



## Earthworks: Berms, Swales & More!



*"Water retention is the name of the game at our house and I don't mean the kind that makes your ankles swell. Not a drop of water that hits our property runs into the street. The gutters that run around the perimeter of our roof catch rainwater and feed it into downspouts that direct the water to infiltrate in our front yard. It's pretty faboo!"*

*- Jessica Tuck, Actress*

In natural areas, rain falls to the ground where it flows through the land and infiltrates the soil. This process not only removes debris and pollutants, but also recharges the aquifer. Ideally, we want to recreate this in our landscapes. But recharging an aquifer in your own yard...really?! It's actually not as hard as it might sound. All you need to know is that the earth works. With the power of a shovel, you can sculpt the land to capture water, improving water quality and quantity. So let's get ready to harvest some rain water!

OK, I'll admit it. It took me awhile to know my berms from my swales. Here are the earthworks solutions in a nutshell. A **swale** is a shallow trench, like a creek, which directs water through the landscape. A **berm** keeps water in or out of a chosen area. It is simply a wall or mound of soil. A **retention basin** is a depression where rain water is held until it can be absorbed. Add plants to that basin and it becomes a **bioretention basin**, commonly referred to as a **rain garden**.

- 1. Study your site**  
Using your map (Sustainable Solutions – May) look for areas to redirect water. Look for where water rushes out onto hard surfaces and can instead be put to use on a lawn or garden bed.
- 2. Test the soil percolation**  
You want to ensure that the water drains fast enough in the area of your rain garden/retention basin. See page 2 for directions.
- 3. Create a swale**  
To direct water toward a rain garden, the swale must slope down at least a 1 – 2% grade (3 - 6" for every 25 feet). Dig a u- or v-shaped trench to create a swale. Make sure it is at least 2 feet from the house foundation.
- 4. Create a berm**  
Pile up the soil and tamp it down. You don't want it to collapse in the rain. You can use a berm around a tree or along the edge of a slope.
- 5. Create a retention basin/rain garden**  
A rain garden only needs to be 6% of the collection area. So if your roof is 1000 square feet, then a rain garden could be about 60 square feet or 6' x 10'. Make sure the location of your basin is at least 10 – 15 feet from the house. Dig your garden 9 to 20 inches deep, then cover with at least 3 inches of mulch. So, with 9 inches, you would end up with a ponding depth of 6 inches, which is most common.

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TreePeople's Sustainable Solutions Program is dedicated to landscape transformation - turning yards into functional landscapes that are beautiful and sustainable. Our monthly guides and checklists detail an easy, step-by-step process, helping us all create a healthy urban forest where water is valued, air is clean, soil is healthy and trees are thriving.

**Next Month: The Grass Is Not Always Greener**

## Linda's List

Linda Eremita, TreePeople's Senior ISA Certified Arborist, has the following suggestions for your September gardening fun:

### Climate Appropriate Plant of the Month

California fuchsia (*Epilobium sp.*, "Zauschneria")

When the flowers of summer have faded, the orange trumpet-shaped flowers of California fuchsia make this a welcome sight to hummingbirds migrating south for the winter. There are over 50 cultivars from less than 1' tall and up to 5' tall. It has small linear leaves from green-grey to silver and the plants can spread by underground rhizomes or volunteer seedlings. It needs very little water once established, and should be cut down to 1" to 2" stubs after blooming in late December.

### Upcoming Workshop

November 14, 2010 - Community Greening Workshop Visit [www.treepeople.org](http://www.treepeople.org)



## Helpful Formulas

### How Much Water Will a Rain Garden Hold?

For the formula below, we used a ponding depth of 6 inches.

1. Multiply the width by the length (in feet) to get the area:  
\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_ square feet

2. Multiply the area by .5 feet (6-inch depth of basin):  
\_\_\_\_\_ X .5 = \_\_\_\_\_ cubic feet

3. Multiply the cubic feet by 7.48 for the capacity in gallons. Total amount of water held:  
\_\_\_\_\_ cubic feet x 7.48 = \_\_\_\_\_ gallons

### How Much Rain Can I Catch?

Use the formula below to figure the amount of water that may come off your roof downspouts, in a 3 inch storm.

1. Multiply the width by the length (in feet). AREA:  
\_\_\_\_\_ width X \_\_\_\_\_ length = \_\_\_\_\_ sq. feet

2. Multiply the area by .62 to get the gallons per inch of rain. Total amount of water from the roof:  
\_\_\_\_\_ area in square feet x .62 = \_\_\_\_\_ gallons per inch of rain

3. Be sure to consider rain from your roof and the rain directly falling into the garden that will be directed to the retention basin.  
\_\_\_\_\_ (water falling on roof) +  
\_\_\_\_\_ (water falling on garden to be directed) =  
\_\_\_\_\_ capacity of retention basin

### 6. Add plants, gravel and mulch

Add climate-appropriate plants and mulch to your berm and rain garden. Line the swale with mulch or gravel.

So dig it. You can make the world a better place, all in the comfort of your front yard. For more information go to [www.treepeople.org](http://www.treepeople.org) or [www.rainwaterharvesting.org](http://www.rainwaterharvesting.org)

## What Is Your Soil Percolation Rate?

Measuring the percolation rate helps you determine how well your soil drains. Doing a "perc test" is essential before doing any earthworks project. Grab a shovel, a yard stick and a watch.

1. Dig a hole about 18" deep and 18" wide.
2. Fill the hole with water and note the time.
3. How long does it take for the water to completely disappear (i.e. 5 minutes, 20 minutes, 1 hour, etc.)
4. If the water is draining slowly, use your yard stick to measure how much water is draining each 30 minutes (i.e. 1" every 30 minutes).

### Results:

0 – 4 minutes: Soil drainage is fast and is fine for a swale or retention basin.

5 – 15 minutes: Soil drainage is ideal for a swale or retention basin.

16 – 60 minutes: If it is at least 1/2 inch per hour (for swales) or 1 inch per hour (for retention basins) it's fine.

Several hours/days: This area will require amending the soil for most earthworks solutions. You can replace the soil with 2 feet of gravel. Top with 6 inches of loam soil (a soil mixture of sand, silt and clay) and then mulch.

## Out-of-the-Box

### Are You A Renter? Head to the Mountains!

Don't have your own yard to do some earthworks project? Don't worry, our local mountains need a little TLC too! Water quality is dependent on a healthy watershed. Native vegetation growing in our local mountains is invaluable to maintain water quality and quantity.

Volunteers are always needed for mountain restoration. Check our online calendar for upcoming events. If, after you've attended a restoration event, you'd like to provide even more help; consider being trained as a Restoration Supervisor. Head to the mountains, restore our watershed and help the earth work for us all.