

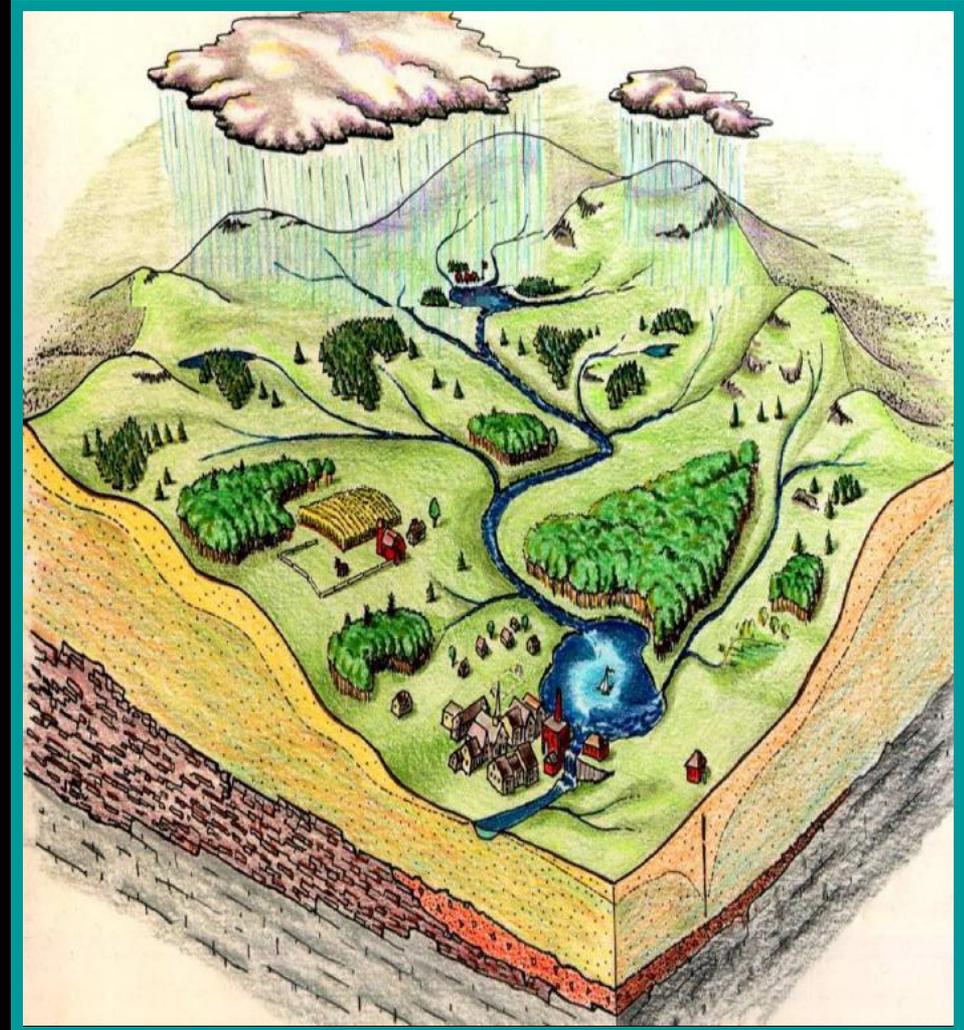
Rain Gardens

A close-up photograph of a pair of weathered, brown hands cupping a small, vibrant green seedling with four leaves. The seedling is growing out of a mound of dark, rich soil. The background is a dark, textured surface, possibly asphalt or concrete, which is slightly out of focus. The overall tone is earthy and nurturing.

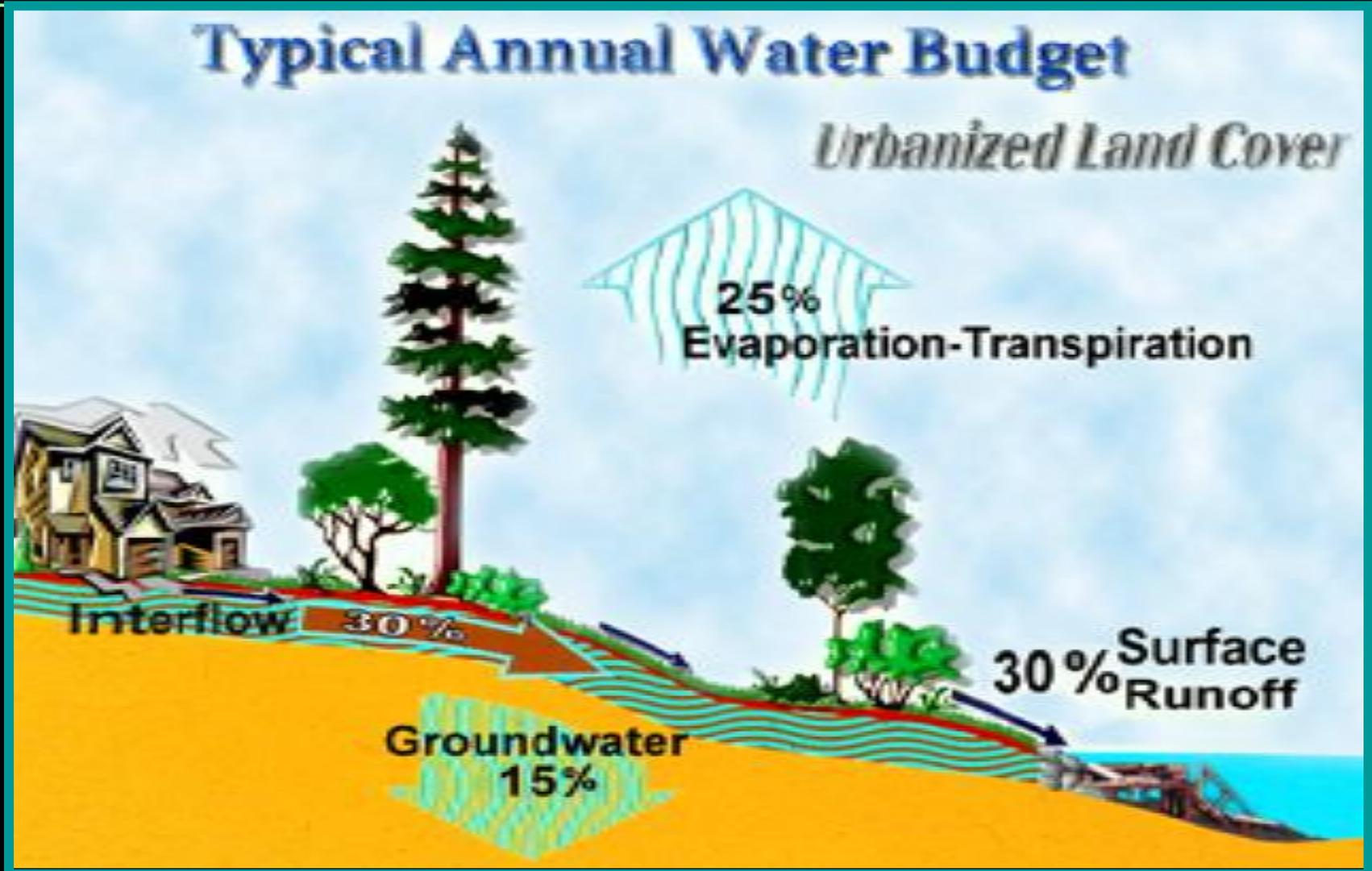
A Welcome Addition to Your Landscape

Where Does The Rainwater Go?

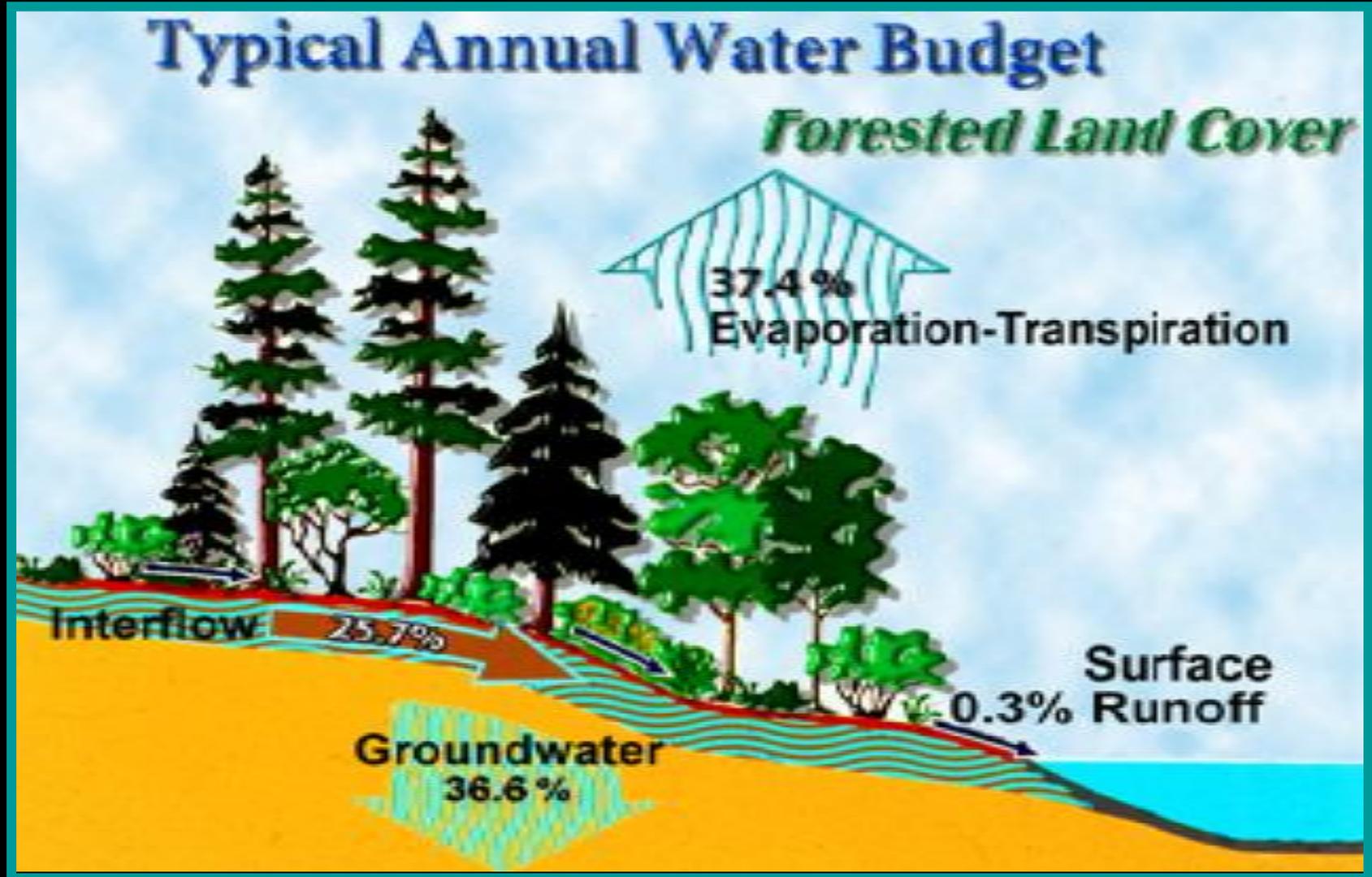
- Naturally, forests provide a way for rainwater to percolate into the soil, filtering pollutants while trees are allowed to remove nutrients and use them for growth
- Developed areas have too much impervious surfaces, causing rainwater to run directly into streams, carrying along with it pollutants including:
 - Petroleum Products
 - Animal Waste
 - Fertilizers
 - Pesticides
 - Household Chemicals



Developed Lands



Forested Lands



How Can Storm-Water Be Managed?

- ❑ Large areas of development (ex: towns and cities) use storm water management ponds to gather storm water, intending to mimic how forested floodplains retain and manage rain runoff
- ❑ On a small scale, you can build your own rain garden to help manage storm water and facilitate nutrient and pollutant management, as well as encourage groundwater recharge

What is a Rain Garden?

- ❑ A Rain Garden is a specially designed garden area created to capture and filter rainwater that runs off from impervious surfaces such as parking lots, roads, driveways and rooftops
- ❑ They can also be created on any scale to meet homeowner or business needs
- ❑ Rain Gardens are a popular new type of “eco-gardening”, allowing homeowners to help manage storm water and help protect their watersheds from pollutants



How Does it Work?

- ❑ The Rain Garden should collect runoff as a rain event occurs
- ❑ The different components work together to filter the runoff naturally
- ❑ The native plants and microorganisms found in the soil remove pollutants that are carried in the runoff from your home or driveway

The Many Benefits

- ❑ Rain Gardens increase the amount of groundwater renewal
- ❑ Pollutants can be removed from run-off before it has a chance to enter streams, thus protecting the overall health of your watershed
- ❑ Increase in vegetation for your yard will provide habitat for insects and birds
- ❑ Rain Gardens can enhance the beauty of your yard
- ❑ Building a rain garden can bring together family or friends (What child doesn't want a good excuse to play in the dirt?)



Ecological Landscaping

- **Benefits of Ecological Landscaping and Reducing the Size of your Lawn**
 - Attract wildlife
 - Hardier lawns and gardens (native plants are drought resistant)
 - Save water (the average lawn consumes 10,000 gallons of water annually)
 - Enhance passive recreational opportunities (bird watching, gardening, photography)
 - Reduce pollution from chemical pesticides and fertilizers
 - Reduce air and noise pollution from lawn equipment

Planning Your Rain Garden

- Observe your yard's landscape
 - Are there low spots?
 - Where does rainwater naturally flow?
 - Are there areas of your yard that have started to show signs of erosion due to storm events?
 - Observe where your downspouts and driveway tend to drain during a rain event
 - Your rain garden should be at least 10 feet from your home so infiltrating water doesn't seep into the foundation
 - Do not place the rain garden directly over a septic system



How Do I Know if My Soil Is Appropriate for a Rain Garden?

- ❑ Contact the Rappahannock Cooperative Extension Office to have your soil tested for nutrients and pH
- ❑ Test your infiltration rate
 - Dig a hole six inches wide and 18 inches deep in the area you want to test
 - Pour water into the hole and observe how long it takes to drain
 - If the water is still standing 48-72 hours later, the soil will need to be amended to improve infiltration, or you will need to choose another location

Infiltration Problems

It may seem that a Rain Garden may be appropriate in areas of your yard where water ponds in your yard, but usually in these circumstances the soil does not allow for adequate infiltration and the rain garden and the soil will need amending to allow your Rain Garden to properly function

Amending Your Soil

- ❑ If your soil needs amending, you may need to excavate and replace the soil with three feet of your own soil amendment containing the following (all of which can be purchased at a local nursery or home improvement store):
 - 50% sand
 - 25% topsoil (no clay)
 - 25% compost or leaf mulch

Remember, if your garden does not achieve the correct infiltration, you increase the chance of creating a mosquito breeding ground instead of a being a useful addition to your yard

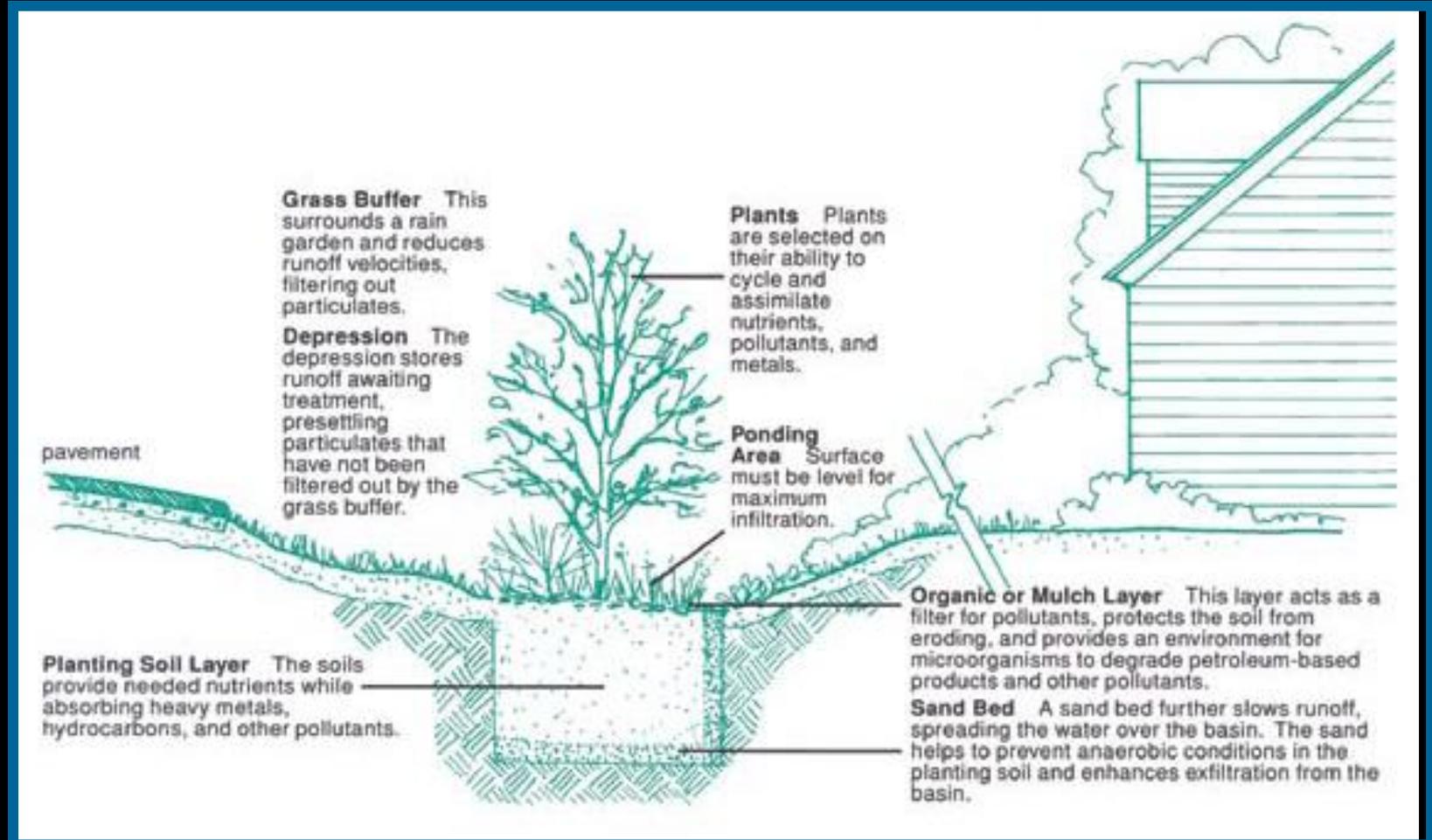
How Large Should My Rain Garden Be?

- ❑ Calculations for Rain Garden size are available on the Virginia Department of Forestry Website (<http://www.dof.virginia.gov>)
- ❑ The ponding depth of your rain garden should not be over 6 inches to prevent water from being ponded for too long
- ❑ Your garden should be about 1/3 of the size of the surface area providing the runoff
- ❑ A typical residential rain garden ranges from 100 to 300 square feet
- ❑ Rule of thumb: Your Rain Garden should be at least twice as long as it is wide
- ❑ Ensure that your garden is wide enough to allow for adequate room for your plants
- ❑ Ensure your garden is long enough to contain all of the rain water that will enter

Building Your Rain Garden

- ❑ To operate effectively, Rain Gardens require several layers:
 - A **grass buffer strip** needs to surround the garden to slow down the velocity of the runoff (your yard grass can function as this layer)
 - A **mulch layer** to help maintain moisture in the soil and provide the perfect environment for biological activities (microorganisms)
 - **Native plants** to take up moisture and nutrients
 - A **soil layer** for the plant roots
 - A **ponding area** or depression to provide storage needed to accept runoff
 - A **berm** containing at least 6 inches of soil or rocks that help dam the water like a pond
 - If you have extremely poor soil conditions, you may need to add a **layer of gravel or stone** to the bottom of the rain garden

Rain Garden Components



Plant Selection

- ❑ The plants that you choose to incorporate into your Rain Garden should be overall moisture tolerant, with the middle of your design containing wet-loving species of plants, since this area will stay moist for the longest period of time
- ❑ The middle of the side slope should contain plants that can be either moist or dry
- ❑ The upper edge should contain plants that prefer dry conditions
- ❑ You may want to visit the Virginia Native Plant Society's website for a comprehensive list of native species at: <http://www.vnps.org>

- ❑ **Why Use Native Plants?**
 - They are best adapted for the local climate and, once established, do not need extra water or fertilizer
 - Many are deep rooted, allowing them to survive droughts
 - Native plants are attractive to the diverse native pollinators (bees, butterflies, beetles and birds)
 - Natives provide habitat and food for native wildlife

Maintenance

- ❑ **Inspect your Rain Garden for the following at least three times a year (In the Spring, Summer and Fall):**

- Weeds & Invasive Plants
- Plant Health
- Excessive Sediment
- Movement of Sediment within the Garden



- ❑ Monitoring these possible issues and correcting them before they become a problem will help ensure the effectiveness of your Rain Garden, as well as helping to prolong its life

Plant Maintenance

- ❑ In a rain garden, dense shrub growth is encouraged rather than eliminated to provide increased filtering capacity
- ❑ Tattered and discolored plants should be cut back after spring arrives and growth is 4-6" tall
- ❑ "Deadheading" plants will also lead to succeeding new growths
- ❑ Collect seeds and cuttings from successful plants in the rain garden and use them for the new season.

Additional Maintenance

- ❑ Collect seeds and cuttings from successful plants in the rain garden and use them for the new season.
- ❑ Plant more of the successful species in the rain garden as necessary.
- ❑ Re-seed the berm if there are areas of exposed soil.
- ❑ Replace rocks that may be diverting flow out of the garden.
- ❑ Alternately, build up areas where more protection is needed.
- ❑ Sediment will tend to accumulate within the garden. This a sign of success – this soil would have been directed straight to the stream without having been diverted into your rain garden
 - With a flat shovel, remove soil that has accumulated in the basin, avoiding the vegetation

The First Season: Lessons Learned

- ❑ After the first season, it may be obvious what plants were successful in this niche and what plants do not work for your rain garden.
 - Over the growing season, was the weather drastically hot, dry, or wet?
 - Was flow too fast through the rain garden, damaging the health of the plants?
 - Is flow being incorrectly diverted from the rain garden?
 - Is sediment covering vegetation?
 - Were some species over-shadowing others?
 - Did pests infest certain species?
 - Is one area of the rain garden not growing at the same rate as another? Why?

RappFLOW's Rain Garden Project



Rappahannock At a Glance

- ❑ Rappahannock County is at the headwaters of the Rappahannock River
- ❑ Seven hundred and fifty-five (755) stream miles in 1,010 stream segments (National Hydrography Dataset 2005), many on steep slopes, crisscross our rural landscape
- ❑ Rappahannock, while not seemingly urban, still has some contributing factors to stream pollution (farms, failing septic systems, sedimentation of streams due to improperly stabilized soils)

The Process

- ❑ In 2007, RappFLOW volunteers decided to design, construct, and demonstrate a working rain garden
- ❑ The garden, besides providing the traditional function of a rain garden, is meant to act as an example to the public of how local landowners can make a difference in water quality in Rappahannock County.
- ❑ In March of 2007, RappFLOW was awarded a grant from the Virginia Department of Forestry to assist in funding the project



Why The Schoolhouse?

- ❑ 27,000 square feet of parking lot (The largest in the county)
 - Provides impermeable surface AND source of contamination
- ❑ Directly adjacent to the Thornton River
- ❑ Perfect way to provide a community illustration of rain garden construction
- ❑ RappFLOW hopes to encourage county homeowners and businesses to implement their own rain gardens or other types of low-impact development



Building Our Rain Garden

- ❑ First, we needed to determine the direction water flowed from the parking lot
- ❑ During a rain event, it was observed that the run-off flowed to the left of the Schoolhouse Building, heading down the service road towards the Thornton
- ❑ From this information, the organization made the decision to place the rain garden in its present location



RappFLOW's Rain Garden,
showing the path of run-off flow

Building Our Rain Garden

- ❑ The Rain Garden's size was determined using resources from the Virginia Dept. of Forestry, the area was prepped for construction, and the excavation began.
- ❑ The garden area was dug out and a special type of biofilter soil was added to assist in the drainage.
- ❑ A berm was constructed to help contain the runoff and it and the surrounding area were also seeded with native grass seed to assist in the stabilization of soil.
- ❑ The service road was then equipped with a constructed swale (a shallow depression) across it that diverted the water flow into the rain garden
- ❑ Inside and around the garden, native trees, shrubs and wildflowers are planted

Small Ways to Make A Big Difference

□ Yard Maintenance

- Mow your yard with the mower deck set on a higher setting
- Contact Cooperative Extension to have your soil tested to ensure that the proper amount of fertilizers are being used on your yard
- Seed areas that have barren soil
- Use mulch in garden areas to help retain moisture
- If choosing to water, water only in the early morning or late evening
- Leave unmowed buffers along forested areas or waterways or ponds
- Dispose of animal waste properly
- Plant trees: they provide many benefits such as helping reduce heating or cooling costs (by providing shade or wind blockage), provide food for wildlife, and can provide erosion control to your yard

Small Ways to Make A Big Difference

❑ Car Maintenance

- Ensure that your vehicles are not leaking fluids by having them properly serviced
- When washing your vehicle, ensure that you do so in a grassy location rather than on an impervious surface
- Recycle old engine oil at the landfill recycling drop-off



Additional Information

□ Visit:

- <http://www.dof.virginia.gov>
- <http://www.lowimpactdevelopment.org>