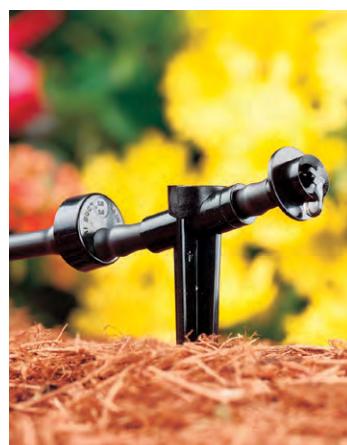
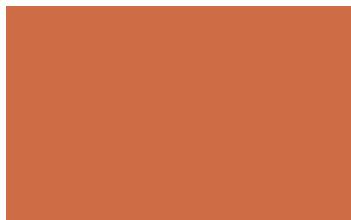
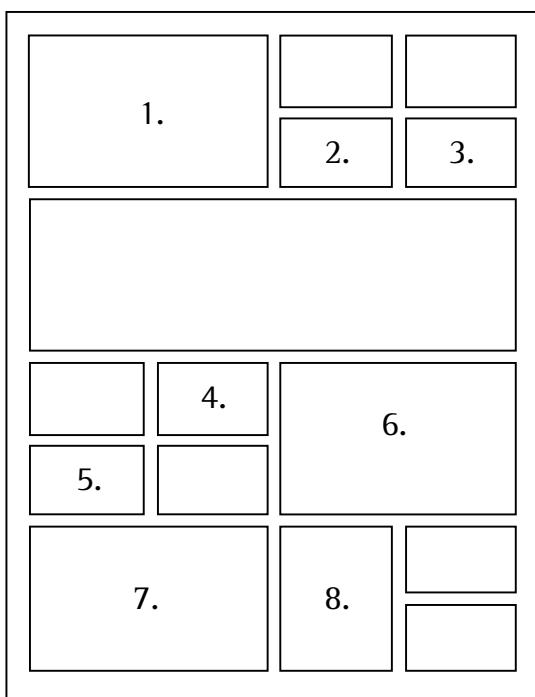


# Saving Water With Microirrigation: A Homeowner Guide



# Table of Contents

What Is Microirrigation? .....	1
Why Microirrigate? .....	1
How Can Microirrigation Work on My Landscape? .....	2
Tips for Do-It-Yourselfers .....	3
Go With a Pro.....	5
When and How Much to Water.....	5
Maintaining Microirrigation.....	6



## Cover Photos

1. *WaterSense Landscape Photo Gallery*
2. *Photo courtesy of Hunter Industries Incorporated*
3. *Photo courtesy of Hunter Industries Incorporated*
4. *Photo courtesy of Hunter Industries Incorporated*
5. *Photo courtesy of The Toro Company*
6. *WaterSense Landscape Photo Gallery*
7. *WaterSense Landscape Photo Gallery*
8. *Photo courtesy of Rain Bird Incorporated*

The U.S. Environmental Protection Agency's WaterSense® program labels products, homes, and programs that help consumers save water. Along with the labeled products, another way to save water outside is to install or retrofit a landscape irrigation system with microirrigation technology. The following guide provides a brief overview of the technology and tips for homeowners interested in using microirrigation; more detailed information can be found in *Adding Microirrigation to Your Services: A Mini-Guide for Irrigation Professionals*, which is available at [www.epa.gov/watersense/microirrigation](http://www.epa.gov/watersense/microirrigation).

## What Is Microirrigation?

Microirrigation is a low-pressure, low-flow-rate irrigation that helps reduce overwatering on residential and commercial landscapes. Also referred to as low-flow, trickle, or drip irrigation, microirrigation delivers water directly to the root zone of plants, where it is needed most. By delivering water more slowly and over a longer period of time, it allows the water to better penetrate soil and reduces runoff.

A microirrigation system can be incorporated into a newly designed landscape, installed in an existing landscape, or added to a landscape that already has an irrigation system. While it can be used in most landscapes, it is best suited for plants and trees that are spaced somewhat apart, as opposed to turfgrass on lawns,

where spray sprinkler systems provide better coverage. Spray sprinkler irrigation is the most common form of landscape irrigation in the United States. If managed improperly, however, water that comes from spray sprinklers can form puddles, evaporate, or land in soil beyond plant roots, causing outdoor water waste.

This guide provides an overview of the benefits of microirrigation, where it works best, how to use it efficiently, and tips for the do-it-yourselfer on how to design, install, and maintain a microirrigation system. And if you're not the do-it-yourself type, there are suggestions for consulting a certified irrigation professional to ensure the system performs well and saves water.

**Because microirrigation provides water directly at the root zone of plants at a lower flow rate, it allows the water to soak into the soil, rather than run off, and applies water only where it is needed.**

## Why Microirrigate?

The average American home uses 30 percent of its water outdoors, but that percentage can be much higher in drier regions of the country. As much as 50 percent of outdoor water can be wasted due to runoff, wind, or evaporation, in part because irrigation systems are not installed, maintained, or used properly. Because microirrigation provides water directly at the root zone of plants at a lower flow rate, it allows the water to soak into the soil, rather than run off, and applies water only where it is needed.

Research indicates that microirrigation systems use between 20 to 50 percent less water than conventional spray sprinkler systems. Installing

a microirrigation system instead of a traditional system can save a typical home more than 25,000 gallons of water per year.

With microirrigation, bare areas of soil or mulch between plants are not irrigated, which not only saves water, but reduces weed growth. Since water does not pool and the landscape is healthier, the need for added herbicides or pesticides decreases. Finally, these systems help protect local water bodies such as streams, lakes, and rivers, because they reduce runoff caused by the inefficient watering that can sometimes be associated with spray irrigation.

# How Can Microirrigation Work on My Landscape?

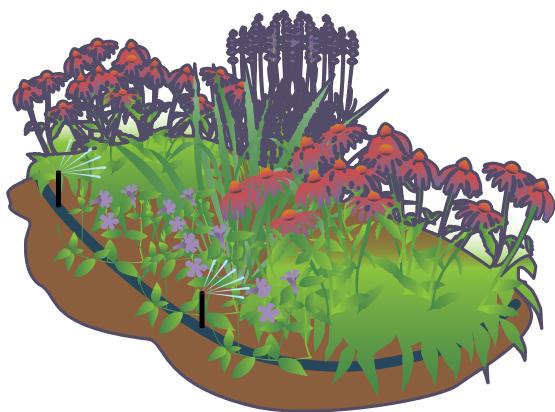
Whether designing a new landscape or developing an irrigation system for an existing one, you can incorporate microirrigation techniques and equipment. Even if you have an existing irrigation system with spray sprinklers, it can be retrofitted with microirrigation in areas where the landscape could benefit from direct water delivery to plant roots.

It's important to note where and on which types of plants microirrigation works best.

The illustrations on this page describe the landscape and plant types best-suited for microirrigation.

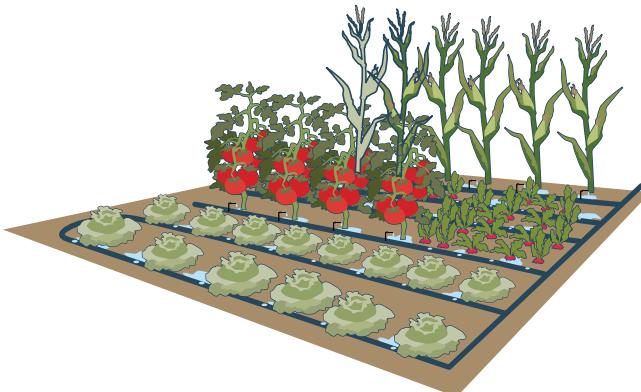
## Flower Beds

Flowers can benefit from a microirrigation system that provides water only to the plants that need it.



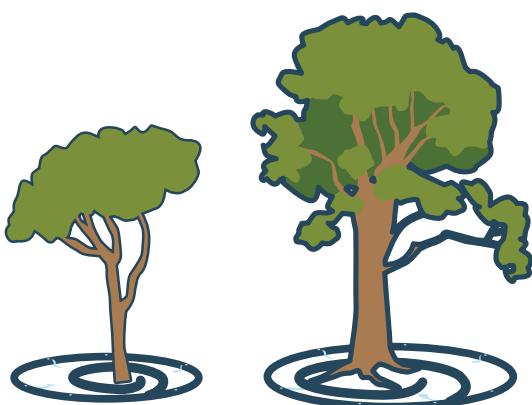
## Vegetable Gardens

In rows or patches, vegetable plants can get all the water they need while decreasing the likelihood of weed growth and reducing pesticide use.



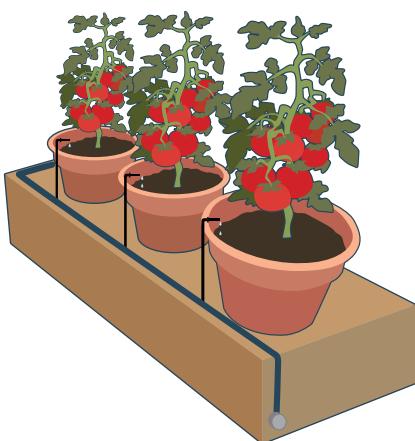
## Trees and Shrubs

Whether circling a tree or running along shrubbery, microirrigation can keep the roots moist without wasting water where it's not needed.



## Container Plants

Microirrigation works for potted plants too. On balconies, porches, or decks, plants in containers can benefit from water lines that deliver water right to the roots.



# Tips for Do-It-Yourselfers

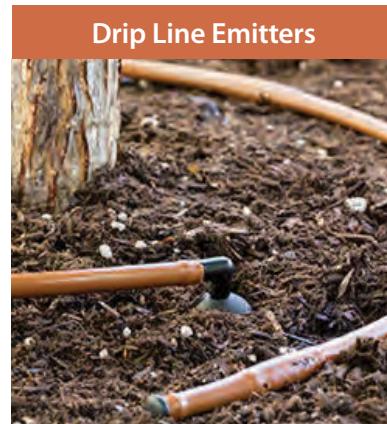
There are a few things to consider when designing and installing a microirrigation system, including the plants in your landscape and how much water they need. This will help determine what types of water-emitting devices should be used and where they should be placed. If starting with a new landscape, the ideal approach is to organize the plants by type and water needs into different irrigation zones. This is also known as hydrozoning.

Separating the landscape into irrigation zones helps ensure that the water needs of different types of plants are met based on plant type, soil type, and sun exposure. To water most efficiently, zones should group plants with similar irrigation needs together in the landscape. For example, turfgrass and shrubs have different irrigation needs and should be in different irrigation zones. However, even if you aren't starting with a new landscape, you can look for areas where microirrigation will work best and tailor the devices used to different types of plants and landscape conditions.

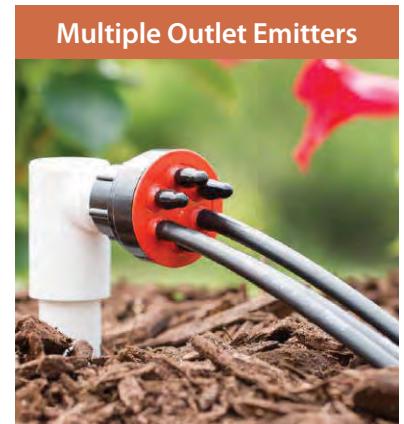
Following are some of the most common types of water emission devices used in microirrigation:

- **Drip line emitters** are tubes with evenly spaced emitters that water at a uniform rate.
- **Multiple outlet emitters** have a centralized assembly with multiple emission points.
- **Point-source emitters** discharge water from a single point that can extend from a long pipe.
- **Microsprays** spread water over a larger area, but still at a low pressure and low flow.

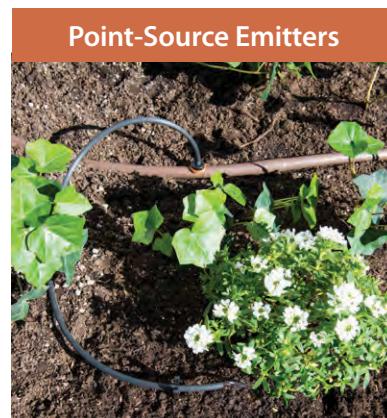
When installing a microirrigation system, it's important to have the correct number of emission devices to deliver the right amount of water to the different plants. The types, number, flow rate, and spacing of emitters used can vary by zone and plant type. Following are a few tips for different types of plants:



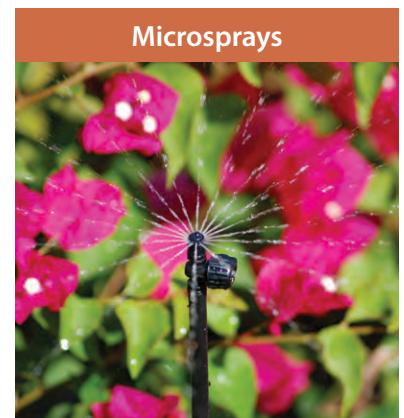
Drip Line Emitters



Multiple Outlet Emitters



Point-Source Emitters



Microsprays

*Photos courtesy of Hunter Industries Incorporated*

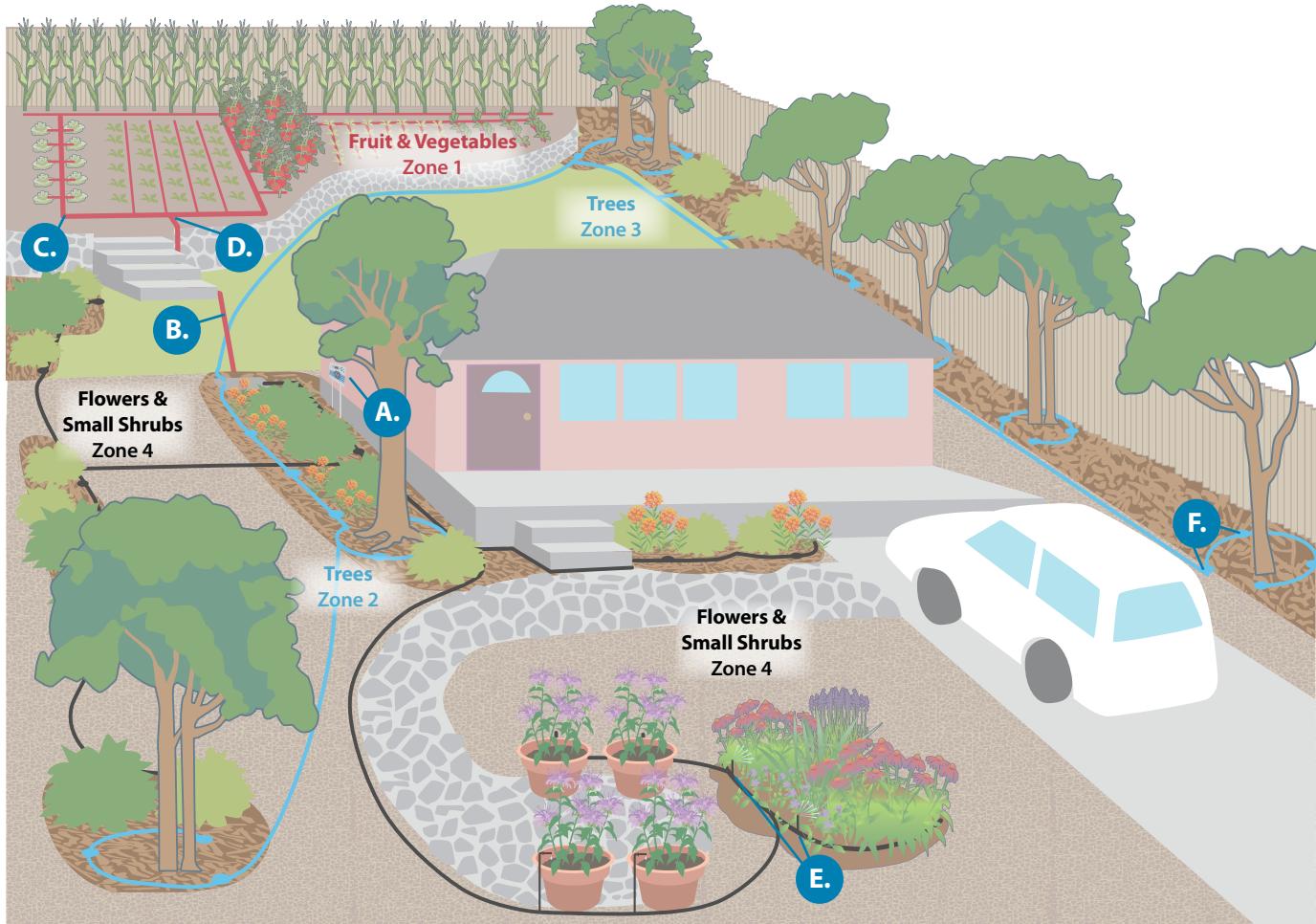
- Flower beds and vegetable gardens may only need one emitter per plant.
- Shrubs often require one or two emitters per plant, depending on their type, size, and age.
- Trees typically benefit from multiple microsprays or drip line emitters placed in concentric circles below the edge of the tree canopy.

Other considerations for installation include the size of the pipes used, the water line pressure, and whether filtration is needed. More microirrigation installation tips for experienced do-it-yourselfers are available in WaterSense's technical guide, *Adding Microirrigation to Your Services: A Mini-Guide for Irrigation Professionals* at [www.epa.gov/watersense/microirrigation](http://www.epa.gov/watersense/microirrigation).

# A Bird's Eye View of a Microirrigated Landscape

The drawing below illustrates how a landscape can be "hydrozoned" according to different plant types with different watering needs, and which type of microirrigation equipment and devices might be appropriate for this landscape. Microirrigation can be easily installed to water a single zone near a house, or as an irrigation system for the entire landscape.

Because landscapes and watering needs will vary by region, you can consult a certified irrigation professional (see page 5) to develop a system that works best for your needs. For more information about specific product types and their installation, consult the guides provided by product manufacturers.



**A. Controller**



Photo courtesy of Rachio

**B. Lateral Supply Tubing**



Photo courtesy of Rain Bird

**C. L Joint**



Photo courtesy of Rain Bird

**D. T Joint**



Photo courtesy of Rain Bird

**E. Microspray Emitter**



Photo courtesy of Rain Bird

**F. Drip Line Emitter**



Photo courtesy of Hunter Industries Incorporated

**Note:** Irrigation lines can be a tripping hazard if they cross pathways or areas with high foot traffic. Make sure to bury lines where possible to avoid trips and falls.

# Go With a Pro

If you are looking for a contractor to install or retrofit a system with microirrigation, WaterSense recommends consulting an irrigation professional certified by a WaterSense labeled program. These qualified contractors have verified knowledge of water-efficient irrigation methods and technologies. To find a certified professional near you, see WaterSense's Directory of Certified Irrigation Professionals ([www.epa.gov/watersense/find-pro](http://www.epa.gov/watersense/find-pro)). Following are a few questions and answers to help ensure your contractor installs a high-performing, water-efficient system.

## How can a contractor assist with a microirrigation system?

The contractor will scope out your landscape to locate the different types of plants for each zone and determine the appropriate type and number of emitters to deliver the right amount of water to each. The contractor should also check your incoming water pressure to see if it is higher than recommended for the microirrigation system, to determine if a pressure regulator is needed. If you already have an irrigation system, a contractor will check it for leaks, clogged emitters, and other issues. The contractor should also review your irrigation schedule to ensure the appropriate amount of water is being applied and address the change in seasons, based on your region.

## What should I look for in a newly installed system?

Walk through the landscape with the contractor and ask for a demonstration of how to use the system (and program the irrigation controller, if one is installed). Drip emitters should be spaced properly to ensure



even distribution, all the connections should be safely secured, and tubing should be positioned so as not to cause a tripping hazard. Remember to ask how often the system will need maintenance, and if the contractor will return to audit or repair the system or update watering schedules.

## What information will the contractor provide?

The contractor should provide the design of the microirrigation system, quantity and types of emitters, and expected installation time. Your contractor may also recommend the following:

- For a new irrigation system installation, some cities require rain sensors on irrigation systems or use of reclaimed water, if available.
- Depending on your source of water, your system may need filtration, or connection to a backflow preventer may be required to avoid contaminated water entering the potable water system.
- If your water pressure is higher than recommended for the system, the contractor will likely install a pressure regulator to reduce water waste.
- The contractor may also recommend replacing a clock timer on an existing system with a weather-based irrigation controller, which is described in more detail below.

# When and How Much to Water

Even with an efficient method such as microirrigation, overwatering can occur when irrigation schedules are set without careful consideration for plants' actual water needs and weather conditions. A certified irrigation professional can help you develop a watering

schedule that best fits your landscape's needs, or you can note the following factors when scheduling watering (and make sure to revisit your water schedule with every change of seasons):

- **Location, location, location.** Landscape watering needs vary by the type and location of plants, as well as the soil in which they are planted. Drought-tolerant plants and those located out of direct sunlight do not need watering as often.
- **Watch the weather.** Instead of a clock timer on your irrigation system, consider a WaterSense labeled weather-based irrigation controller. These independently certified devices do the thinking for you by using local weather and soil conditions to determine when and how much to water your landscape. Check if your local utility offers a rebate on these devices at [www.epa.gov/watersense/rebate-finder](http://www.epa.gov/watersense/rebate-finder) and learn more about smart controllers at [www.epa.gov/watersense/irrigation-controllers](http://www.epa.gov/watersense/irrigation-controllers).
- **Timing is everything.** Avoid watering in the middle of the day, when the sun's heat can evaporate water before it can be absorbed into the soil.
- **How (old) does your garden grow?** Newly established plants need to be watered more frequently, but once they are established, watering frequency can decrease. As shrubs and trees grow, they require more water to remain healthy; however, since their roots are better developed, much of their watering needs can be satisfied by rainfall, depending on the region.

## Think Globally, Plant Locally

Plants native to your region often require less water. Many utilities provide lists of regionally appropriate plants. Your local nursery, cooperative extension service, or gardening group can also provide advice on the right amount of water for your region or plant types.

## Maintaining Microirrigation

Proper maintenance is essential to a water-saving microirrigation system. Water lines at ground level are susceptible to weed growth, freezing, and damage from landscape work or animals. Emitters can also become clogged without preventive care. Following are a few key maintenance steps for successful microirrigation:

- **Remove weeds when needed.** While direct water delivery can help reduce weed growth, weeds can still grow into the emitters, causing clogs and reducing efficiency. Remove weeds at their roots to avoid emitter damage.
- **Filter for a free flow.** Emitters can also become clogged by particles that enter the irrigation system. Use filters to block these particles, especially in systems fed by non-potable water, and clean them frequently.
- **Is winter coming?** At the end of the irrigation season, and before the first freeze, the system should be flushed of standing water, to avoid

the water lines freezing during winter months and causing cracks in the pipes.

- **Look for leaks.** In addition to cracks in frozen pipes, landscape work and animals can damage tubing, pipes, and emitters and cause water-wasting leaks. Flow meters and other devices can help detect leaks before they become a drain on your water bill and reduce flow to plants.

With the proper design, installation, and maintenance, along with a little help from a WaterSense labeled irrigation controller and a certified professional, your microirrigation system can save a significant amount of water while maintaining a healthy landscape and enhancing your home's curb appeal. For more information, including more technical instructions for installing or retrofitting a system, visit [www.epa.gov/watersense/microirrigation](http://www.epa.gov/watersense/microirrigation).

