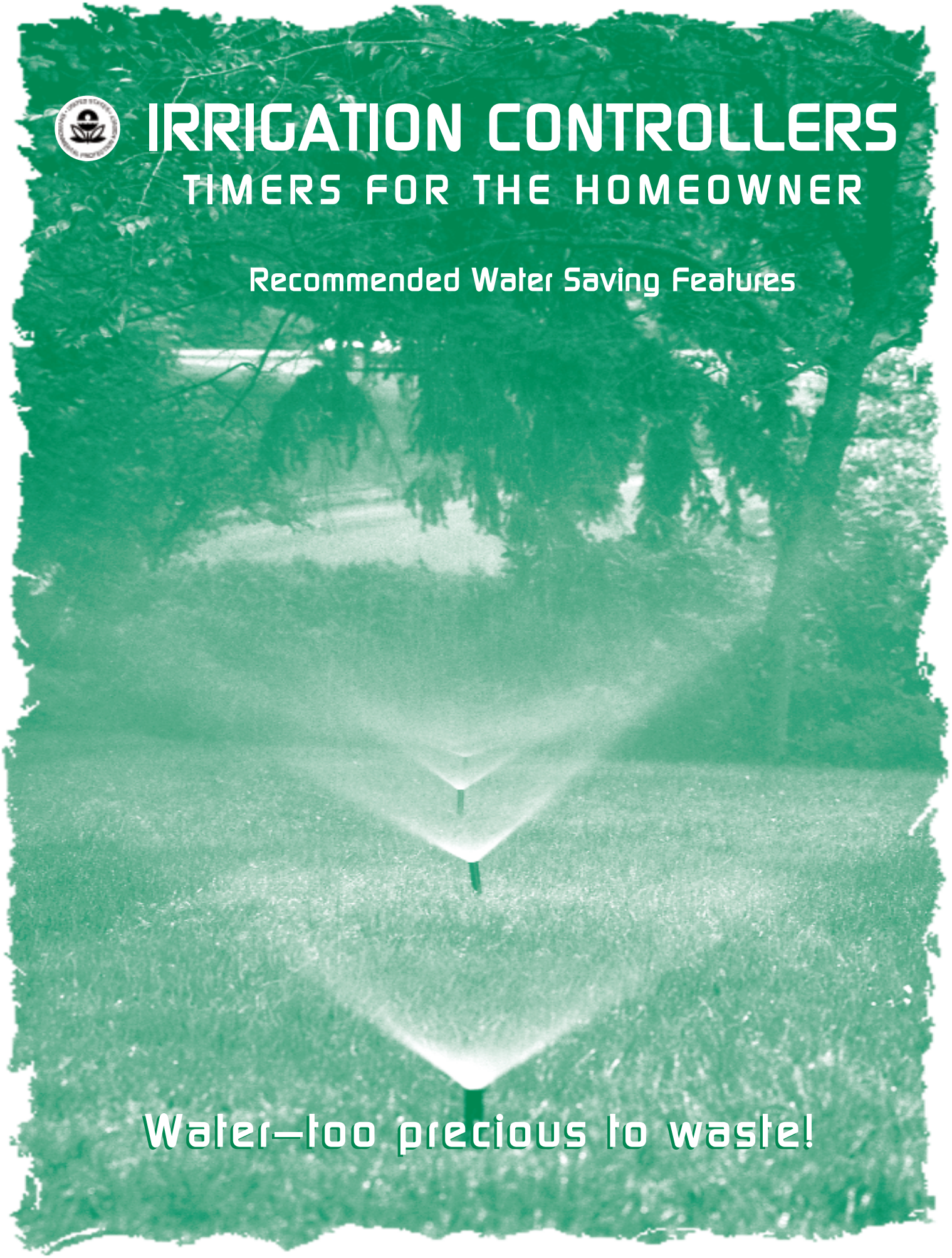

IRRIGATION CONTROLLERS

TIMERS FOR THE HOMEOWNER

Recommended Water Saving Features

Water—too precious to waste!

IRRIGATION CONTROLLERS

TIMERS FOR THE HOMEOWNER

Recommended Water Saving Features





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Disclaimer

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Preface

The U.S. Environmental Protection Agency published this booklet because of the importance that efficient landscape water use has for the environment and the economy.

The most obvious benefit of efficient landscape water use is conservation of water resources. In most situations the water we use to irrigate landscapes is treated drinking water. By reducing the amount of drinking water used for landscape irrigation, we reduce the burden on water treatment facilities and often can defer future facility costs. A small but growing number of municipalities have reduced drinking water facility needs by building a separate water reuse system to supply reclaimed wastewater to homeowners for landscape irrigation and other non-potable uses. In either case, irrigation water should be used efficiently. This booklet is designed to help the homeowner understand and select the right controller for their individual needs and use it properly—the key to efficient irrigation.

Efficient landscape water use can have many environmental and economic benefits:

- Lower water bills from reduced water use.
- Extended life for water system infrastructure (e.g. treatment plants, pipe systems), thus reduced taxpayer costs.
- Reduced runoff of storm water and irrigation water that carries topsoil, fertilizers, and pesticides into lakes, rivers, and streams.
- Conservation of natural resources and preservation of habitat for plants and wildlife such as fish and waterfowl.
- Decreased energy use (and air pollution associated with its generation) because less pumping and treatment of water is required.

Acknowledgement

Special recognition goes to Dick Bennett and Richard Harris of the East Bay Municipal Utility District for their efforts in producing this booklet.

Foreword

This brochure is a cooperative effort sponsored by members of both the water and landscape industry to promote efficient landscape water use. The purpose of this brochure is to highlight important features of a controller (also called a timer or clock) that allow for proper watering schedules. Since many people are somewhat mystified or intimidated by these devices, hopefully, this brochure will help when making the decision of which controller to obtain. **The main point to keep in mind is that the key to watering efficiently is to obtain a controller that can handle diverse landscape and weather situations and then to program it properly.** This message is so important; it is repeated again in the text.

Also discussed in this brochure is information on a new generation of controllers, called ET based controllers, that automatically change water schedules based upon past or historic climate conditions for a given region.

We encourage you to contact your local water agency or landscape company to obtain more information on how to improve landscape water use efficiency. For any technical assistance you may need with your controller, contact the manufacturer.

Importance of Irrigation Controllers

A large part of our household water use goes to watering our landscape and many households rely on automatic in-ground irrigation systems to accomplish this. One of the most important components of an automatic in-ground irrigation system is the irrigation controller (also called a timer or clock). The controller turns the automated irrigation system on and off at the times you select. In other words, **the controller controls the irrigation system and you control the controller. Having a controller with certain minimum performance capabilities is vital to efficient watering.** The right controller, properly scheduled, can result in significant water savings and lower water bills. While controllers come in all types of shapes and sizes, the most important features are how well they can be programmed to handle diverse landscape and weather conditions.

How Does a Controller Work?

An automatic in-ground irrigation system is a collection of pipes, tubing, valves, sprinkler heads, and circuitry used to irrigate a landscape. Automatic valves (also called stations or zones), which control the flow of water to different parts of the landscape, open and shut upon a signal from the controller. For example, there may be one valve that controls the water flow to some groundcover, another valve for some shrubs and another valve for the lawn. Once programmed, the controller determines when, how often, and how long each valve is open. **It controls how much water goes where and when in your landscape based upon your instructions. The more programming flexibility the controller has, the more efficiently water can be applied to the landscape.**

Why Certain Controller Features are Important

The key to watering efficiently is to obtain a controller that can handle diverse landscape and weather situations and then to program it properly to meet your plants' water needs. Let's imagine you have a front yard with three valves that control the water flow to a sloped lawn area, to several trees, and to a groundcover area. You desire to water the lawn every third day for the entire month in three short time intervals of five minutes each and want a 30-minute break between watering to avoid runoff from the slope. You also desire to water the trees, which are on a drip system, once a month for two hours. Next, you want to water the groundcover once a week for 30 minutes. Finally, you don't want to water if it is raining. To accomplish this, your controller would need the following features: 1) three independent programs, 2) 120 minute station run times, 3) three start times per program, 4) interval program capability to 30 days, and 5) rain shut-off device capability (the actual rain shut-off device needs to be purchased separately).

Important Water Saving Features

The recommended minimum **hardware features** for a controller include:

- **Three independent programs**
- **Station run times from 1 to 200 minutes**
- **Three start times per program**
- **Odd/even, weekly and interval program capability up to 30 days**
- **Water budgeting from 0-200%, in 10% increments, by program**
- **365 day calendar, adjusted for leap year**
- **Non-volatile memory or battery back-up**
- **"Off", "Auto", and "Manual" operation modes without disturbing programming**
- **Rain shut-off device capability**
- **Diagnostic circuitry to notify homeowner when station is shorted or a power failure has occurred**

The above features, discussed in more detail below, are important because they give you the **ability** to properly manage your landscape watering.

Multiple independent programs allow watering different parts of the yard on different days. **Station run times** determine the upper and lower limit on how long an area can be watered. While watering times are usually in minutes, a few controllers are capable of assigning run times in seconds (for potted plants) and hours for drip applications. **Multiple start times** allow for repeat watering in the same area on the same day. **Odd/even, weekly, and interval program capability** allows for flexibility in deciding what days to water. For example, a 30-day calendar would allow watering a large tree once a month. **Water budgeting** (also known as a percent switch) allows for an increase or decrease in station run times by a certain percent. For example, during a cool spell, you may want to decrease watering time by 10% for all programs. This feature allows for the changing of all station run times within a given program in one easy step. **365-day calendar** allows for the tracking of the number of days in each month throughout the year. **Non-volatile memory** retains the set program in case of a power failure. However, the set start watering times are still affected. For example, a four-hour power failure where the watering times are set to start at 6 a.m. would result in 10 a.m. start. A **battery back-up** is recommended to retain the 6 a.m. watering time. Controllers with only volatile memories would both lose their set program and have the watering start time affected. For controllers with volatile memories, a battery back-up would retain both the set program and the set watering times. **Rain shut-off device capability (and rain shut-off device)** is used to automatically override the call for water during rain events. (The actual rain shut-off device needs to be purchased separately since it is not included with the controller.) **Diagnostic circuitry** to notify the homeowner when a station is shorted or a power failure has occurred is useful so that the controller can be checked for any changes or problems as soon as possible.

In addition to the above hardware, programming instruc-tions, technical support phone numbers, and irrigation scheduling information are important resource tools.

Check with your local water utility, irrigation supply company, or landscape professional for local watering guidelines.

Optional Controller Features

Besides the above mentioned recommended controller features, several desirable but optional features include **“pause times”** and **“soak cycles”.** The “pause time” feature allows for some time to elapse before watering different stations within a program. This feature allows time for a control valve to completely close before the next valve opens ensuring more uniform pressure and thus better uniformity of coverage. For those on well water, this feature may allow time for the level in the well to recover before the next irrigation cycle. The “soak cycle” allows for short, multiple watering cycles. This feature can be used either before a normal irrigation cycle to reduce runoff or for multi-ple, short waterings of a given area.

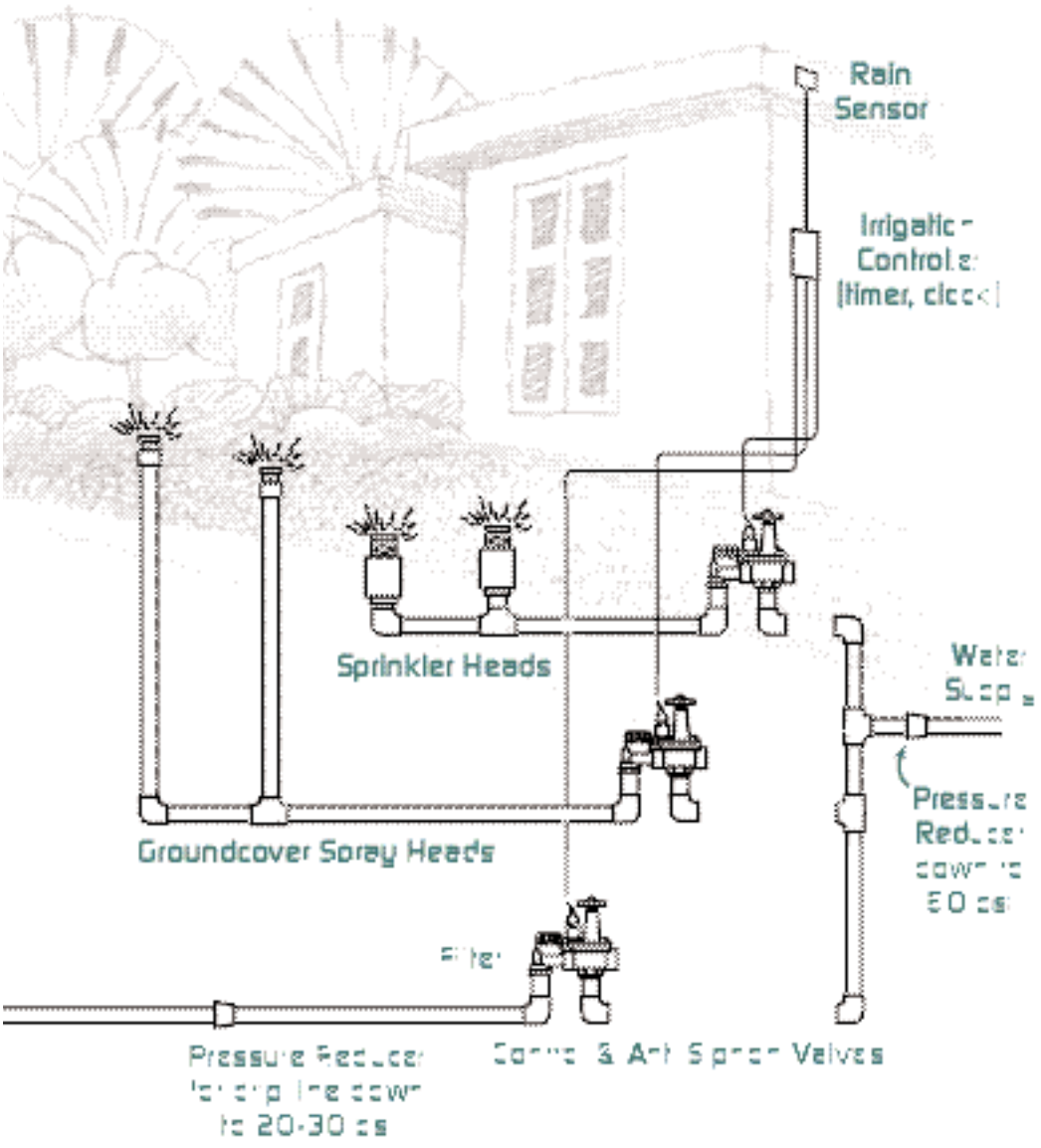
Controller Warranty

Ask about the warranty on any controller you are considering. The length of a product warranty is often linked to quality and many controller manufactures are offering warranties in the 2-5 year range: the longer, the better.

Other Important Components of an Efficient Irrigation System

Besides obtaining an irrigation controller with the recom-mended features, there are other irrigation components that should be used with irrigation systems to save additional water. **Control valves** control the flow of water to different parts of the landscape and are used for the separate watering of plants with different watering needs. **Check valves** can be installed in sprinkler heads to prevent water from draining out of the irrigation line when the water is turned off and are most useful on sloped landscapes. **Rain shutoff devices** can be wired to a controller to shut off the system when it is raining. **Moisture sensors** can be wired to control valves to override the call for water if they “sense” that enough moisture is already present in the soil. Moisture sensors, therefore, “monitor” the irrigation schedule for over watering. **Drip or bubbler irrigation** can be used to irrigate slowly and minimize or eliminate evaporation, runoff and overspray. Finally, **low precip-itation spray, stream, and sprinkler heads with matching precipitation rates can dramatically improve efficiency.** It is important to note that automatic irrigation sys-tems, if not properly managed, can waste a lot of water. Always be mindful that YOU are the “brains” behind your irrigation system scheduling and YOU control the controller.

AUTOMATIC IRRIGATION SYSTEM


Rain
Sensor
Irrigatic -
Controlle
(timer, clock)
Sprinkler Heads
Groundcover Spray Heads
Pressure
Reducer
down to
30 psi
Pressure Reducer
to drip line down
to 20-30 psi

The Importance of Proper Irrigation Scheduling

Plants require the most water during the summer and little or no water in the winter. After July, plants need less water each month, and by November, often little or no irrigation is required until March or April. Then, plant water needs increase each month through July. The chart below compares the typical month to month average percentage changes in your landscape's water requirement to the July requirement. For example, the landscape's water requirement in May is twice that of April but only 60% of the July requirement. This chart demonstrates the importance of regularly changing your irrigation schedule. Note that by the end of September, your landscape will need only about half of the water it needed in July. Since this chart is based upon the change by month in a plant's water need, local precipitation will, of course, affect how much supplemental irrigation is needed. Check with your local water agency or Cooperative Extension office for specific monthly water requirements for your landscape.

Typical Monthly Percentage Comparison of Landscape Water Need Using July as Basis

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	30	60	90	100	90	60	30	5	0

Other Water Saving Landscape Practices

Besides proper irrigation system design and scheduling, water use efficiency in the landscape can also be increased through appropriate use of plant material, soil preparation, and proper horticultural practices (maintenance).

Extensive use of plants suited for the climate of the region should be considered for your landscape. Plants should be grouped, as much as practical, according to their water requirements. Proper horticultural practices that include regular pruning, weeding, lawn aerating and dethatching, and the use of mulches and fertilizers should be followed.

For more detailed information regarding water saving opportunities in the landscape contact your local water agency, irrigations supply store, or landscape professional.

New Generation of Controllers

A new generation of controllers, called ET based controllers, has recently become available that uses a measure of plants' water requirement called "Evapotranspiration" (ET). ET is used to schedule watering based on historical climate for a locale and is a measure of the rate of a plant's water requirement that involves plant transpiration and soil evaporation.

Figure 1. Two examples of ET controllers

The ET rate is dependent on such weather factors as sun light, temperature, wind, and humidity, and varies throughout the day, by day, by week, etc. ET is usually measured in inches per day and is highest in the summer and lowest in the winter. In fact, often times no watering is needed in the winter because many plants are dormant and because winter precipitation meets or exceeds the plants' water requirement (ET rate). Some ET controllers have the watering schedule programmed into their computer chip based upon historical ET data for a given region. Other ET controllers can change the water schedule weekly based on the past week's weather for a region via a radio signal.

Why is an ET based controller important in watering schedules? By scheduling watering based on ET rates, plants can receive the required amount of water to remain healthy without over or under watering since the **ET controller adjusts the watering schedule automatically.** Thus, the homeowner doesn't have to guess what the optimum watering schedule might be throughout the year. Because many homeowners don't adjust a controller's watering schedule often enough, ET controllers have the potential to increase watering efficiency.

Some of the new ET controllers also have temperature and rain sensors that further adjust the watering schedule when large differences from historical climate occur such as during unseasonably hot or cold spells. Ask your local irrigation supplier about the new ET based controllers.

Sample Water Schedule

The chart below shows a sample watering schedule. You can increase or decrease the amount of water applied to the landscape by changing either the number of start times per day, the number of minutes per day, or the number of watering days per week. Note in this example the watering times stay the same but the number of watering days per week change during the year. Also, note no watering is shown for the winter months. To determine the appropriate watering schedules for your area, contact your local water agency or landscape professional. Keep your schedule in your controller for easy references.

Plant Type	Sprinkler Type	Starts per day	Minutes per day	Number of Watering Days per Week: Fall and Spring	Number of Watering Days per Week: Summer
lawn	spray	2	7	2	3
groundcover	spray	2	7	.5	1
shrubs	drip	1	30	.5	1
trees	drip	2	30	0	.5

Sponsoring Agencies

California Department of Water Resources
California Landscape Contractor Association
California Urban Water Conservation Council
City of Austin, Texas
City of Santa Barbara
Contra Costa Water District
East Bay Municipal Utility District
Irrigation Association
Johnson County Water District #1
Massachusetts Water Resource Authority
New Mexico Office of the State Engineer
Santa Clara Valley Water District
Southern Nevada Water Authority
Tacoma Water, Washington
United States Bureau of Reclamation
United States Environmental Protection Agency

United States Environmental Protection Agency
Office of Water (4204M)

www.epa.gov/owm/water-efficiency/index.htm

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