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Water Efficiency

[Water Efficiency Programs & Services](#)

Information about the Portland Water Bureau's Water Efficiency Program.

[Indoor Water Efficiency](#)

Information on water efficiency indoors.

[Outdoor Water Efficiency](#)

Information on saving water outdoors.

[Resources](#)

Videos, brochures and information for water conservation.

[Multifamily Water Efficiency](#)

Information and services for multi-family residents, owners and managers.

[Commercial Water Efficiency](#)

Information and services for business, industrial, and government customers.

[Green Building](#)

Information on graywater reuse, rainwater harvesting, WaterSense and more.

[Leak Detection](#)

Information on how to find and repair leaks - for home and commercial.

[Water Efficiency Devices & Information](#)

Portland Water Bureau customers can order free water efficiency devices for homes and businesses.

Water Efficiency

Master the 5-minute Shower!

Some are naturally inclined to take short showers. For the rest of us there is the 5-minute showertimer.



The Portland Water Bureau's **Water Efficiency Program** can be reached at 503-823-4527 or conserve@portlandoregon.gov.

Efficiency Programs & Ser

[Water Conservation Device](#)
Online form

[Contact Us](#)
Find out how you can get in touch with the efficiency program.

[Water Efficiency Program Factsheet \(PDF\)](#)
An overview of the Portland Water Bureau's water efficiency programs.

[Annual Report \(PDF\)](#)
Get details about the conservation program's accomplishments in FY 2008-2009.

[Hazelwood Water Conservation Demonstration Garden \(PDF\)](#)
Located at the East Portland Neighborhood Office, the Hazelwood Water Conservation garden showcases drip irrigation, gravel mulch and water wise plant choices.

[Home Water Assessment \(PDF\)](#)
The Portland Water Bureau has collaborated with Energy Trust of Oregon to offer a Free Water Audit and Home Energy Review to look for ways to save water and energy inside your home.

[School Assembly Program](#)
Schools in the Portland Water Bureau service area can schedule a FREE water conservation themed assembly program.

[Water Efficiency Survey](#)
Information on what a free water efficiency survey entails and how it might be useful to your business.

[Water Management & Conservation Plan](#)
Link to document in the "library"

Water Efficiency Programs & Services

The Portland Water Bureau's efficiency program offers information and technical resources to all customers about using water efficiently and cost effectively. The Portland Water Bureau (PWB) has been implementing water conservation programs since 1990. PWB offers a wide variety of programs including:

- **Youth and community education and outreach.** Through [school assembly programs](#), summer radio campaigns, community events, and presentations the Portland Water Bureau provides indoor and outdoor water conservation information to children, gardeners, homeowners, and commercial property managers.
- **Conservation device distribution.** Through its website, conservation hotline, and customer service center, the Portland Water Bureau distributes [outreach materials and water conservation devices](#) throughout the year.
- **Technical assistance to commercial and residential customers.** The Portland Water Bureau's [Business Industry and Government program](#) provides on-site water efficiency surveys and technical assistance to commercial customers and large multi-family facilities. In addition, a limited number of free home water assessments are available to single-family residential customers.
- **Pilot projects and partnerships.** The conservation program periodically field tests new water efficiency technologies such as soil moisture sensors and is actively participates with collaborative organizations such as the [Regional Water Providers Consortium](#), [Sustainability at Work](#), and the [Alliance for Water Efficiency](#).

PDF Information

Some of the links on this page are to PDF documents. To open PDF files you will need Adobe Acrobat Reader installed on your computer, it is available for free from [Adobe.com](#).



Bathroom and kitchen faucets account for 16 percent of the water used in an American home. In a typical house, faucets run for around 8 minutes a day and consume nearly 11 gallons of water per person per day. Reducing faucet water use and repairing leaks is an easy way to save water and money around the house!

How much water does my faucet use?

Prior to 1994, faucets used between 2.75 and 7.0 gallons per minute (gpm). Today, federal requirements state that residential bathroom and kitchen faucets have a maximum flow rate of 2.2 gpm, and non-residential public restrooms of 0.5 gpm. Faucets are often fitted with a device called an aerator that screws onto the end of the faucet. They are designed to mix air with water and produce a more full flow.

To determine your faucet flow rate, start by checking the side of your current aerator where it is often stamped into the side of the metal. If it's not there, order a free home water audit kit from the Portland Water Bureau* to determine your faucet flow rate. The actual flow rates may be different than what is stated on the aerator due to debris, high or low water pressure, and damage.

Retrofit Your Faucet

One of the easiest ways to save water and money with your faucet is to install a water-efficient aerator. Bathroom faucet aerators that flow between 0.5 to 1.0 gpm are generally adequate for hand washing. Kitchen faucets may require a higher flow rate such as 1.5 to 2.0 gpm to fill a sink or spray food off of dishes. Reducing the flow can increase the wait time for hot water.



Typical bathroom (left) and kitchen (right) faucet aerator.

* Portland Water Bureau customers can request a free home water audit kit or water conservation devices like faucet aerators by calling (503) 823-4527 or visiting: www.portlandoregon.gov/water/conservation

Install a WaterSense fixture

If it's time for you to replace a new bathroom or kitchen faucet, consider buying a WaterSense approved faucet fixture.



WaterSense is the U.S. Environmental Protection Agency's product labeling program for quality, water-efficient products. Learn more about the program by going to: <http://www.epa.gov/watersense>

Repair your leaky faucet

Is your faucet dripping? If the answer is yes, you may be wasting a lot of water. For example, a faucet that leaks at one drip per second can waste over 8 gallons of water per day, or around 2,900 gallons per year.

In some cases, the repair can be relatively simple, such as replacing a worn washer. Learn more about diagnosing a faucet leak and how to make minor repairs with the Portland Water Bureau's brochure "Yes! You can Fix a Leaky Faucet!".

To get a copy call (503) 823-4527 or download it at:

www.portlandoregon.gov/water/conservation



Easy Faucet Water Conservation Tips

- Turn the bathroom faucet off while brushing your teeth.
- When washing dishes by hand, fill the sink or a pan with soapy water instead of letting the faucet run while soaping dishes. Rinse dishes in a filled sink or a pan of water.

Replace your toilet

Today it's easy to find a water-saving and high-performance toilet thanks to WaterSense – a national program sponsored by the United States Environmental Protection Agency. Only toilets that are 20 percent more water-efficient than standard toilets, and pass rigorous independent performance testing receive the WaterSense label.



A new WaterSense High-Efficiency Toilet could save a family of 4 over \$300 per year on their water and sewer bill. Review the table below to see how much a toilet upgrade could save you per person in your household.

Toilet flush volume (gallons/flush)	Flushes per person per day*	Gallons used per year	Cost per gallon**	Toilet cost per person per year
1.28	5	2336	\$0.0129	\$30.13
1.6	5	2920	\$0.0129	\$37.67
3.5	5	6388	\$0.0129	\$82.41
5.0	5	9125	\$0.0129	\$117.71

* National estimates say that each person flushes the toilet approximately five times daily.

** based on the 7/1/10 City of Portland residential rates for 1 Ccf at \$9.65 (\$6.92 for sewer and \$2.73 for water)

Another resource for choosing a new toilet is the Maximum Performance Testing study of toilet performance. It is an excellent, unbiased source for information about the performance of popular toilet models and brands. Download a free copy here:

http://www.cwwa.ca/freepub_e.asp

Composting toilets

Composting toilets are toilets designed to use little or no water. Toilet waste is treated on site through managed aerobic decomposition.

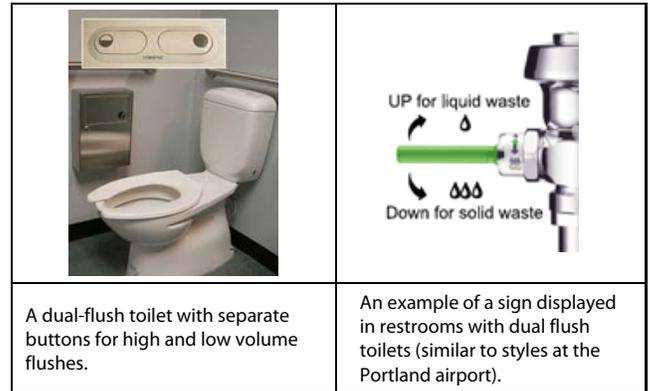
Composting toilets are allowed by Oregon plumbing code if the model and brand complies with the National Sanitation Foundation's NSF/ANSI Standard #41. Several composting toilet models are available on the market today. For more information visit: <http://oikos.com/library/compostingtoilet/>.



Dual-flush toilets

A dual-flush toilet is designed to give the user a choice between a standard volume flush for solid waste (usually 1.28 to 1.6 gallons), and, a lower volume flush for liquids and toilet paper (0.8 to 1.0 gallons). Dual-flush toilets are becoming more common and can even be found at the Portland Airport in Oregon.

Preliminary field testing of dual-flush toilets in Washington, California, Oregon, Utah, and Canada, is showing that dual-flush toilet consumption is very similar to the 1.28 gallon per flush High-Efficiency Toilets.



A dual-flush toilet with separate buttons for high and low volume flushes.

An example of a sign displayed in restrooms with dual flush toilets (similar to styles at the Portland airport).

Using gray water to flush a toilet

Gray water – or wastewater from bathtubs, showers, washing machines or bathroom sinks – has been approved for flushing toilets in Oregon as an alternate method to the state plumbing code. A variety of water reuse systems have been approved for sale in the U.S. and can be bought “off-the-shelf”. Get more information on sizing, installing and maintaining your system from the Oregon Building Codes Division by calling 503-823-7300, or visiting:

<http://www.cbs.state.or.us/external/bcd/pdf/0990.pdf>

Using rainwater to flush a toilet

If you are thinking about harvesting rainwater for flushing toilets, you will need to follow the relevant rainwater harvesting code guides. Contact the Oregon Building Codes Division at 503-823-7300, or by visiting:

<http://www.cbs.state.or.us/external/bcd/pdf/3660.pdf>

If you live in Portland, get the specialty code at: <http://www.portlandonline.com/shared/cfm/image.cfm?id=68627>

Did you know that your old toilet could have another life as part of a roadway? If you decide to replace your toilet, (or sink!) don't forget that it can be recycled. Contact Metro's Recycling Hotline 503-234-3000 for locations near you.

Showers account for roughly 17 percent of the water used indoors and are typically the third-largest use of water in the average home. According to a national study of residential water use, the average American shower uses roughly 17 gallons of water and lasts for around 8 minutes. The average bath uses 24 gallons of water and accounts for roughly 2 percent of the water used indoors. Taking the time to think about how you can conserve water in the shower or bath will help you save water, energy, and money!

Determine how much water your shower uses

The amount of water consumed while taking a shower depends on two main factors: the flow rate of the showerhead, and how long the shower lasts.

- **Flow rate:** Prior to the 1980s, most showerheads used 5 gallons-per-minute (gpm) or more. By the mid-1990s federal requirements mandated that new showerheads use no more than 2.5 gpm. Most showerheads are marked with the flow rate on a small silver button in the center of the head.



- **Shower length:** Changing how long you spend in the shower is the least expensive way to conserve water. A 10-minute shower will use twice as much water as a 5-minute shower taken at the same flow rate. Some people believe that a lower flow rate leads to longer shower times; however, studies show that flow rates have little influence on the duration of the shower.

To determine exactly how much water your showerhead uses, use a flow measuring bag provided in the Portland Water Bureau's home water audit kit.

Order an audit kit and other water conservation devices like a water-efficient showerhead and five-minute shower timer free of charge, by calling (503) 823-4527 or going to the Portland Water Bureau's website: www.portlandoregon.gov/water/conservation.

Replace your showerhead

Another great way to conserve water in the shower is to make sure you are using a water-efficient showerhead. Showerheads generally last about 10 years. As showerheads age, they may wear and leak, or the nozzle holes can enlarge or plug, causing them to use more water or change the pattern of the spray so that the shower spray no longer feels even and comfortable. If you have showerheads that are more than 10 years old, it may be time to replace them.

Today there are many well-performing showerheads on the market that flow at 1.5 gpm or less! The performance and quality of showerheads can vary greatly. Talk to representatives at your local plumbing supply store and visit the WaterSense web site to make sure you purchase a showerhead that is right for you.

WaterSense labeling

WaterSense is the U.S. Environmental Protection Agency's (EPA) product labeling program for quality, water-efficient products. The EPA will soon be labeling



showerheads that have been tested for performance and are water-efficient. Look for the WaterSense label on showerheads in 2010. More information can be found at: <http://www.epa.gov/watersense>

Energy savings

Hot water for showers is one of the biggest energy users in the home after the furnace. Switching to a water-efficient showerhead not only cuts down on water use, but also the energy needed to make and keep that water hot.

Water consumption in the bath

The amount of water used while taking a bath varies depending on the size of the bathtub and the level to which the user fills the tub. The American bathtub size has generally decreased over time and today the typical modern bathtub (non-jetted) holds between 25 to 45 gallons. A person who only fills the tub half-way will consume approximately 20 gallons while bathers that fill the tub up to (or exceeding) the overflow valve will use 40 to 50 gallons.

To reduce water used while taking a bath follow these helpful hints:

- **Fill the tub to your belly button.** Only fill the bathtub as much as you need.
- **Use a small tub insert when possible.** Bathing babies, small children, and pets requires much less water, so use a small tub insert or baby bathtub.
- **Don't over fill the tub.** Over filling the tub forces unneeded water into the overflow drain.

Estimated Water Use by Duration and Bathing Method						
Device	Duration of Event in Minutes					
	5	10	15	20	25	30
Tub half-full	20 gallons	20 gallons	20 gallons	20 gallons	20 gallons	20 gallons
Tub full	45 gallons	45 gallons	45 gallons	45 gallons	45 gallons	45 gallons
Whirlpool tub	80 gallons	80 gallons	80 gallons	80 gallons	80 gallons	80 gallons
1.5 gpm showerhead	8 gallons	15 gallons	23 gallons	30 gallons	38 gallons	45 gallons
2.5 gpm showerhead	13 gallons	25 gallons	38 gallons	50 gallons	63 gallons	75 gallons
5.0 gpm showerhead	25 gallons	50 gallons	75 gallons	100 gallons	125 gallons	150 gallons
	Extra-Efficient	Efficient	Non-Efficient		Wasteful	

Table is adapted from the Alliance for Water Efficiency:

http://www.allianceforwaterefficiency.org/Residential_Shower_Introduction.aspx

About 22 percent of the water used in a typical residential home is for washing clothes. Estimates say that a four-person household with a standard washing machine will generate more than 300 loads of laundry per year, consuming 12,000 gallons of water. A high-efficiency front-loading washing machine can reduce water consumption by more than half, saving you energy and money.

Top-versus front-loading washing machines

Top-loading or vertical-axis washing machines are designed to suspend clothes in soapy water while an agitator moves laundry around dissolving and removing stains and dirt. Design



has changed little since they were created in the 1940s and many top-loading washing machines still use up to 40 gallons per load because they require a large amount of water to keep clothes suspended.

Horizontal-axis, or front-loading washing machines use only 15-30 gallons of water to wash the same amount of clothes as a top-loading one. A constantly rotating drum lifts clothes in and out of the water removing dirt and stains, eliminating the need to suspend them in water. Studies have shown that this process is not only gentler on fabric and more water-efficient, but also requires less laundry detergent and saves on the energy used to heat water.

High-efficiency washing machines

Today, the most efficient front-loading washing machines use as little as 5 gallons of water! If you are considering the purchase of a high-efficiency washing machine, do your research to find an efficient model that works for you. The Alliance for Water Efficiency and Consortium for Energy Efficiency have great web sites for more information:

- http://www.allianceforwaterefficiency.org/Residential_Clothes_Washer_Introduction.aspx
- <http://www.cee1.org/resid/seha/rwsh/rwsh-main.php3>

Incentives for efficient washing machines

If you purchase a high-efficiency washing machine, check with the [Oregon Department of Energy](#) and [Energy Trust of Oregon](#) for residential or business energy tax credits and rebates.

Multi-family laundry facilities

Central laundry facilities in multi-family buildings typically use far less water per occupant than providing in-unit washing machines and dryers. A 2001 study by the National Research Center showed that tenants with in-unit washing machines use 3.3 times as much water and 5 times as much energy for laundering than tenants that use common-area laundry rooms.

The convenience of having a washing machine at hand combined with the fact that most apartment dwellers do not pay their own water and sewer bill creates conditions in which tenants tend to wash smaller loads more frequently. If tenants are not charged directly for water use, central laundry facilities can reduce water use and therefore water and sewer fees.

Of course, in-unit washing machines and dryers are generally offered as a convenience to tenants for marketing purposes in which case consider purchasing high-efficiency machines. High-efficiency washing machines use 40 percent less water and 60 percent less energy than a typical washing machine.

Laundry Water Conservation Tip

- Remember to operate the clothes washing machine with full loads only.

Portland Water Bureau customers can request free water conservation devices, by calling (503) 823-4527 or visiting: www.portlandoregon.gov/water/conservation

In the dishwasher versus hand washing debate, using an automatic dishwasher to clean dishes generally wins for both water and energy efficiency. Most conventional dishwashers installed in U.S. households today use 7-14 gallons per load and account for less than 2 percent of the water used in an average American home. Despite the small portion of overall water consumption by dishwashers, newer machines are substantially more water-efficient than older models. Today the most efficient (full-size) machines use a maximum of 7 gallons per load - and some as little as 4.5 gallons. Energy savings also result from upgrading to an efficient dishwasher because fewer gallons of water need to be heated per cycle.

Choosing a Dishwasher

If you are considering replacing or installing dishwashers at your property, investigate the possibility of upgrading to a high-efficiency model. ENERGY STAR is a national program that labels dishwashers if they are energy efficient. This can also be a good indicator that the machine is also water efficient. Standard size Energy Star dishwashers use a maximum of 5.8 gallons per cycle.



If you purchase a high-efficiency dishwasher, check with the Oregon Department of Energy to see if residential or business energy tax credits are available.

Pre-rinsing

The next time you turn on the faucet to pre-rinse your dinner plates, remember that five minutes of pre-rinsing in the sink using running water can use up to 12 gallons of water depending on your faucet. Using the pre-rinse cycle (if your dishwasher has one) to rinse dishes uses approximately one gallon of water.

Another way to prepare dishes for the dishwasher is to do what most appliance manufacturers recommend and scrape (not rinse) dishes before placing them in the dishwasher.

Easy Dishwashing Water Conservation Tips!

- Operate the dishwasher with full loads only.
- If hand-washing dishes, wash them in a filled sink and let the water run only while rinsing items under the faucet.

Choosing a Cycle

Most dishwashers provide a variety of cycle choices. Using the right wash cycle will increase cleaning and water efficiency. Choose the shortest wash cycle for lightly soiled loads and the “heavy” or “pot/pan” cycle for heavily soiled items. Using the heavier setting when it’s not needed won’t clean dishes any better – it will just waste water.

Loading

Operate the dishwasher with full loads only. Load dishes properly so that water is able to reach all dish surfaces. Incorrect loading may cause part or the entire load to be re-washed. To help you load correctly follow these helpful [dishwasher loading tricks](#) from *Real Simple* magazine:

- Face plates toward the center of the dishwasher.
- Put bowls on the top rack facing center so water can reach all surfaces more easily.
- Place large platters and cookie sheets on the bottom rack along the outer edges to prevent them from blocking detergent and water from other dishes.
- Place large serving spoons too big for the silverware basket horizontally across the top rack and facedown to not collect water.
- Large pots, serving bowls, and casseroles belong on the bottom rack at a slight angle to ensure proper water contact.
- Glasses should go on the top rack between tines, not over them, to prevent them from rattling or coming out with tine marks.

Portland Water Bureau customers can request free water conservation devices, by going to our website, www.portlandoregon.gov/water/conservation, or calling (503) 823-4527.



Indoor Water Efficiency

[Faucets](#)

Bathroom and kitchen faucets account for 16% of the water used in an average residence.

[Toilets](#)

Learn about how much your leaky or old toilet is costing you

[Shower\Bath](#)

Showers and baths use 19% of the water in an average household

[Laundry](#)

Find out more about water efficient washing machines and laundry practices

[Dishwashers](#)

Find out how to conserve water while doing the daily dish load.

[Home Water Use Audit](#)

Performing an audit on your water use will help you understand where you can start saving the most water.

Home Water Use Audit - Printable Version

Performing a **Home Water Use Audit** will help you understand where you can start saving the most water. This process is simple and may take up to an hour to complete. It will help you locate leaks, prioritize fixing them, and help you start saving money and water.

The Portland Water Bureau offers free Home Water Audit Kits to its customers. This kit includes a bag to measure shower and faucet flow rate, toilet leak detection tablets, a drip gauge to measure leak rate, and instructions for use.

To request a Home Water Audit Kit or other free water conservation devices please fill out our [web request form](#).





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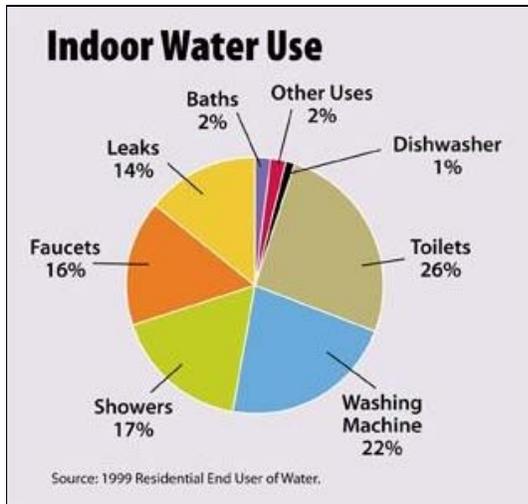
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Indoor Water Efficiency



Portland Water Bureau customers have already discovered that using water wisely indoors is simple!

To order free water conservation devices and information please fill out our [web request form](#).

PDF Information

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Outdoor Efficiency

[Water-Efficient Landscapes](#)

Choosing the right plants for your landscape will increase water efficiency and beauty

[Water-Efficient Lawns](#)

Find out how to plant and maintain a healthy green lawn without using too much water.

[Irrigation](#)

Learn how to irrigate your landscape efficiently whether you irrigate by hose and sprinkler, drip irrigation, or if you have an in-ground automatic system.

[Landscape Maintenance](#)

Tips for keeping your water efficient landscape healthy and beautiful year round.

[Plant Guide](#)

Looking for plants that don't need a lot of water? Get our guide "Water Efficient Plants for the Willamette Valley"

Outdoor Water Efficiency



In the Portland area, we use nearly twice as much water on a warm summer day as on a winter day. During hot dry weather, water demand increases, streamflows into the reservoirs decrease, and the volume of water in the reservoirs decreases. While Portland currently has enough water to meet summer demand by supplementing [Bull Run](#) water with groundwater from the [Columbia South Shore Well Field](#), conserving water supports stream flows for fish and other important uses.

Here you can learn about choosing water efficient plants, landscape irrigation and maintenance.

PDF Information

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PLANTING & MAINTAINING YOUR LAWN





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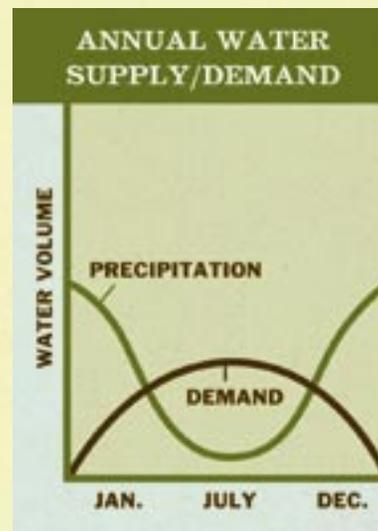


WATER SUPPLY

Nearly 30 percent of the water used in a single-family residence is used in the summer to water lawns. As a result, the Portland metropolitan area can use two to three times as much water in the summer months than in the winter months. This can be a problem because of the limited storage of our reservoirs and the lack of summer rainfall in the Pacific Northwest.

As our community grows, so will the water supply problem. We have two options to meet summer demands:

1. We can invest in costly new supply facilities, or
2. We can conserve water to reduce the demand on our existing supply.



Water conservation alone will not eliminate the need to increase our water supply, but it can make a big difference. It may also postpone or reduce our need to build expensive new supply facilities.

LOOKING AT LAWNS

We love lawns. A lawn can be a serene oasis, an open expanse where kids can play, and a source of pride. But they are thirsty. Lawns use about 2-1/2 to 3 times as much water as other plants in the landscape. Current research indicates that lawn watering typically results in as much as 50 percent water waste. This happens when water is lost to evaporation, runoff, overspray and overwatering.

The information in this booklet will help you learn how to properly install and maintain your lawn, keeping it green and healthy with the appropriate amount of resources — fertilizer, water, and your time.

BENEFITS OF TURF

There are many benefits to planting grass in landscapes. Proper soil preparation, planting, and routine maintenance are crucial to maximizing these benefits.

AESTHETICS - Turfgrass is versatile and functional. A well-maintained landscape can increase property value and create a sense of community pride. It complements trees and shrubs, and is ideal for foot traffic because it withstands trampling more than any other type of plant.

RECREATION SURFACE - Grass provides an excellent recreation surface for outdoor activities. It is a low-cost safety cushion for sport participants and spectators, a healthy surface for picnics, yard games and other outdoor activities, as well as a delight to walk on. It is also an ideal surface for dogs and other pets.

REDUCES RUNOFF AND SOIL EROSION - Grass is one of the most effective plant materials to reduce runoff and prevent soil erosion. When it rains or when we water, pollutants are moved into the thatch and surface soil levels where they are trapped, preventing them from washing into our water systems. With up to 90 percent of the weight of a grass plant in its roots, it is no wonder that grass is a very efficient erosion prevention device.

COOLING EFFECT - Research shows that turfgrass can be up to 30 degrees F cooler than concrete or blacktop and up to 14 degrees cooler than bare soil. The cooling effect of an average lawn can equal over eight tons of air conditioning (the average home air conditioner produces four tons of cooled air). The cooling effect is the result of the evaporation of water within the green leaves. Grass surfaces reduce temperature extremes by absorbing the sun's heat during the day and by slowly releasing it in the evening, thus moderating temperatures.

ABSORBS DUST AND OTHER AIR POLLUTION - With its extensive and intertwined system of leaves and roots, grass surfaces around the world are estimated to trap some 12 million tons of dust and dirt from the air annually. Many activities in our lives create gases that can be harmful such as carbon dioxide, ozone or methane. Grass requires carbon dioxide to survive. As it takes this gas out of the atmosphere it replaces it with oxygen. Grass is such an efficient carbon dioxide-oxygen converter that an area just 50 feet by 50 feet generates enough oxygen to meet the needs of a family of four.

PLANTING A NEW LAWN



Where do you begin? Whether you are installing a new landscape or redoing an existing landscape, first analyze your needs. Do you need a large recreational area for your family? Do you want an area in the front of your yard to appear green and well-manicured? Are areas you are considering for new turf easy to irrigate and maintain? Can plants such as low-water use groundcovers be used in areas such as narrow borders and parking strips? Could you increase planting beds and reduce lawn size? These are some questions to answer before making changes to turf areas or planting a new lawn. A smaller turf area helps to reduce the need for water and lawn maintenance while still meeting your own needs for aesthetics, recreation, and resource use, including your own time.

WHAT TYPE OF GRASS TO PLANT

Selection of the type of grass to plant depends on your individual aesthetic and maintenance needs. Generally, you want to plant a cool season turf type in our area. Warm season grasses are more successful in hot, dry climates. The following information can help you make decisions about which turf type best meets your needs.

PERENNIAL RYEGRASS

This is the most commonly planted turfgrass in western Oregon, and is fairly drought tolerant. Turf experts often recommend perennial ryegrass because it is easy to establish, grows vigorously and can compete with weeds (which reduces the need for chemical control). It forms an attractive turf for most of the year. Perennial ryegrass is thatchless, allowing good water penetration over many years if the soil remains porous. This turf type is highly adaptable to a wide range of soils from light and sandy to heavy and clay like.



Perennial ryegrass is quite disease-resistant with proper maintenance. It does well in light to moderate shade, but not in deep shade. Its color is moderately dark green with good density and fine leaf texture. It grows well in mixes with bluegrass and fine fescues for added cold and shade tolerance and a more hardy turf area that can be used for sport fields. It has a low growth habit, which is best mowed at 1 to 2-1/2 inches.

TALL FESCUES

Turf growers in western Oregon have not had much luck with tall fescue. It is a relatively new turfgrass in this area and is quite drought tolerant — it can go days or longer without water if it is irrigated slowly and deeply when it is watered. The whole soil profile needs to be wet each time it is irrigated in order for tall fescue to maintain its vigor. Tall fescue has the deepest root system of turfgrasses, with root system depths from 3 to 6 feet. It will stay greener longer in a drought. It

doesn't necessarily use less water (under some circumstances it may use more); it just uses it as a deep-rooted plant would. Other grasses, however, tend to displace tall fescues very quickly, making it not as appealing a choice as perennial ryegrass.

Tall fescue doesn't stay quite as green in the winter as perennial ryegrass. It has a medium to dark green color and moderate density. It is also somewhat coarser in texture than perennial ryegrass. This grass type can adapt to a wide range of soil conditions since it has a rather deep, extensive root system that makes excellent use of soil moisture and mineral nutrients. It also has a good tolerance to saline soil conditions. Optimum mowing height for this grass type is 2 to 3 inches. Tall fescue turf takes water readily because it produces little thatch.

FINE FESCUES



Fine fescues are a deep green color, have the finest grass blade of any lawn grass, and have an upright growth habit that creates a pleasing uniformity. This grass type has rapid germination and seedling establishment. It tolerates acid soil well, growing within a soil acidity range of pH 5.0 to 6.5 and has the lowest fertilizer requirements of any cool season grass. It is often used

in mixes with other grasses because of its ability to blend and is often used in bluegrass mixtures because it grows well in shade or drought-dry soil.

Fine fescues have a high drought tolerance for a cool season grass and can go dormant in summer if irrigation is withheld. Once moisture is supplied again it will green up quickly.

Fine fescues are best used in partially shaded areas under low maintenance. This grass type does best with a mowing height of 1 to 2-1/2 inches. Clippings from frequent mowings can be left on the lawn because fine fescues do not develop thatch. Fine fescues can also be left unmowed for the "meadow look."

BENTGRASS

This is the most dominant grass in landscapes in this area, but not by choice. Bentgrass is usually an "invader grass." It will take over even the best-maintained lawns planted with other seed types after a few years. It can be easily identified in early morning when dew hangs on the grass. It forms very dense, fine-textured patches, which hold the dew longer than other grasses. If you want to get rid of it, quick removal by chemical means or hand weeding is recommended before patches enlarge.

Bentgrass performs better at mowing heights below 1-1/2 inches. It looks its best when it is mowed at least once a week. To stay green it will need to be mowed two times a week. At these very low mowing heights, it requires water more often. Bentgrass produces thatch and will need to be de-thatched every one to two years. It dominates other lawn grasses because it grows well in the cool times of the year, tolerates drought by going dormant, requires very little fertilizer, and gets few diseases if it is not over-fertilized.

Creeping bentgrass is a specialty turfgrass that requires high maintenance and expert turf management. It is usually recommended only for golf courses due to its ability to withstand an extremely low cut as well as its ability to recover quickly from high traffic and other injuries (e.g., divots).

KENTUCKY BLUEGRASS

This grass does not do as well as the other grass types in this area. It is poorly adapted to wet and mild winters. It prefers cool, humid, semi-arid and temperate regions. It is a cool season grass with a deep, rich dark green color. It has dense and beautiful appearance with a medium leaf texture that has excellent leaf uniformity. It is moderately drought tolerant and does not do well in partial or full shade.



Optimum mowing height is 1-1/2 to 2 inches. It can develop some thatch at higher nitrogen levels. It performs best in fertile, non-acid reacting soil with good drainage.

COMMON MIXTURES

Typical seed mixtures include approximately 70 percent perennial ryegrass and 30 percent fine fescue. Hard fescue, a fine fescue (very narrow blades of grass), is the grass of choice in this mix due to its drought tolerance, good color, and resistance to red thread disease. Red thread disease is a fungal disease that looks like mats of red threads on the tips of leaves. This disease commonly occurs in turf that is in poor soil or a slow-growth period (such as drought times). It is primarily a cosmetic problem.

ECOLAWNS



An “ecolawn” is an alternative to conventional grass lawns. Ecolawns combine grasses with selected broad-leaf plants to produce an ecologically stable mixture of plants that require less maintenance than a typical lawn. For example, perennial ryegrass mixed with strawberry clover (*Trifolium*), yarrow (*Achillea millifolium*), English lawn daisy (*Bellis perennis*), Baby-blue-eyes (*Nemophila menziesii*), and Roman chamomile (*Chamaemelum nobile*) creates a green, white, pink, and blue carpet of plant material. This mix requires very infrequent mowing to maintain desired height (maybe once every three weeks), and little to no fertilizer and no pesticides. Often these mixes take at least two seasons to become established. Check with your local nursery or turf specialist for a mix you would enjoy.

WHEN TO PLANT

The best time to plant a new lawn is in the spring or fall to take advantage of rainfall and avoid the heat stress of summer. You can either plant seed or install sod. Seeding may not be as effective after mid-October, but sod can be laid as late as November if the weather isn't too severe. If you have old sod, strip it or work it into the soil completely before adding new seed or sod.

PREPARING THE SOIL

Before putting in new grass or sod it is very important to properly prepare your soil. For maximum growth and aesthetics, grass needs four essential factors: sunlight, air, water, and nutrients. Three of these four essential factors (air, water, and nutrients) are obtained from soil, but many soils lack the ability to provide these factors. Some have too much clay and may be very compacted, so cannot make the air and water available to the roots. Other soils are too sandy, making it difficult for water and nutrients to stay in the soil. Another problem is that the pH (the degree of acidity or alkalinity) is too high or too low. The best soil conditions for turf are loams, sandy loams and clay loams (easily crumbled soils) with a pH of 6.0 to 7.0. Almost all soils can be improved, but you need to know what you have before you can make the improvements. Take the time before you plant to improve your soil. This will save time and money in lawn maintenance once your lawn is established.

Take soil core samples from several locations in your yard and have them analyzed. Sampling information and materials are available at the County Extension Office (see Page 20 for the Web address). You can also have your soil tested by a commercial soil-testing laboratory. Check with your local nursery or the Extension Office for locations. Once you know your soil needs, add amendments to make it a healthy environment for your turfgrass.

The key to healthy grass is a deep root system. A healthy root is usually 8 to 24 inches deep. Add 6 to 12 inches of good topsoil to promote healthy root growth. The topsoil should be clay loam or sandy loam or other soil suitable to the area. Healthy plant roots can reach through several inches of topsoil for moisture, and can often go a week or more without water. In contrast, shallow root systems need more frequent watering as their root systems cannot reach moisture deep in the soil. Before you add the top soil, however, till to a depth of at least 2 inches. This will control most annual weeds, alleviate subsoil compaction, permit bonding of the topsoil to the subsoil, and improve root penetration and water movement.



Grading the soil to a 1 percent to 2 percent slope provides good surface drainage away from your house and other buildings. Smooth,

roll and lightly rake the surface. If time permits, allow the area to settle further with rainfall or by applying irrigation water. This will ensure a truly firm, level surface. Water the soil area thoroughly, up to 6 inches deep for best results. Then seed following the rates recommended on the turf seed package. Divide the grass seed in half and spread over the area twice in perpendicular directions to get consistent coverage. Rake the seed into the soil and roll again to firm and level the seedbed. If installing sod, roll it out after the soil is prepared as described above.

FERTILIZING

Fertilize new lawns with a 3-1-2 ratio of nitrogen (N), phosphorous (P) and potassium (K). Nitrogen is the most important element for successful turf growth. Use 1 lb. of nitrogen per 1,000 sq. ft. at the time of seeding, about three to four weeks after seeding, and again about six weeks later. To determine the amount of fertilizer needed for turfgrass areas, divide 100 by the nitrogen percent. If you have a 10-3-6 mixture, 100 divided by 10 is 10. Therefore, use 10 lbs. of this mixture for 1,000 sq. ft. of turfgrass area to achieve a rate of 1 lb. N/1,000 sq. ft. Each grass type, however, has its own requirements for fertilizing. Check with your local turfgrass specialist or consult the Websites provided in the back of this brochure for more specific information.

HOW MUCH FERTILIZER TO USE

$100 \div \% \text{ of nitrogen} =$
of lbs. of fertilizer per 1,000 sq. ft. of lawn

Example

$100 \div 10 (\% \text{ of nitrogen}) = 10 \text{ lbs. of fertilizer}$

WATERING

New plantings need to be watered lightly and more frequently than established turfgrass areas if the weather is dry following seeding. If laying sod, follow within a half hour with at least 1 inch of water. You may need to do this in short time increments to avoid runoff. New sod and seed need to stay moist for the

first few weeks to allow for successful establishment. For best results, follow the directions of your lawn care specialist until your new lawn is well established.

CARING FOR YOUR ESTABLISHED LAWN

Once your lawn is established it still needs some tender loving care. If you practice appropriate maintenance, you will be pleased with the results and your lawn will be green and healthy.

AERATION

Aerating your soil in the spring or fall (or both, if you can) each year can help correct excessive soil compaction which can cause water runoff during irrigation. It promotes moisture infiltration into the soil, efficient use of fertilizers, and better root growth. Deeper roots are better insulated from summer hot spells and require less frequent watering. The plugs left by the aerator can be left to dry for a couple of days and then bagged or "shattered" by your mower.

Leave the holes or fill them with a soil mixture that is lighter (more sandy) than the current soil. This fill soil will make its way into the compacted soil and break it up. Overseed the core holes by applying seed at 1/3 to 1/2 of the initial seed rate. You can rent or buy aeration tools. Check with your local nursery or your turfgrass specialist.

WATERING

Heat and wind cause water to evaporate more quickly. For best results, water early in the morning when the air is calm and evaporation is kept to a minimum. Watering in the evening is the next best time. If your lawn needs water, it will turn from bright green to dull blue or grey-green. If when walking on it, you can look back and see your footprints, because the grass no longer springs back from your weight, you need to turn on your sprinklers. Usually one spot will dry out before the rest; use it as an indicator of when your lawn will need water.

You can also use a soil probe or screwdriver to tell if it is time to water. If the core from the soil probe shows moisture in the root zone, wait to irrigate. If dry, then water. If a screwdriver can easily penetrate the soil beyond 2 inches, there should be enough moisture for the present time. If there is resistance of 2 inches or less, then it's time to water.

HOW MUCH TO WATER

Established lawns need an average of about 1 inch of water per week (a bit less in cool moist weather, and a bit more in hot dry weather). Overwatering can yield a shallow-rooted lawn, can leach fertilizers and nutrients out of the root zone, and can encourage disease problems that must be treated with expensive and often toxic chemicals. Supplying too much water also causes grass to grow faster, which means more Saturday mowing for you!

Whatever method you use to irrigate — automatic or manual in-ground sprinkler systems or hose end sprinklers — make sure you see that you are getting a uniform distribution of water to all areas of your lawn, especially when it is new. Choose sprinklers that send large drops of water close to the ground. These sprinklers are more water efficient than sprinklers that spray a fine mist and lose a lot of water through evaporation.

After you irrigate you can also use a soil probe or screwdriver to find out how deeply you're wetting the soil. Push the soil probe into the ground, twist it back out and you'll have a 10 inch or longer core that shows how wet the soil really is. If the core is moist only 2 inches deep, and roots could easily go down 6 - 12 inches, you need to water longer. If you are using a screwdriver it will move easily through moist soil but will stop when it reaches dry soil. If it stops a few inches or less, you should water a bit longer. If soil conditions are good, 1 inch of applied water should penetrate the soil about 6 inches.

Try to avoid overspray onto any hard surfaces such as sidewalks and driveways, and make sure that you know how much water your soil can absorb before it puddles up and runs off.

Never apply water at a faster rate than it can soak into the soil. If you need to water for 10 minutes and the water begins to run off the lawn after five minutes, then five minutes is the longest you should water at any one time. Wait 30 minutes to allow the water to soak in, and then water again. Keep repeating this process until you have applied water for the total number of minutes you have scheduled.

EVAPOTRANSPIRATION (ET)

This is a measurement of the total amount of water needed to grow plants. This term comes from the words evaporation (from the soil into the sky) and transpiration (the use of water by plants). There are other variables related to the weather and the plants that are used to compute this measurement, but to begin to understand the concept, just consider evaporation and transpiration.

For turf watering, we use the historical ET for cool season grasses in our area. You can make adjustments to fit your own garden and the weather. Based on the average historical ET for our area, the 1 inch per week works well June - September. If the temperature gets close to 90 degrees F or above for days at a time, water 1-1/2 inches during that week. You may be able to get actual ET rates from your local irrigation specialists or weather forecasters.

RAIN SENSOR

This is one of the easiest ways to upgrade any automatic system. Mount the rain sensor or shutoff device where it is exposed to open sky and won't fill with leaves or other debris. Rain sensors are designed to shut off irrigation systems when the moisture level reaches a preset amount, usually 1/4 inch. Once the moisture level subsides, the sensor re-enables the irrigation system, resuming the previous watering schedule.



SOIL PROBE

MOWING



It's best to mow your lawn at a height that is consistent with the variety of grass that was planted. Review the mowing information for the turf types previously mentioned.

It is also important to mow with sharp blades to prevent tearing and injuring the grass. The rule of thumb is to mow often enough that you never cut more than one-third of the height of the grass blades. Lastly, save some time and help your lawn and environment by leaving short clippings on the grass (where the recycled nitrogen is) rather than sending them in bags to the landfill.

FERTILIZING

Fertilizing can encourage root development and replace essential nutrients lost through leaching and transpiration. Use the right amount and the right kind for your lawn. Follow the package labels carefully.

In late spring and early fall use a 3-1-2 fertilizer. That is 3 parts nitrogen, 1 part phosphorus, and 2 parts potassium. A 6-1-3 mixture may be used in late fall to improve the lawn's appearance. (See the chart on Page 10 for how much fertilizer to use.)



There are two types of fertilizers: quick release and slow release. In quick-release fertilizers, all of the nitrogen is released immediately. Urea, ammonium sulfate, and ammonium nitrate are quick-release types. With quick-release fertilizers there is a quick response but fertilizer will need to be applied more often. With slow-release fertilizers, nitrogen is released over a long period of time. IBDU, sulfur-coated urea, and urea-form are slow-release types. Slow-release fertilizers are more expensive but turf growth and color are more consistent over time. A mixture of both quick-release and slow-release may produce the best results. Check with a lawn care specialist for your particular turf type.

You can also use compost or compost tea as a fertilizer. If using compost, apply 1/4 inch of well-aged compost in the spring and fall for best results. Another non-chemical option is alfalfa pellets. They come with trace minerals and all the other basics your lawn and garden need, plus the added value of organic matter that helps soil organisms thrive and feed your plants. When to fertilize: Fertilizing in late May encourages color development and maintenance of the root system during the summer. In late September and late November, fertilization should take place to generate new root growth.

CONTROLLING WEEDS

Weeds compete with plants for nutrients, light and water, so weed frequently. If you are weeding by hand or with a hand tool, make sure that you remove the entire weed, roots and all. Chemical controls of weeds can be effective, and is best done when weeds are small and require less active chemicals.



Surrounding shrub and tree foliage is also less susceptible to chemical effects in the fall. Use spot applications of herbicides rather than a broadcast application, which can harm other organisms in the soil and potentially pollute groundwater.

CONTROLLING MOSS

Moss is a symptom of compacted and acidic soil, low in organic matter. Moss also likes shade where grasses usually don't perform well. If you have lawn in a shady area, try thinning nearby trees to allow more sunlight in.

You can help control moss by aerating. If moss has already built up in your lawn, apply iron granules or liquid iron. Note that the moss will turn black before it decays into the soil and/or grass grows back. You may need to increase the pH of your soil by "sweetening" it with lime.

CONTROLLING THATCH

Thatch is comprised of grass clippings and other organic matter, and usually only becomes a problem when the ecosystem comprised of the soil, grass, water, and microorganisms is out of balance. Generally the microorganisms will eat the grass clippings and organic matter and provide food for the individual grass plants. If the system gets out of balance because of too much or too little water or too much fertilizer, the decay process slows or stops, and thatch starts building up.

When this happens water will run off instead of soak in, and your grass will be stressed. Regular aeration of your lawn will help water reach through the thatch and allow air into the soil as well, and will help the ecosystem to control thatch.

In situations where thatch exceeds 1/2 inch, a dethatching machine can be used to cut through this layer; removing excess root mass and promoting its breakdown. When aerating or de-thatching, it is also beneficial to top-dress the area with 1/4 inch of fine compost. This further speeds the breakdown of organic matter while releasing valuable nutrients.

ALTERNATIVES TO TURF

You may decide that you don't want a large lawn or want to diversify your landscape. If so, here are some other things to consider.

GROUNDCOVERS

Where foot traffic is infrequent or undesirable, consider groundcovers, low water-using plants, and mulches. Groundcovers offer much of a lawn's neatness and uniformity with less maintenance. Steep slopes, sharp angles, and narrow driveway strips

are difficult to water efficiently and are usually hard to mow, and are the first to suffer if they don't get enough water. Established groundcovers in these areas will reduce weeds, prevent erosion and will need less water and maintenance.

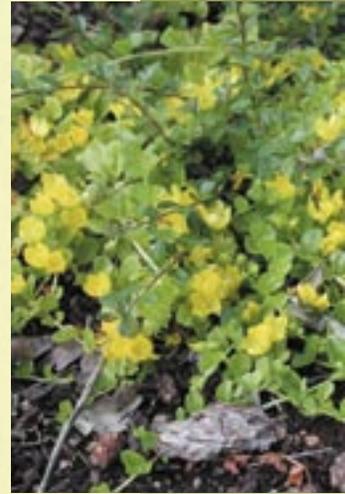
PERENNIALS AND SHRUBS

Perennial and shrub beds, as well as trees, can provide similar benefits for erosion control, cooling and pollution absorption as grass. There are many low water-use/low maintenance plants that are colorful and vary in texture. Contact your local nursery for more information on low water-use plants, shrubs, and trees.

HARDSCAPES

Instead of grass, you can select creative hardscape, such as pavers or decking. Decks for example, shade the soil and permit what rain you get to drip down between the boards. They also provide an excellent surface for entertaining, playing, or lounging.

A healthy green lawn that is well-maintained and watered appropriately can be an enjoyable place, where kids play, folks relax in lawn chairs, passersby enjoy the cool and refreshing hue of a healthy lawn. By making sure you practice appropriate maintenance — proper mowing, fertilizing and watering — your lawn will have fewer problems with weeds, diseases, and insects. A well-kept lawn can remain dense and attractive, providing you many moments of enjoyment as well as benefiting the environment.



RESOURCES

WATER AUDIT

Many local landscape companies are starting to offer landscape water audits. These audits consist of having a landscape professional evaluate your landscape and irrigation system and highlight issues relevant to your yard. The landscape professional typically gives customers a report listing recommendations to improve the landscape or irrigation system efficiency, as well as a watering schedule based on soil make-up and plant types.

Soil Analysis: _____

Irrigation Analysis: _____

Recommendations: _____

HOW DO I KNOW WHEN I'VE WATERED 1 INCH?

Here is a simple way to figure out how long to water your grass:

1. Set out five empty tuna cans (or something similar) at various places on your lawn within your sprinkler's range. Place cans halfway between the sprinklers and in the areas that generally receive the least amount of sprinkler water.
2. Turn on your sprinklers for exactly 15 minutes.
3. Measure the depth of the water in each can. Add the numbers and divide by 5 to get the average water depth (in inches) of all of the cans.
4. Check the following chart and locate your average water depth number. The box to the right of that number lists your total weekly watering time.

AVERAGE WATER DEPTH IN THE CANS (IN INCHES) AFTER 15 MINUTES	NUMBER OF MINUTES TO WATER 1" ONCE A WEEK
1/8	120
3/16	80
1/4	60
5/16	46
3/8	40
1/2	30
5/8	24
3/4	20
1	15
1-1/4	12

NOTES:

- During hot, dry spells you may need to increase your total weekly watering time.
- Never apply water at a faster rate than it can soak into the soil. If water puddles or runs off your lawn when you water, divide your total weekly watering time in half. Add a "resting period" between watering periods so that the water has time to soak into the ground and reach the grass roots. For example, if your watering schedule is 40 minutes per week, your new schedule might be to water for 20 minutes at 6 a.m., stop, then again for 20 minutes at 8 a.m. Keep repeating this process until you have applied water for the total number of minutes you have scheduled.
- If the water doesn't penetrate the soil well, the lawn may need to be aerated or de-thatched.

WEBSITES AND BOOKS

Water Right - Conserving Our Water, Preserving Our Environment; International Turf Producers Foundation; 1855 Hicks Rd., Suite C, Rolling Meadows, IL 60008; www.lawninstitute.com; www.turfgrassod.org

Ortho's All About Lawns; Meredith Books, Des Moines, Iowa; 1999

Healthy Lawns, Healthy Environment: Caring for Your Lawn in an Environmental Friendly Way; EPA (H7506C) Washington, DC 20460

How Much Water Does Your Lawn Really Need?
Sunset Special Report; June 1987

Turfgrass Resource Center: www.turfgrassod.org/trc

The All Seeing All Knowing Lawn Care Manual:
www.unce.unr.edu/publications/sp93/sp9302.pdf
(Publications; Horticulture, Gardening)

Landscape Concepts Inc.:
www.landscapeconcepts.com/resources

Lawn Talk: www.urbanext.uiuc.edu/lawntalk

County Extension Office information:
<http://extension.oregonstate.edu/locations.php>





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

Summer landscape irrigation is an important part of creating vibrant outdoor spaces – but it takes time and costs money. Many Portland residents and businesses irrigate in the summertime leading to summer water use that doubles or triples. A well-designed and well-maintained irrigation system will use water efficiently while creating a healthy landscape for years to come.

Best Practices for Irrigation

How you choose to irrigate depends on your budget, the type of plants you have, and size of your landscape. Regardless of what you use to irrigate - a hose, drip, or automatic irrigation system - there are several best practices that are important to follow:

- Prepare the soil to ensure proper drainage and water-holding capacity. Healthy soil needs less water than poor soil.
- Water when the potential for evaporation is low – late in the evening and early in the morning.
- Actively manage and maintain your irrigation system. Check regularly for leaks and misdirected spray.
- Water lawns 1 inch of water per week (*more during long, hot dry spells*). Water lawns separately from other plants. A good rule-of-thumb for watering your landscape is to apply 50% of what you put on grass, on perennials and shrubs, and 75% for vegetables (although new starts require more water).

Manual Irrigation

If you water your landscape with hand-held hoses, several devices are available to help you irrigate efficiently.

- **Hose nozzle:** Automatic shutoff nozzles are an easy way to keep a hose from running. They are often available with multiple spray patterns such as mist, shower, and jet.
- **Soaker Hose.** Soaker hoses release water to plants through thousands of tiny pores that drip water slowly and evenly at low pressure. They are great for watering shrubs and bushes, and present an inexpensive alternative to drip irrigation systems.



- **Sprinklers.** If you use a portable sprinkler, try to use one that waters low to the ground to prevent misting and evaporation into the air. Also look for sprinklers with rotor action that lay water down at a slower rate compared to those with a constant spray pattern. Applying water at a slower rate allows water to be absorbed into the soil as opposed to running off.
- **Timers.** A hose timer that lets you set the start time and duration of a watering session is a good way to control your manual sprinkler. A variety of timers ranging from battery-operated, electric, or wind-up are available. They are typically attached to the hose bib and can be reset for each use.

Drip Irrigation

Drip irrigation is one of the most efficient ways to water plants, shrubs, vegetable gardens, and outdoor container plants. With drip



irrigation, water works its way slowly into the soil, where water goes directly to the roots of the plant, keeping evaporation to a minimum. Drip irrigation is ideal for clay soils - where too much water, too quickly, can result in puddles and run-off.

Most garden centers carry drip irrigation kits or components, and the manufacturers of these products publish instructions that go with them. With regular maintenance, a drip system can be very efficient and help you save water.

Choosing the right pieces for your drip system

Drippers or emitters, bubblers, and micro-sprayers are the types of heads used on a drip irrigation system. Each system can be customized to deliver the right amount of water where it's needed by choosing different heads for the types of plants you are watering.

- **Drippers or emitters** generally water at rates of ½, 1, and 2 gallons per hour, while **bubblers** are slightly higher. The slowest drip rate is best for clay soils; high drip-rates are best suited to sandy soils.
- **Micro-sprayers** use the most water in a drip system – up to 15 gallons per hour – but still much less than standard above-ground sprinklers. They are best for ground covers, flower beds, and pots where drippers and soakers won't fit or where plants need more humidity.

Hooking up the system

In order for a drip watering system to work properly, clean water and low water pressure are needed. A filter to prevent drip devices from clogging over time and a pressure regulator are vital pieces in any drip system. To get the most from the system, install a timer on the hose bib in order to avoid over-watering.

In-Ground Automatic Irrigation



An automatic irrigation system consists of a collection of pipes, tubing, valves, and pop-up spray heads or rotors. A plumbing permit and back-flow device that prevents irrigation water from flowing

back into the municipal water system is required for any new automatic irrigation system. Get information on backflow prevention and assemblies here:

www.portlandonline.com/water/index.cfm?c=29743

- **Spray Heads.** Pop-up spray heads can be adjusted to spray in a quarter, half, or full circle. Spray heads can put out a lot of water in a short period of time, making it necessary to have multiple, short run times to ensure that the water penetrates the soil.
- **Rotors.** These heads deliver water more slowly than spray heads, allowing soil to take in the water without puddling too quickly. Used in the past for large turf areas such as sports fields, rotors are now available and practical for smaller turf areas.

Components are typically connected to a **controller**, or a small computer that is able to control water to different parts of the landscape. Once programmed, the controller determines when, how often, and for how long the water goes out to your landscape. There are different types of irrigation controllers available:

- **Traditional.** These types of controllers rely on manual schedule entry. Some are capable of programming multiple run times, which is essential if you are using spray heads. They can also come with a water budget

feature so that one can easily adjust run times for warmer or cooler days.

- **Weather-based.** Many types of weather-based controllers are on the market today. Some use third party communication with weather stations; some are pre-programmed with historical weather data; some have on-site weather stations. Solar radiation and temperature are the primary drivers of water use in plants. Wind is also a factor. Weather-based controllers use some or all of these variables to water various landscape materials.
- **Soil Moisture Sensors.** You can add sensors to existing controllers or install a complete system with sensors and a related controller. Sensors measure the moisture content in the soil and enable the controller to water or not, depending on the level of moisture in the soil.

Getting the most from your automatic system:

- **Install a rain sensor.** Rain sensors – or rain shutoff devices - prevent an automatic system from turning on during or after rainfall. These are not necessary with a soil moisture sensor.
- **Adjust the direction of sprinkler heads.** When sprinkler heads are sending water to the pavement, instead of the plants, you're watering something that doesn't grow.
- **Repair broken heads and pipes immediately.** Broken heads and leaky pipes can waste a lot of water and money. Regularly inspect your system for pieces that are broken. Automatic does not mean maintenance-free.
- **Schedule an irrigation audit.** Find out how efficient your current system is, how to improve it, and develop a water-efficient irrigation schedule by contacting an Irrigation Association-Certified Landscape Irrigation Auditor.

Additional Resources

Irrigation Association: Visit www.irrigation.org to find a Certified Landscape Irrigation Auditor.

Regional Water Providers Consortium: Sign up for the Weekly Watering Number www.conserveh2o.org

Portland Water Bureau: Get helpful brochures on general landscape planning and maintenance, or information on finding an irrigation contractor. www.portlandoregon.gov/water/conservation

Caring for your landscape doesn't need to be difficult, time-consuming, or use a lot of water. There are easy things you can do to give grass, plants, shrubs, and trees the resources they need to produce beautiful colors and texture in the garden and still use water efficiently and effectively. Whether you are maintaining your current landscape, or planning a new one, remember that adding compost, mulching, and maintaining your irrigation schedule and system will keep your landscape healthy for years to come.

Build your soil!



Adding amendments to soil - such as compost - on a regular basis is one of the easiest ways to have a productive and healthy landscape while conserving water. Mixing compost into the top six

inches of your soil improves its ability to hold water and increases nutrients and beneficial soil organisms. Soils rich with organic matter act like a sponge for water, preventing runoff and storing more water in the root zone where plants can use it.

Mulch, mulch, mulch!

Evaporation is the major source of water loss from soil and therefore your plants. Adding a layer of mulch around your plants can significantly reduce the amount of soil-water evaporation that results from the sun and wind. Mulches can also help reduce erosion and assist with weed control.



Mulches come in a variety of shapes, sizes and colors, and should be chosen according to your personal preference. Mulch can be organic (bark, wood chips, or compost), or

inorganic (gravel or landscape cloth). Both provide a protective layer covering the soil surface. Organic mulches should be applied annually or as needed throughout the year. To be most effective, apply 1-2 inches of compost, leaves, sawdust, or 2-4 inches of coarsely shredded bark or wood chips.

Water Wisely!

Many of us are guilty of overwatering our landscapes by watering too much, too often. Not only is this practice wasteful, but it can harm plant growth and health.

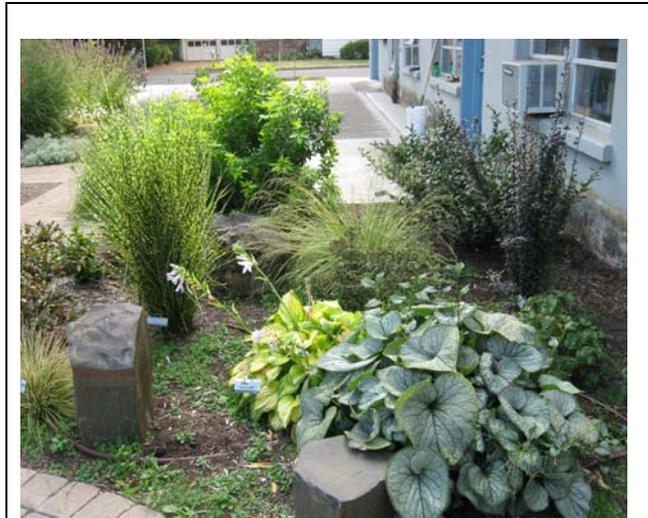
- **Adjust your watering schedule.** Pay attention to rain showers, cooler weather, and periods of extended high temperatures. Adjust your watering times accordingly.
 
- **Established trees and shrubs typically don't need much supplemental water.** Except for maybe a deep soak or two in the summer, established trees and shrubs don't need a great deal of additional water. They have root systems that tap into deeper sources of water. Newly planted trees, however, need regular watering for the first couple of years.
- **Water in the morning or evening.** Heat and wind cause water to evaporate more quickly. Watering early in the morning or later in the evening when the sun is low in the sky helps keep evaporation to a minimum.
- **Watch for puddles and runoff.** Avoid applying water faster than it can soak into the soil.
- **Water lawns with 1 inch of water per week (more during long, hot dry spells).** Water lawns separately from other plants. A good rule-of-thumb for watering your landscape is to apply 50% of what you put on grass, on perennials and shrubs, and 75% for vegetables (although new plant starts require more water).

- **Sign up for the Weekly Watering Number.** The Regional Water Providers Consortium takes the guesswork out of watering by e-mailing you the amount of water (in inches) your lawn will need each week. The weekly watering number is available every Thursday from April-September. It takes into account local weather according to your zip code. Sign up at www.conserveh2o.org
- **Aerate or de-thatch your lawn.** If water isn't penetrating the soil, your lawn may need to be aerated or de-thatched.

Keep it up!

Routine maintenance of your landscape is the trick to keeping plants happy and healthy. Regular pruning, fertilization, weeding, and pest control will keep plants at their peak and more resistant to insects, disease, and extreme temperatures.

Don't forget to check your irrigation system several times a year to make sure it is providing the correct amount of water where and when you want it. Fix leaks and broken sprinkler heads immediately and don't water your sidewalk or driveway!



Visit the Hazelwood Conservation Demonstration Garden

The Water Conservation Garden at the Hazelwood HydroPark (1017 NE 117th Ave.) was designed to showcase water-efficient gardening practices, as well as provide a welcoming "front porch" for the East Portland Neighborhood Office. Looking for inspiration on how to make your landscape water-efficient? Come visit!

Additional Resources

Get more information on landscape planning and maintenance from the resources listed below. Before long you will be using water wisely while maintaining a healthy and beautiful landscape

Brochures are available at the [Portland Water Bureau web site](#) or by calling (503) 823-4527

- [Water-Efficient Plants for the Willamette Valley](#): This beautiful plant guide outlines water-efficient trees, shrubs, bulbs, perennials, ground covers, and ornamental grasses suited to our climate and that require less maintenance once established.
- [7 Basic Steps for Creating Water Efficient Landscapes](#): The seven steps in this brochure can help you create a water-efficient landscape that is colorful and easy to maintain. It includes recommendations of plants appropriate for the Pacific Northwest.
- [Selecting a Landscape Contractor](#) & [Selecting an Irrigation Contractor](#): These brochures provide tips for selecting a landscape contractor for designing and maintaining a landscape, and installing an irrigation system.
- [Planting and Maintaining a Lawn](#): This brochure provides detailed information on how to design and maintain a lawn to reduce water consumption and maintain a healthy look.

Web sites

The Hardy Plant Society of Oregon
www.hardyplantsociety.org

Native Plant Society of Oregon
www.npsoregon.org

Pacific Northwest Native Wildlife Gardening
www.tardigrade.org/natives/

Oregon State University Extension Service
Gardening Encyclopedia
<http://extension.oregonstate.edu/gardening/>

Oregon State University Extension Service Online
guide to plant disease control
<http://plant-disease.ippc.orst.edu/index.cfm>

International Society of Arboriculture
www.treesaregood.com



Outdoor Efficiency

[Water-Efficient Landscapes](#)

Choosing the right plants for your landscape will increase water efficiency and beauty

[Water-Efficient Lawns](#)

Find out how to plant and maintain a healthy green lawn without using too much water.

[Irrigation](#)

Learn how to irrigate your landscape efficiently whether you irrigate by hose and sprinkler, drip irrigation, or if you have an in-ground automatic system.

[Landscape Maintenance](#)

Tips for keeping your water efficient landscape healthy and beautiful year round.

[Plant Guide](#)

Looking for plants that don't need a lot of water? Get our guide "Water Efficient Plants for the Willamette Valley"

Plant Guide - Printable Version

Whether you are redoing an existing landscape or landscaping a new home or business, consider this plant guide a powerful tool in your toolkit.

It was created by horticulture and conservation experts to assist the everyday gardener in choosing plants that will help them use water more efficiently in their landscapes. Filled with colorful pictures you will refer to this handbook over and over again

Portland Water Bureau customers can get this guide FREE by going to our [online order form](#) or calling (503) 823-4527.

