprayers. Drip systems can be customized to meet each plant's needs. Separate zones should be used for each type of emitter.



Drip systems require meticulous and regular maintenance to maintain efficient performance. If improperly maintained typical home-managed systems can use more water than conventional sprinkler systems. Also damage, leaks, and other problems may not be as visibly noticeable as they are with conventional systems and thus can remain unchecked until significant damage to plants or soils becomes evident.

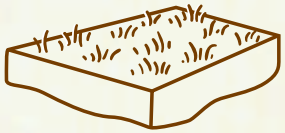
Important Sprinkler System Terms To Understand

Distribution Uniformity

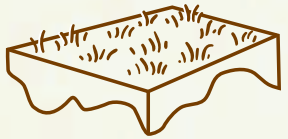
One of the most important characteristics of an efficient sprinkler system is making sure that it is designed and maintained to distribute water as uniformly as possible. The main problem with a non-uniform system is that dry spots occur. With poor distribution uniformity, areas that don't need water often get overwatered and areas that need more water don't get enough. This is often indicated by brown spots in your lawn.

Moisture Depths In Soil After Watering

Uniform



Non-Uniform

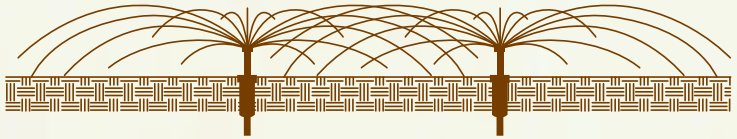


The Most Common Causes Of Poor Distribution Uniformity Include:

- unmatched precipitation rates of sprinkler heads/ nozzles due to mixed equipment types
- improper operating pressure
- broken or leaking equipment
- irregular spacing of sprinkler heads
- poor design and improper installation
- obstruction of plant material or structures interfering with sprinklers
- watering during hot and windy conditions
- clogged, worn, or obstructed sprinkler nozzles

Head-To-Head Coverage

Sprinkler systems should be designed to operate with head-to-head coverage to maximize distribution uniformity. Head-to-head coverage means that water from each sprinkler head reaches to just beyond the next closest sprinkler head.



Rule: Sprinkler Radius = distance between sprinklers

6

Use Mulches

Mulches come in two forms – organic and inorganic. Organic mulches include aged manure, compost, bark chips, or wood chips; inorganic mulches include gravel and river rock.

All mulches increase the soil's ability to store water by covering and cooling the soil thereby minimizing evaporation. They also reduce erosion and help with weed control. Use about 2-3 inches of organic mulch for weed control, but do not bury the crowns of plants as this may cause them to be smothered and rot. Also, if mulch is too deep, water will have a difficult time reaching the plant roots. Since inorganic mulches can absorb and reflect heat, care in selecting plants for these areas is critical.

7

Keep Up The Maintenance

- Water-efficient landscaping means paying attention to your soil, water, and plant needs. Routine maintenance such as pruning, pest control, and fertilization will keep your plants healthy and your landscape at its peak while saving water.

- Control thatch and aerate your lawn annually to ensure that its roots are receiving the right amount of water.

- Weeds compete with plants for nutrients, light, and water, so weed frequently by hoeing or pulling weeds by hand. Remember, a good layer of mulch will help with weed suppression.

- Water and fertilize plants only as needed. Rather than adhering to a rigid schedule, become aware of what your landscape requires and learn to recognize and react to the indicators.

- Make every drop count – check that your sprinkler system is providing the right amount of water at the right place. Walk through your landscape and check for leaks or blocked, broken, or misaligned sprinkler heads. If you need help with your water-efficient landscape, consult a landscape professional, or seek advice from your local garden center.

Additional Sustainable Landscaping Ideas

Landscapes can offer great benefits to the environment if designed and maintained with sustainability in mind. Water conservation is a great first step. Here are a few more ideas to help you make your yard more nature-friendly.

- Provide a diverse habitat for birds, bees, and butterflies by using native plants to create a layered landscape with ground-covers, shrubs, and trees.

- Reduce your energy use and carbon footprint by reusing materials, using hand tools instead of power tools, and (when possible) shopping locally for plants and supplies.

- Reduce polluted runoff into rivers and streams by creating a rain garden to collect the storm water. Or, consider disconnecting your downspout and re-directing run-off into your garden area. Be sure to check with your local water provider for downspout disconnection regulations.

- Reduce or eliminate your use of pesticides and soluble fertilizers to protect water quality.

Bleeding Heart

Resources

- The Hardy Plant Society Of Oregon
  503.224.5718 or www.hardyplantsociety.org

- Native Plant Society Of Oregon
  www.npsoregon.org

- Great Plant Picks
  www.greatplantpicks.org

- Turf Grass Water Conservation Alliance
  http://www.tgwca.org/
  Information on third-party certified waterwise grass varieties

- Metro Natural Gardening Program
  www.oregonmetro.gov/garden

- Landscape Irrigation Tutorials
  www.irrigationtutotrial.com

- Irrigation Association
  www.irrigation.org
  Information on irrigation and certified irrigation professionals

- Oregon Landscape Contractors Board
  http://www.oregon.gov/LCB/index.shtml
  Regulates Oregon's landscape construction industry (education, licensing, dispute resolution and enforcement)

Sources:

Barbara Ashmun, Garden Author
Steve Schmidt, American Ornamental Perennials

For more information regarding water-efficient landscape practices, please visit the Regional Water Providers Consortium Website at www.conserveh2o.org, or contact your local water provider.

REGIONAL WATER PROVIDERS CONSORTIUM

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REV. 2012