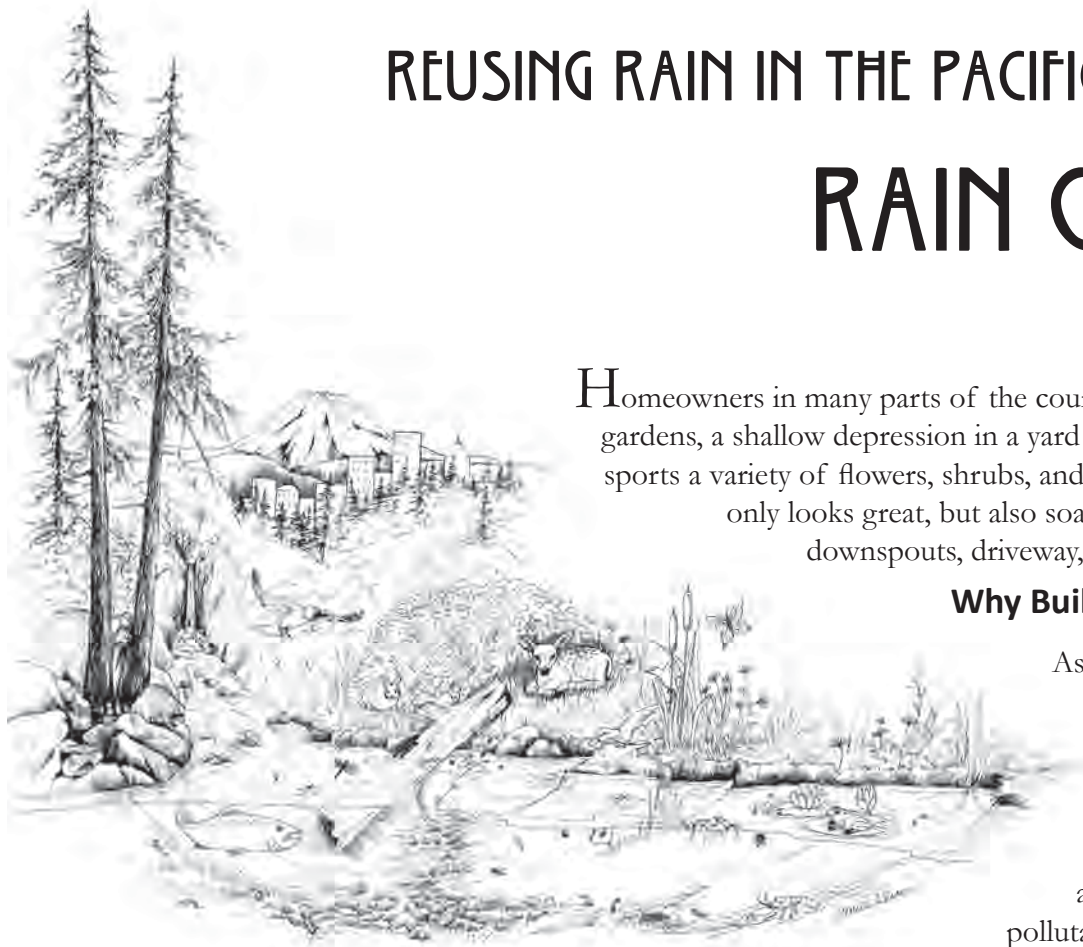


# REUSING RAIN IN THE PACIFIC NORTHWEST

## RAIN GARDENS



Homeowners in many parts of the country are catching on to rain gardens, a shallow depression in a yard that collects rainwater and sports a variety of flowers, shrubs, and grasses. The garden not only looks great, but also soaks up rainwater from your downspouts, driveway, or sidewalks.

### Why Build a Rain Garden?

As more development occurs in the Pacific Northwest, rain pours off roofs, driveways, sidewalks, and other impervious surfaces into our streams and rivers, transporting pollutants such as fertilizer, oil, pesticides, and pet waste. Rain gardens keep runoff from leaving your yard

and pollutants stay in the garden where they can be absorbed by plants. Rain gardens reduce flooding by limiting the amount of water transported directly to the stream during rain storms. Rainwater infiltrates into the ground and replenishes ground water while helping diminish flooding in local streams. As an added bonus, a rain garden planted with the right types of plants attracts birds, butterflies, and bees.

### Planning the Rain Garden

Think carefully about how the rain garden will function in your yard. Is the area sunny, shady, windy, or sheltered? Do you want to view the garden from inside your home or from an area in the yard? Consider the color and bloom time of plants incorporated into the garden.

Generally, you obtain a better effect by planting taller plants toward the back and shorter plants toward the front. The rain garden should meld seamlessly with existing or planned garden features such as arbors, patios, picnic areas, and benches. Rain gardens work particularly well near other wildlife friendly features such as ponds, bird baths, and feeders.

### You Need to Know:

Rain gardens do not hold water for more than a few hours, they are designed to absorb runoff.

Mosquitoes require several days to hatch, so rain gardens do not breed mosquitoes. In fact, they attract insects that can control mosquito populations!

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**Shapes.** A formal garden often forms a square or rectangle with carefully defined edges while informal gardens usually feature curving lines and loosely defined edges. Consider including evergreen shrubs from the recommended list in Table 2 to provide greenery and structure all year round. Gardens composed entirely of flowering perennials look wonderful during the summer, but can look barren in winter.

### Choosing a Location

Look for a relatively level site that is slightly downhill from your downspout(s) and at least 10 feet from the basement or foundation of the structure. Talk to your neighbor if the garden will be located on or near the property line. Do not locate a rain garden over a septic tank or its drain field. You should also mark the underground utilities even when digging the garden by hand. Shape the rain garden to your personal taste, but make sure rainwater will flow and pool where needed. A kidney or horseshoe shape may be best in the middle of the yard, while a long, narrow garden usually works best along a property line.



### Testing the Absorption Rate of Your Soil

Before investing the time and expense of building a rain garden, test your soil to determine its suitability. Some soils simply drain too slowly to adequately infiltrate rain water fast enough. Test your soil by digging a hole 6 inches deep. Thoroughly soak the ground around the hole and fill the hole completely with water. Water should drain completely from the hole within 24 hours. If it does not drain, the area will not support a rain garden. In this event, look for another site in your yard with better drainage.

### Determining Size

Almost any size rain garden will help remove pollutants from storm water, improve groundwater recharge, and reduce your impact on the environment. However, you can accurately size your rain garden by following some simple guidelines. You will need to estimate how much area will drain into the rain garden, the general type of soil you have, and the slope of the land where the rain garden will be.



**Determining Area Draining to the Rain Garden.** Using the example in Figure 1, first figure out the roof area that will drain to the downspouts feeding the rain garden. For example, a roof measuring 45 feet by 50 feet drains 2250 square feet. However, you determine that only half that will drain to the downspouts watering the rain garden. This leaves 1125 square feet of area. Remember to count only those downspouts draining directly into the rain garden when determining the roof area.

### Do's and Don'ts:

Do not place the rain garden over a septic system!

Do not build your rain garden where water already ponds - runoff will not soak in.

Do locate your rain garden where plants get at least partial sun - you can use a wider variety of plants.

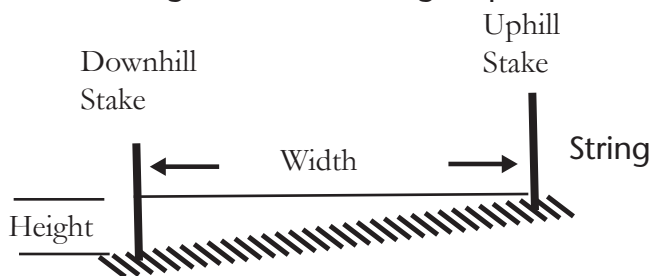
Do try to put your rain garden on flatter ground - dig less!

**Measuring Slope.** You can calculate the slope of the land by using the method shown in Figure 2. Run a string from a stake pounded into the ground at an uphill spot to a stake pounded into the ground downhill. The string should be level (an inexpensive “line level” can be purchased from a local home improvement store). Measure the length in inches of the string (your width measurement) and then measure the height (in inches) from the string at the downhill stake to the ground. Divide the height by the width to get the slope in decimal format. Multiply this times 100 to obtain the percent. (For example: a height of 26 inches divided by width of 240 inches equals 0.108, which multiplied by 100 produces a slope of 10.8%, or rounded to 11%.)

Figure 1: Calculating Drainage Area

	House Width (ft)	x	House Length (ft)	=	Roof Area (square ft)	x	% Drained to Raingarden Downspouts	=	Draining to Raingarden (square ft)
Example	45		50		2250		50% (50% = 0.50)		1125

Figure 2: Calculating Slope



**Sizing Your Rain Garden.** A slope of 11% requires a rain garden depth of 8 inches as shown in Table 1. Using your soil type, you can then find the rain garden size factor from Table 1. For our example, if you have a clayey soil with the slope of 11%, then your size factor would be 0.20.

Table 1: Factors for Sizing Raingardens

Slope of land		Less than 5%	5% - 8%	8%- 12%
Raingarden Depth		3-5 inches	6-7 inches	8 inches
Raingarden Size Factors	Sandy soils	0.19	0.15	0.08
	Silty soils	0.34	0.25	0.16
	Clayey soils	0.43	0.32	0.20

Using our example, we multiply the area drained from Figure 1 (1125 sq. ft.) by the size factor of 0.20 to arrive at a rain garden area of 225 square feet (Figure 3).

Figure 3: Sizing the Raingarden

	Slope of land	Soil Type	Raingarden Depth	Size Factor	x	Area Drained (square ft)	=	Raingarden Size (square ft)
Example	11%	clay	8 inches	0.20		1125		225 (equals 0.11)

### Plant Selection

A wide variety of plants work well in rain gardens as shown in the recommended plant list. Vigorous perennials work great in sunny sites. Since native plants are adapted to the area and usually resistant to disease, consider using these plants in your rain garden. When shopping for plants, look for specimens that tolerate a wide variety of conditions and do not require well drained soil. Go to a local, reputable nursery that knows conditions in your area.

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**Table 2: Selected Rain Garden Plant List**

	Common Name	Botanical Name	Sun	Part Sun	Shade	Bloom Time	Bloom Color	Size	Soil Type
Perennials	Bellflower	<i>Campanula sp.</i>		x	x	Varies	Various		Loam
	Black-eyed Susan	<i>Rudbeckia hirta</i>	x	x		Summer	Yellow	3-5 ft.	Loam
	Bleeding Heart	<i>Dicentra sp.</i>			x	Spr/Sum	Various	1-4 ft.	Loam
	Blue Flag Iris	<i>Iris versicolor</i>	x	x		Summer	Blue	2-3 ft.	Any
	Butterfly Weed	<i>Asclepias tuberosa</i>	x			Summer	Orange	3 ft.	Loam
	Camas Lily	<i>Camassia sp.</i>	x			Summer	Various	1-3 ft.	Any
	Cardinal Flower	<i>Lobelia cardinalis</i>	x	x		Summer	Red	2-4 ft.	Loam
	Coneflower	<i>Echinacea purpurea</i>	x	x		Summer	Purple	1-5 ft.	Loam
	Daylily	<i>Hemerocallis sp.</i>	x	x		Summer	Various	1-4 ft.	Any
	Gayfeather	<i>Liatris sp.</i>	x			Varies	Various	2-3 ft.	Loam
	Goldenrod	<i>Solidago sp.</i>	x	x		Summer	Yellow	1-3 ft.	Loam
	Sunflower	<i>Helianthus sp.</i>	x	x		Sum/Fall	Yellow	3-6 ft.	Any
	Joe-Pye Weed	<i>Eupatorium sp.</i>	x	x		Summer	Pink	4-6 ft.	Loam
	Marsh Marigold	<i>Caltha palustris</i>	x		x	Summer	Yellow	1-2 ft.	Any
	Rush	<i>Scirpus sp.</i>	x		x	None	None	1-3 ft.	Clay
	Sedge	<i>Carex sp.</i>	x		x	None	None	1-4 ft.	Clay
Sweet Flag	<i>Acorus gramineus</i>	x	x	x	None	None	1 ft.	Any	
Shrubs	Andromeda	<i>Pieris sp.</i>		x	x	Spring	White	3-10 ft.	Loam
	Currant	<i>Ribes sp.</i>	x	x		Spring	Pink	4-12 ft.	Loam
	Elderberry	<i>Sambucus sp.</i>	x	x	x	Spr/Sum	White	6-10 ft.	Any
	Huckleberry	<i>Vaccinium sp.</i>		x	x	Spring	White	3-10 ft.	Loam
	Mock Orange	<i>Philadelphus sp.</i>	x	x		Summer	White	2-10 ft.	Loam
	Ninebark	<i>Physocarpus sp.</i>	x	x	x	Spr/Sum	White	4-8 ft.	Any
	Oregon Grape	<i>Mahonia sp.</i>	x	x	x	Spring	Yellow	2-10 ft.	Any
	Snowberry	<i>Symphoricarpos sp.</i>	x	x	x	Spring	Pink	2-6 ft.	Loam
	Spirea	<i>Spirea sp.</i>	x	x		Spr/Sum	Varies	2-8 ft.	Any

**Site Preparation**

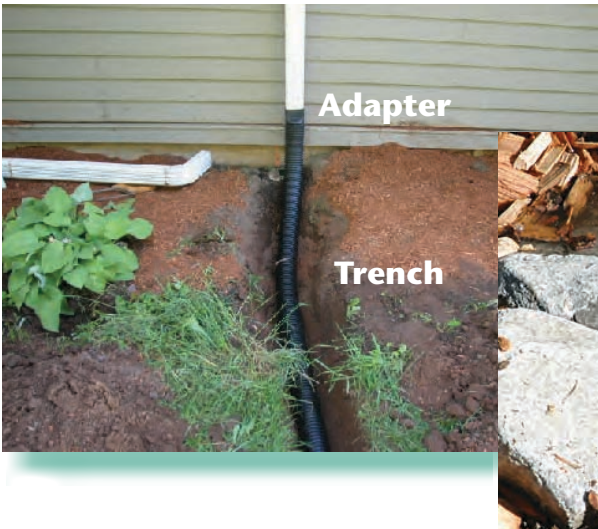
Define the edges of the garden using a hose, string, or marking paint. Dispose of removed vegetation by transplanting, composting, or adding to the yard debris recycling bin. Dig the entire garden about 12 inches deep, sloping the sides at a 45 degree or less angle to reduce the incidence of sloughing. Make the main “basin” of your rain garden as level as possible to ensure water spreads evenly across the garden and infiltrates the soil. Use excess soil from the excavation to create a berm or dam around the downhill edge of the garden so water remains in the garden after a hard rain. Place an outlet in the berm to drain excess water from a particularly large storm into your yard without causing damage to your garden. This outlet is usually just a small dip in edge of the berm.

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Next, determine how you will divert water from your downspouts to the rain garden. Choosing to simply allow water to flow across the lawn toward the garden can create muddy areas in the yard. A



corrugated (non-perforated) plastic drain pipe provides the simplest method to convey water to the rain garden and can be found at many home improvement stores. (Perforated pipes allow water to seep out and sediment may eventually block the pipe.) Attach the corrugated pipe to your downspout using an downspout adapter (available home improvement stores)

at



and bury it in a 12 inch deep trench at a two percent or greater slope to your garden. After testing the system, cover the pipe in the trench. Add a few rocks at the outlet of the pipe inside the rain garden to break up the flow during a heavy rain and prevent erosion.

You may find it more interesting to convey water from the downspout to the garden by constructing a dry creek bed.

Dig a 4 to 6 inch deep trench about 12 inches wide from your downspout to the rain garden. Line the trench with weed cloth

and cover with two or three inches of river rock. Add a meander or two to make your stream look more natural and complement your landscape. Test your layout by running water through the downspout. Be certain the water runs smoothly through the stream or pipe and spreads evenly across the bottom of your rain garden without eroding the sides.



Once satisfied with the layout and function of the rain garden, work 3 to 5 inches of compost into the soil over the entire garden using a roto-tiller or shovel. This aids stormwater infiltration and gives the



plants a healthy start. Lay out plants according to your plan and plant. After finishing planting, mulch the entire garden with wood chips 2 to 3 inches deep. Avoid bark dust since it will likely float away during a heavy rain storm. The large surface area of wood chips captures and holds pollutants, keeping them out of our streams and lakes. Wood chips also reduce your garden's water needs during the drier summer months.

## Maintenance

Rain gardens require extra water during the first couple of summers to become established. Water thoroughly, deeply, once weekly to encourage deep roots and vigorous growth. The garden also requires more weeding during establishment. Weeds decrease considerably as the plants establish. After each growing season, stems and seed heads can be left for winter interest, wildlife cover, and bird food. They should be cut back in the early spring to allow room for new growth. As the rain garden becomes more established, the need for maintenance will decline and you can spend your time enjoying the benefits!

## References:

Rain Gardens of West Michigan [www.raingardens.org](http://www.raingardens.org)

University of Wisconsin Extension <http://clean-water.uwex.edu/pubs/raingarden/>

Wisconsin Department of Natural Resources <http://www.dnr.state.wi.us/org/water/wm/nps/rg/>

City of Portland <http://www.portlandonline.com/bes/>

King County Yard and Garden web site <http://dnr.metrokc.gov/topics/yard-and-garden/>

Minnesota Rain Gardens <http://www.mninter.net/~stack/rain/>

Rain Garden Network <http://www.raingardennetwork.com/>

*No endorsement is intended of any business listed here, nor is any criticism of unnamed businesses*

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By Gary Bock and Douglas Stienbarger (December, 2005; Updated January 2008)

For more information and classes, check out Watershed Stewards program  
<http://clark.wsu.edu/volunteer/ws/index.html>

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Clean Water Program

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*Reusing Rain in the Pacific Northwest: Rain Gardens*

