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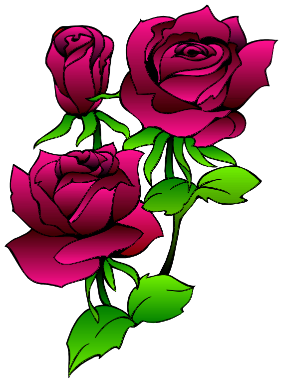

Living with Landscape Irrigation Restrictions

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Landscapes and gardens are one of the primary factors contributing to the quality of life in Utah. It is very difficult to place a dollar value on the worth of a home landscape, city park, ball diamond, industrial park landscape, or home garden. They beautify our surroundings, cleanse our environment, provide natural cooling, sustain wildlife, and provide many other important benefits. Their value is extensive and they are without question a worthwhile use for Utah water. Because landscapes are often over-irrigated, there is a great potential for significant water conservation without negative effects.

✿ Why Water Restrictions?

Utah is the second driest state in the nation, with much of the state's moisture coming as winter snowpack that must be stored for summer use. Utah is also subject to fluctuating weather patterns that result in dry and wet cycles. During dry cycles, or droughts, normally dry conditions are worsened and available water becomes limited. Maintenance of water supplies is dependent on enough moisture coming during the winter to replenish the reservoirs and aquifers that are used during the summer. It is also dependent on wise conservation of available water.

In addition to the natural climatic restraints on Utah's water supply, the state is also faced with an increasing demand on that supply due to population growth. While water is a renewable resource, available, usable water is a finite resource during any given time period. As populations increase there will unavoidably be less water available to meet demands. The ability to properly manage and conserve the state's water will thus have a great effect on the future quality of life in the state.

✿ Irrigate with the Proper Amount of Water

To conserve water and maintain a healthy landscape or garden, irrigation should be as infrequent as possible, and each irrigation should moisten the soil root zone. Frequent, light irrigations result in plants with shallow root systems that dry rapidly when under water stress. Infrequent deep irrigation encourages the development of extensive root systems which fully utilize the entire soil profile.

To correctly apply enough water to moisten the root zone without losing excess water to deep drainage requires an understanding of soils. Soil is much like a sponge that holds water. Once the soil is moistened, plants are able to obtain water from the soil. As more water is added to a soil, it will eventually become saturated and excess water simply drains through and is lost to ground water.

Determining how much water to add to a soil at each irrigation depends in large part on the texture of the soil. Coarse, sandy soils have rapid infiltration rates, good aeration, and poor water retention. Finer, clay-loam type soils have slower infiltration rates and greater water retention. With turf irrigation it is recommended that the top 10-12 inches of the soil be moistened at each irrigation. To moisten a sandy soil may require 1 inch of water, while a fine-textured soil may require 2 inches.

The turf requires the same amount of water regardless of soil type. Therefore, since sandy soils hold less water than clay soils, they must be irrigated more frequently, with smaller amounts, to meet the plant's needs.

Soil texture can be determined by a soil test and is very useful in determining soil moisture holding capacity. It is easy to estimate soil moisture by measuring how far the water has penetrated into the soil following irrigation. This can be determined by forcing a long screwdriver into the soil. The screwdriver will easily pass through moist soil, but will meet resistance with dry soil. The depth of infiltration can also be determined by digging a small hole with a shovel and observing the depth of moisture in the soil. If the application rate of a sprinkler system is known, or if applied water can be measured, the number of inches applied per time period, and how far it will penetrate can be determined. Future irrigations can then be based on this knowledge.

Efficient irrigation requires uniform application of a known amount of water to the landscape. There is such great diversity in sprinkler designs that it is virtually impossible to predict how much water a given system will apply per hour. To determine uniformity and rate of application, the water applied must be measured.

Water applied by sprinklers can be easily measured by placing straight-sided cans in several locations on the lawn to catch the irrigation water The cans should be tall enough to prevent water from splashing over the sides.

After irrigating, measure the depth of water in the cans with a ruler and average the measurements from all the cans. By using this value, the amount of water applied over a given time period can be determined. In other words, if the sprinklers are on for 1 hour, and an average of 1 inch of water is collected in the cans, then the application rate is 1 inch per hour. Measuring water can also provide an indication of the uniformity of application. Many problems in the landscape can be resolved by uniform application of water so there are no wet or dry spots.

✿ Irrigate at the Right Time

Irrigate as infrequently as possible, and only when plants have used most of the available soil moisture. In general, irrigating once or twice a week is ideal. Only with very porous sandy soils should irrigation occur three times per week. Restrictions such as irrigation on odd or even days, or only twice a week do not limit the ability to grow plants. These irrigation intervals are well within desirable ranges.

In actuality, many landscapes are over-irrigated and such restrictions tend to bring them closer in line with recommended guidelines. Restrictions placed on irrigation need not limit the ability to garden or have an enjoyable landscape.

Within the general guidelines of irrigating once or twice a week, a number of things can be done to "fine tune" irrigation timing and further conserve water. Irrigation timing can be determined in two ways. The first method is to monitor the plants and/or soil in the landscape or garden. The second method is to determine the amount of water that has been lost from the landscape and how much will be needed to replace it.

✿ Scheduling Irrigation Based on Observation

Optimum irrigation requires irrigation just prior to water stress. However, if a little stress can be tolerated, timing can be determined by careful observation of the landscape to notice the symptoms of early water stress. Bluegrass turfs will begin to change from a bright green color to a dull, blue-green color when they become water stressed. They also lose their ability to spring back rapidly from foot traffic, so a dry lawn will show visible footprints for a longer period of time. Another observation method is to use indicator plants to predict irrigation needs. Almost every landscape has a shrub or plant that wilts sooner than any other plant in the landscape. This plant can be used to indicate the time to irrigate. Occasionally plants may wilt under hot, dry conditions even if the soil is moist. Therefore soil moisture should also be determined.

Soil moisture status can also be monitored to determine irrigation needs. The screwdriver test not only indicates how deep the soil is moistened but also when it needs to be irrigated again. When the soil is too dry to penetrate with the screwdriver, it is past time to irrigate. Soil moisture can also be estimated by squeezing the soil into a ball. If water runs out of the soil, it is obviously well moistened. If the soil forms a firm ball, and a thin film of moisture is visible on the skin, then soil moisture is near optimum levels. If the soil forms a loose ball that crumbles easily, and the skin remains dry while handling it, then it is time to irrigate. Other techniques that can be used include rather sophisticated methods such as tensiometer or gypsum blocks which provide a measurement of soil moisture status. These methods may be too elaborate and expensive for home use.

✿ Scheduling Irrigation Based on Evapotranspiration

Irrigation scheduling can also be determined by measuring or predicting evapotranspiration (ET). ET is the sum of water lost from the landscape through evaporation from the soil surface and transpiration through the leaves of plants. ET is determined by the plant species and the climatic conditions. It can be estimated directly, calculated from weather data, or determined from an evaporation pan. With an evaporation pan, the amount of water evaporating from a known surface area is determined and used to predict ET. ET rates for various geographical areas are often published by the local newspapers and Cooperative Extension offices.

It is also simple to make your own evaporation pan. It should be a fairly large container with a flat bottom and straight sides and filled with a few inches of water. A ruler can be used to measure the water depth and estimate the daily rate of evaporation from the pan. This rate can be used as an estimate of the ET rate for individual landscapes.

By knowing the water storage capacity of a soil and the daily ET rate, you can calculate when the available moisture will be near depletion and irrigation is needed. For example, if a loam soil holds 1.5 inches of water in the top 12 inches, and during the summer the ET rate is ¼ inch per day, after 6 days (6 x 0.25 = 1.5) the available water would be depleted and irrigation would be required. To replenish the soil moisture 1½ inches of water would need to be applied. This method is known as the “checkbook” system of irrigation scheduling and simple, yet effective.

Research with ET values for an average landscape along the Wasatch Front has shown that at the peak of summer, a lawn will need about ¼ inch of water per day. Extremely hot, dry, windy periods may increase the ET rate to ⅓ inch per day. Over the course of a week, this amounts to about 2 inches of water that must be supplied. Because ET rates vary depending on climatic factors such as solar radiation, temperature, humidity, wind speed, clouds, and fog, irrigation requirements also vary accordingly. In the winter, ET is virtually zero; but it increases during the spring with increased sunshine and temperature to a maximum in midsummer. The following table gives a general guide as to the amount to water needed for a bluegrass lawn.

Water needed for Bluegrass Lawn

	Period Total
May 1 – June 15	1.25" per week = 9"
June 16 – July 15	1.75" per week = 7"
July 16 – August 15	2.00" per week = 8"
August 16 – September 30	1.75" per week = 10"
Total Season	34"

If irrigation is restricted to twice a week, then the weekly requirements would need to be divided between the two irrigation turns. It is important to realize that these rates are for a solid canopy of plant material such as a lawn. Landscapes or gardens with less than 100% cover of the soil would use less water. It is also possible to grow turf with approximately 30% less water than it will use if water were abundant, and still maintain acceptable quality.

✿ Conserving Water in the Landscape

Irrigating at the right time and in the right amount can permit water conservation and optimum plant growth, even under irrigation restrictions. There are several other cultural practices that can be used to conserve irrigation water.

- Irrigate early in the morning when temperatures are cool and when the wind is not blowing so that less water is lost to evaporation.
- Apply mulches in gardens and around trees and shrubs to reduce water loss from soil surface evaporation.
- Maintain irrigation systems so that water is applied at appropriate pressures, leaks are repaired, and alignment is correct.
- Mow turfgrass frequently at a height of 2½ to 3 inches. This improves tolerance of hot, dry conditions.
- Increase infiltration of water by aerating turf to reduce compaction and thatch.
- Segregate landscape plants according to water requirements to reduce over watering of low-water use plants yet maintain high-water use plants.
- Use drip or trickle irrigation systems to reduce the amount of water used in the landscape or garden.

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