

Solution: Improving Soils

Community Example: Portland, Oregon

A team of community members removed a section of the pavement outside this ice cream shop in Portland, Oregon. They brought in some compost and mulch, which they put on top of the dirt that was underneath the asphalt. This new soil is healthy enough to grow plants in, and will absorb runoff that the pavement did not.



Bottom picture: shop with pavement driveway (where wheelbarrows are); Top picture: pavement removed and soil and plants added! (Image from Depave).

Find it near you:

The Highland Park Improvement Club in Seattle also de-paved some of its parking lot to put in healthy soil instead. Around the city, look for hillsides covered in dark dirt—they are probably using compost or mulch to control erosion!

Improving Soils Benefits and Challenges

Adding mulch and compost to improve soil is a cheaper option than most – it doesn't take too much time to do and the materials are affordable or sometimes free. It takes some work and needs to be done every few years, but can be done by anyone. It doesn't take additional space or take away space from anything, and the mulch and compost will help soil and plants be healthier.

Amount of space needed: low

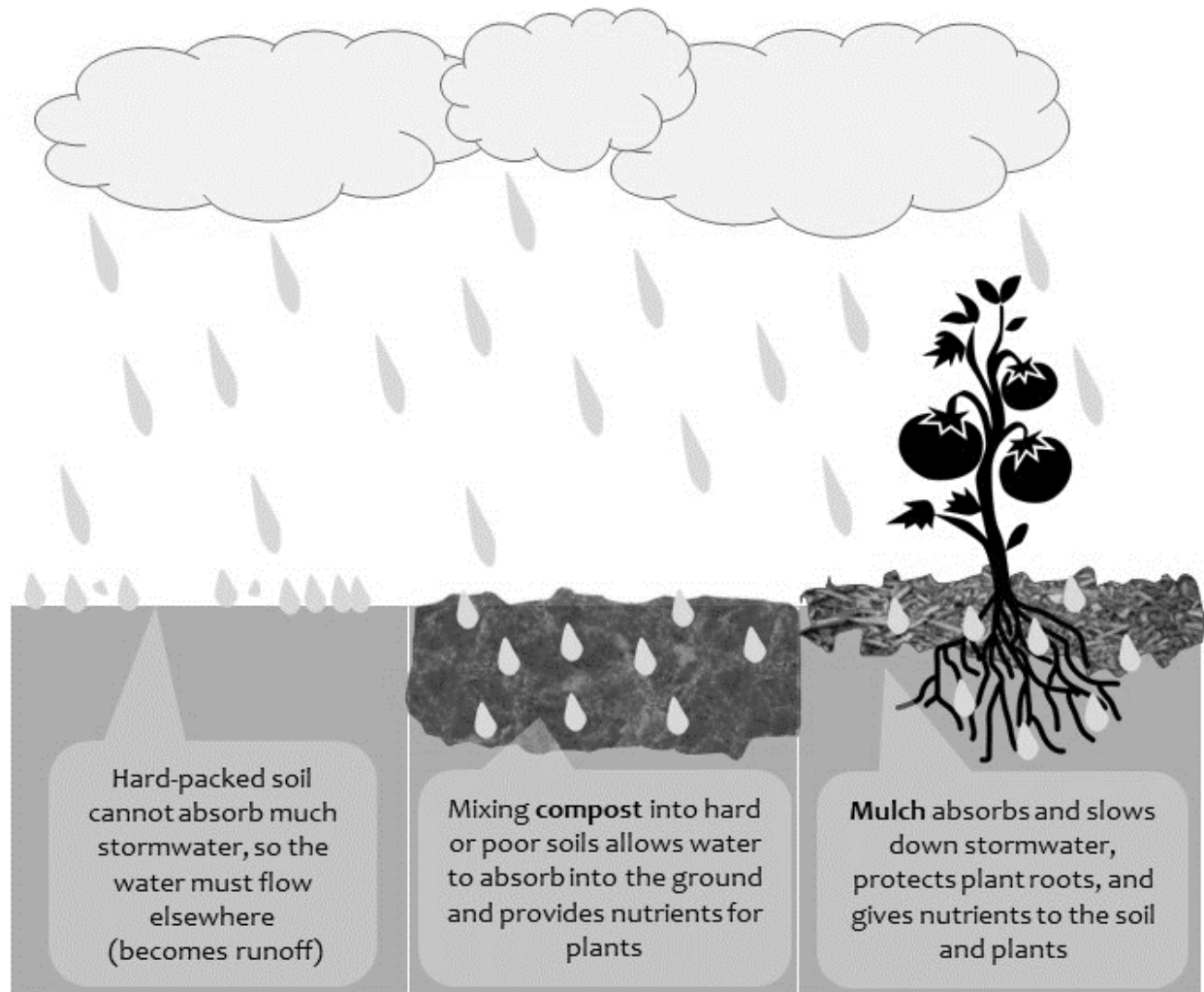
Amount of money needed: low

Time for building and maintaining: low

Solution: Improving Soils

How it works:

Soils in urban communities are often compacted (hard-packed), which makes it hard for water to soak in or for plants to grow. Improving the soils using compost (decomposed plants that have become soil) or mulch (plant material like wood chips, compost or dead leaves put on top of the soil around plants) helps stormwater runoff to absorb into the ground. Compost and mulch are rich in nutrients and helpful soil organisms, which help plants grow.



Plant image by Michael Zick Doherty from the Noun Project

Solution: Planting Trees

Community Example: East Palo Alto (near San Francisco), CA

In this community, there were very few trees and lots of blacktop. This means that rain water had few places to soak into the ground and students had few places to play that kept them cool. Students and community members planted trees at schools, which help with stormwater while also helping kids stay cool and schools save money on air conditioning.



Young students help plant a tree in Ravenswood City School District, East Palo Alto, California.
(Image from Canopy)

Find it near you:

Trees are all around us!
Are there trees at your school that you play under or that shade the buildings?
Look for trees that have been planted next to the road to help with stormwater. You can see this around the High Point neighborhood in West Seattle.

Planting Trees Benefits and Challenges

Just about anyone can help plant a tree, and trees are affordable and sometimes can even get donated. Trees create shade and help clean the air, but can't hold onto lots of stormwater. They don't take up much space, but they do need some space to grow.

Amount of space needed: low

Amount of money needed: medium-low

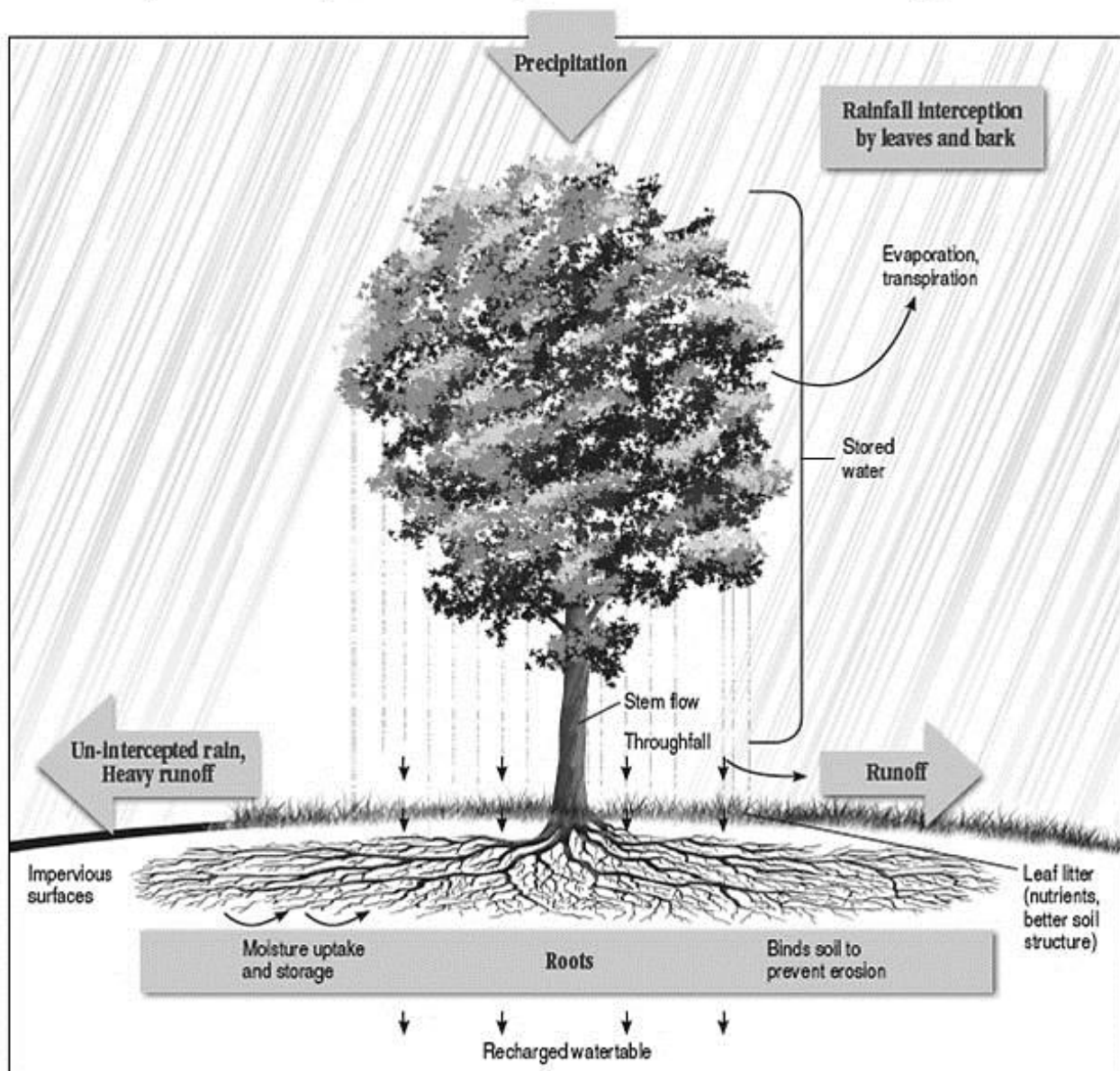
Time for building and maintaining: low

Solution: Planting Trees

How it works:

Trees slow down the rain water as it falls, and the leaves and bark hold onto the water. The roots soak up water for the tree to use, and the soils hold onto the water like a sponge. In the Northwest, evergreen trees are best to plant since they can help all year long and don't clog storm drains with their leaves.

Important Ways a Tree Helps with Stormwater Management



Solution: Pervious Surfaces

Community Example: Philadelphia

At Albert Greenfield Elementary School, porous rubber play surfaces cover most of the playground area. The porous rubber is made of recycled tires! This school was one of many in Philadelphia trying to limit the amount of stormwater going into the city's rivers by getting rid of some blacktop and using pervious surfaces. The school worked with the City of Philadelphia, students and their parent-teacher group to plan and raise money for the new school grounds.



Find it near you:

In the Greenwood neighborhood in north Seattle, Piper Village has apartments and shops surrounded by pervious pavement. Also, look for rubbery play surfaces like in the example above, or sidewalks like in the pictures on the other side of this page.

Students play on pervious playground surface made of rubber. A rain garden is next to the playground. (Image from Community Design Collaborative)

Pervious surfaces Benefits and Challenges

Pervious (or permeable) pavement and sidewalks are great for areas where cars will be driving or people walking or playing. They can be expensive because they have to be professionally installed. Pervious surfaces don't clean or store the water, but do allow it to soak into the ground.

Amount of space needed: low

Amount of money needed: medium-high

Time for building and maintaining: medium

Solution: Pervious Surfaces

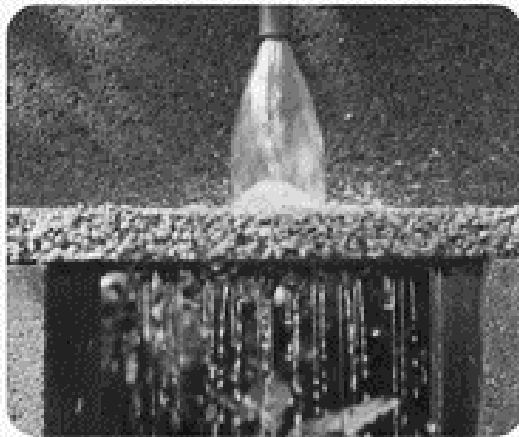
How it works:

Specially-designed pervious surfaces are solid enough for driving cars or playing basketball, but still allow water to soak into the ground underneath. The spaces between the hard surfaces let water travel into the ground.
(Pervious, Porous and Permeable are somewhat the same).

Examples of Porous Pavements



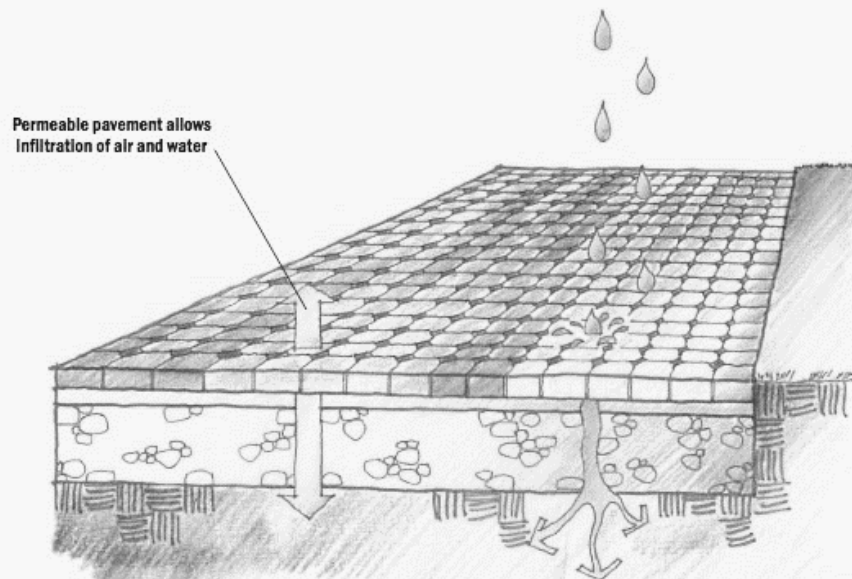
Permeable Pavers



Permeable Concrete



Grass Pavers



Solution: Rainwater Collecting

Community Example: Mexico City, Mexico

In Mexico City it can rain so much that water flows down stairs into the subway! There is a lot of rain at times, which can cause flooding, but some people also lack access to clean water for drinking and cooking their food. Isla Urbana is an organization that helps schools, families and businesses put in rain barrels to store water from the rooftops during the rainy season for use during drier months.



Art and Water. Montessori School, Condesa, Mexico City. (Image from Isla Urbana)

Find it near you:

Many people in Seattle collect rainwater for their gardens. View Ridge and Schmitz Park Elementary have rain barrels that collect water from the roofs of portables. Visit www.700milliongallons.org to see more projects in the city!

Rainwater collecting Benefits and Challenges

Collecting rainwater in cisterns or rain barrels can be great in places where there is not a lot of space, and they can be more affordable than some solutions that use plants. Cisterns can hold more water than rain barrels, but both can only take water off of rooftops. The water that's collected has to be used for something or released slowly into the ground.

Amount of space needed: low

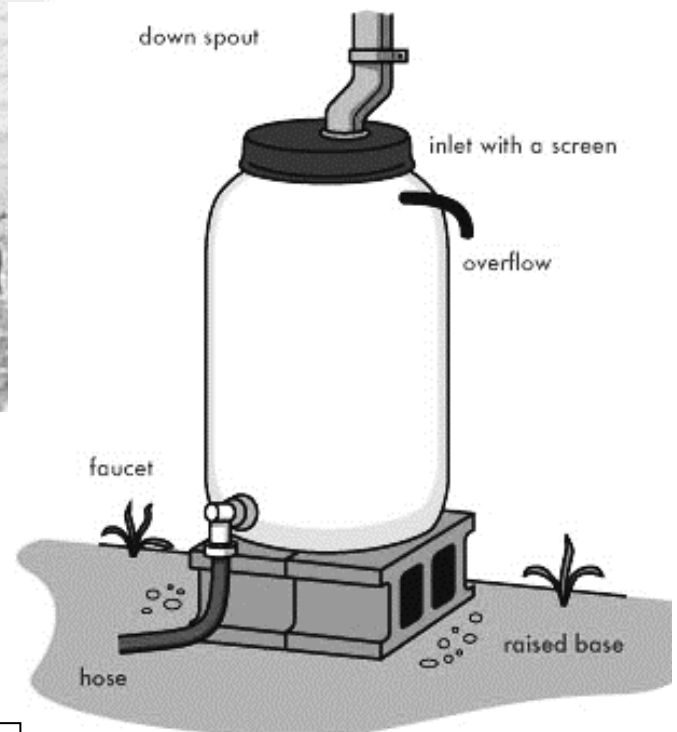
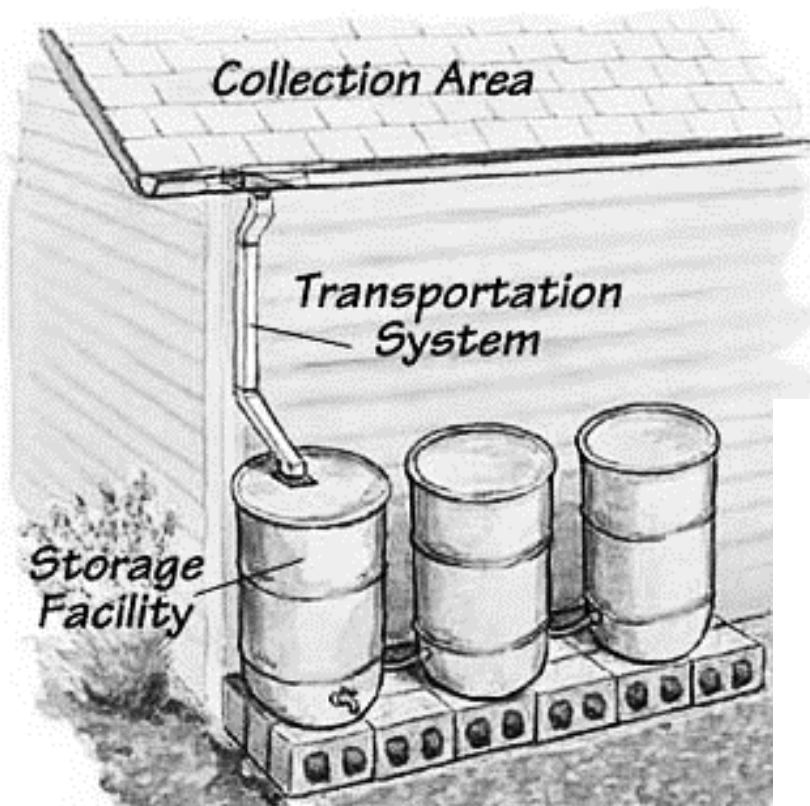
Amount of money needed: low

Time for building and maintaining: low

Solution: Rainwater Collecting

How it works:

Rainwater collecting means collecting water from rooftops using large containers called cisterns, rain tanks or rain barrels. This keeps the water from becoming runoff and the water can then be used to water gardens and plants.



Solution: Rain Garden

Community Example: Seattle

Students at Hope Academy/Al Noor Mosque in West Seattle helped plant a RainWise rain garden at their school to trap and clean the water from their parking lot. The school didn't have a lot of space to use, so this rain garden is small. Students and community members will now take care of the garden and teach others about the benefits of rain gardens. This rain garden is helping Puget Sound get healthy!



Find it near you:

Rain gardens can be found in people's yards all around Seattle. B.F. Day, Montlake and Wedgewood Elementary Schools have rain gardens too! Visit www.700milliongallons.org to see more projects in the city.

Rain garden at Hope Academy. (Image from West Seattle Blog)

Rain garden Benefits and Challenges

Rain gardens come in all shapes and sizes to fit a yard or schoolgrounds. Rain gardens can make good habitat for bugs, birds and other wildlife. In Seattle, there can sometimes be grants (money) to pay for rain gardens to be built.

Amount of space needed: medium

Amount of money needed: medium

Time for building and maintaining: medium

Solution: Rain Garden

How it works:

Rain gardens hold onto stormwater in a temporary pond so it can slowly absorb into the ground. The plants and special soils in rain gardens help to clean the water. Rain gardens can be beautiful as well as helpful!

Beautiful, Hard Working Rain Gardens

Rain gardens prevent flooding, increase home value and create habitat for birds and butterflies.

12,000 RAIN GARDENS
in Puget Sound

Rain Garden Soil

Clean Water

Puget Sound

A RAIN GARDEN is a beautiful landscape feature in your yard that captures and filters runoff from your roof, driveway or other hard surface.

 **x 600**

The average home rain garden naturally filters 30,000 gallons of water per year, enough to fill a bathtub 600 times!

Calculation based on a typical 10' x 12' residential rain garden capturing average rainfall for the Puget Sound region from 1,200 square feet and a bathtub volume of 50 gallons.

For more information go to: www.12000raingardens.org

Solution: Bioswale

Community Example: Portland

Portland has a problem with pollution in its rivers. To help, students, parents and neighbors removed some of the blacktop at James John Elementary School and planted native plants. Runoff from the playground will collect in the bioswale and slowly soak into the ground. This school is one of many in Portland that have been working to get rid of some of their blacktop and put in plants instead.



Image from Eric Rosewall/Depave.

Find it near you:

Bioswales come in many shapes and sizes and are common in many places in Seattle. They are easy to find once you know what to look for! Visit www.700milliongallons.org to see more projects in the city.

Bioswale Benefits and Challenges

Bioswales are similar to rain gardens, but because they are larger and deeper than rain gardens they can handle more water – but also can cost more to build and require more engineering. Depending on where they will be the most useful, people might have to remove concrete to put in a bioswale. Bioswales make great habitat for bugs, birds and other wildlife.

Amount of space needed: medium

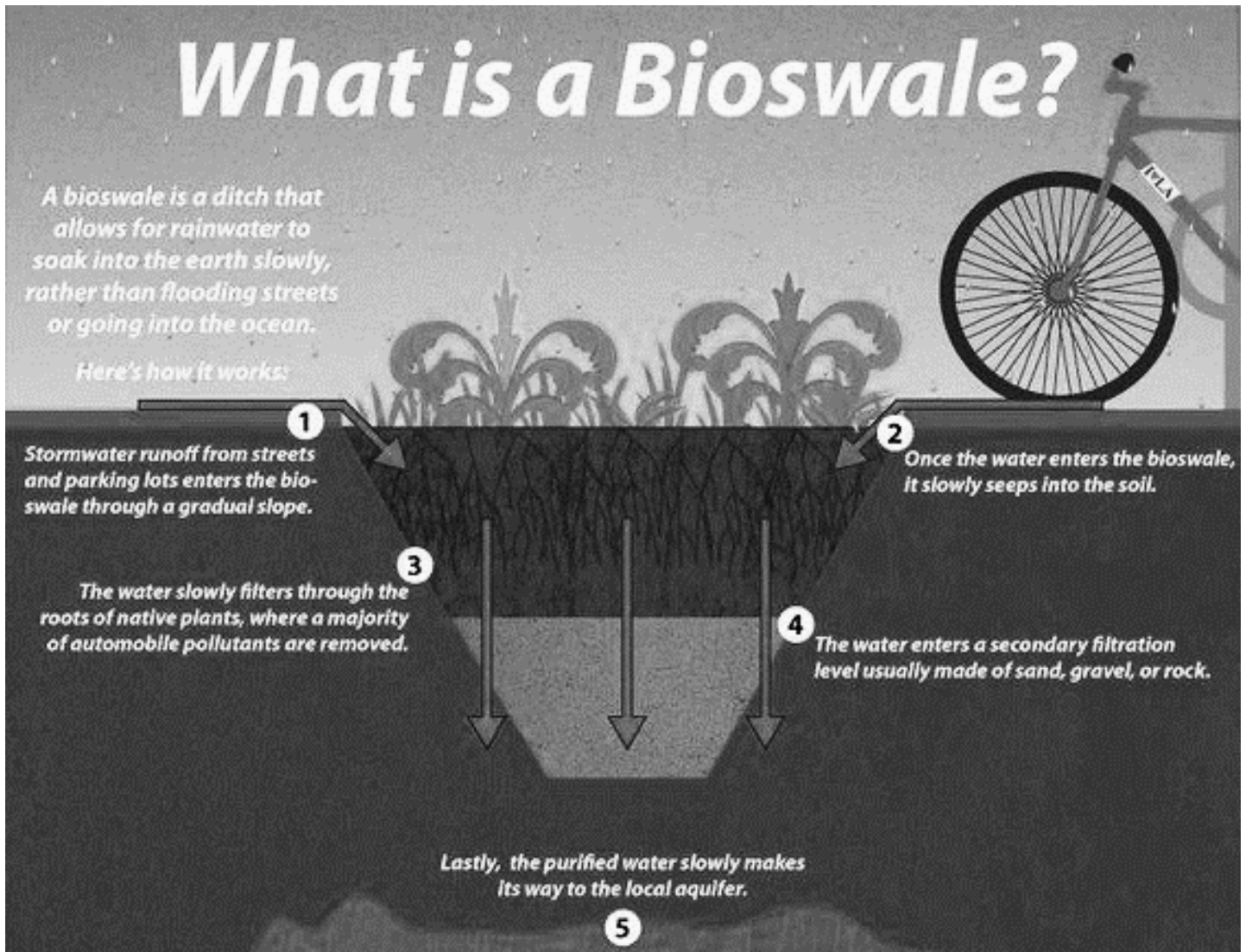
Amount of money needed: medium-high

Time for building and maintaining: medium

Solution: Bioswale

How it works:

Bioswales (also called bioretention) are shallow places for water running off of parking lots, roads, or playgrounds to collect. The plants and soils there slow the water down, absorb and clean it, and provide habitat for animals. Stormwater soaks through the soil into a sand or gravel layer underneath it.



Solution: Green roof

Community Example: New York City

New York City is the largest city in the United States and has thousands of rooftops adding to its storm water problem. To help, students at the Bronx Design and Construction Academy worked with teachers to design and plant this green roof at their school. Through this project, students learned about construction, plants and soils, plumbing, and even art. Some students even investigated how well solar panels worked on the green roof. This green roof helps keep stormwater where it falls, instead of flowing out to the streets or rivers.



Bronx Design and Construction Academy ninth-graders Elton Hollingsworth (left) and Noel Cruz, both 14, stand atop the green roof with Nathaniel Wight (far right), a teacher who leads the school's science club. (Photo by Nick Pandolfo)

Find it near you:

South Shore Middle School, Yesler Terrace and The Ballard Public Library are some places you can see green roofs. Visit www.700milliongallons.org to see where other green roofs are in the city!

Green roof Benefits and Challenges

Because green roofs are on rooftops, it takes special materials and people to build them, which can be very expensive and take a lot of time. A green roof would be out of the way of people, so wouldn't take up space that people need. They can be any size, depending on the roof. Lastly, green roofs make great habitat for bugs, birds and other wildlife.

Amount of space needed: medium

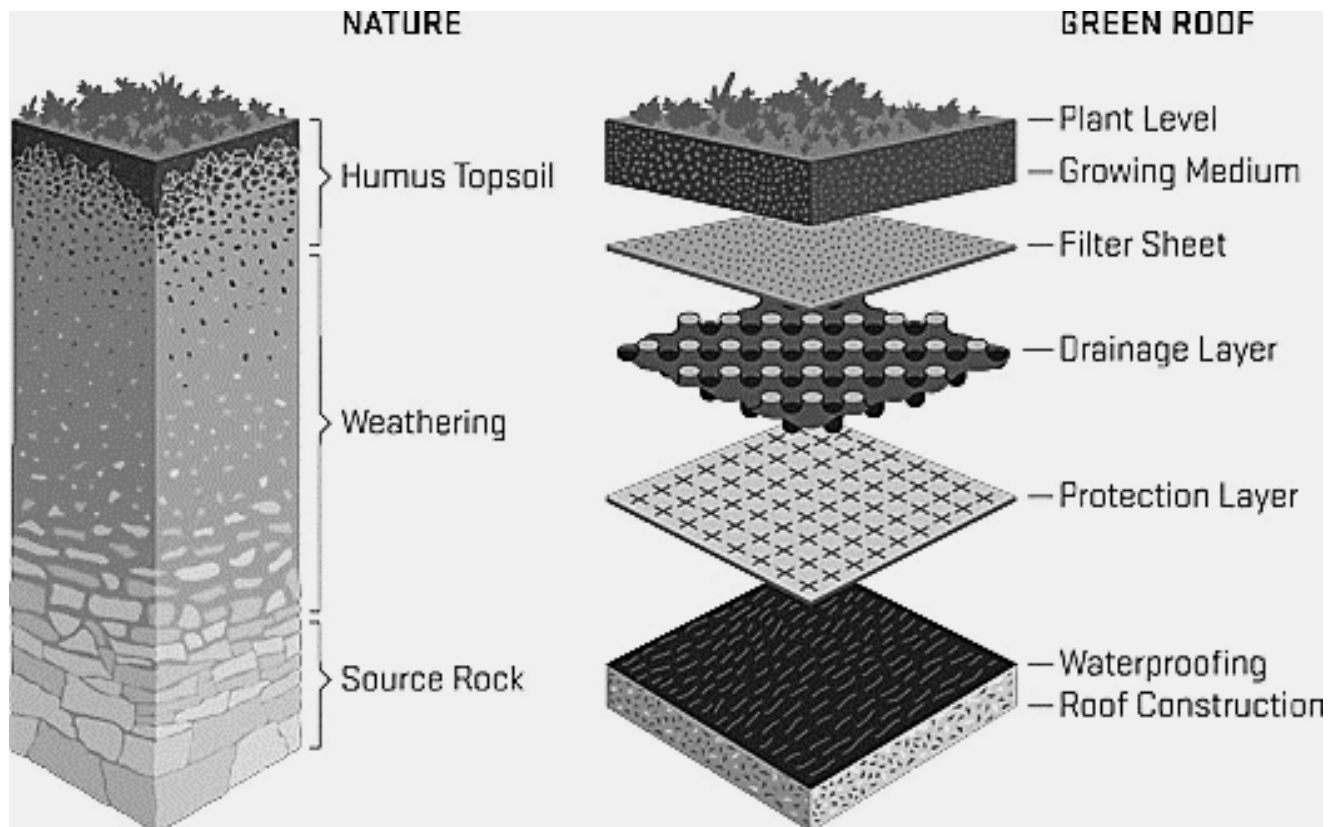
Amount of money needed: high

Time for building and maintaining: high

Solution: Green Roof

How it works:

Green roofs have special soil and plants that absorb rainwater on rooftops. Some green roofs have vegetable gardens, and others have tiny plants called sedums. Green roofs are excellent at cooling the building below it and reducing heat coming off the rooftop.



Solution: Stormwater Planters

Community Example: Seattle, Washington

Viewlands Elementary created stormwater planters to catch, filter, and slow the water running off the roofs of five classrooms. Originally, downspouts from the roofs poured stormwater directly onto the asphalt, flooding walkways between classrooms. Notice the large downspout carrying water into these planters. The planters use native plants like salal, ferns, and grasses.



Find it near you:

In Seattle there are many examples of stormwater planters of all shapes and sizes. Look for planters next to buildings and houses or on parking strips between sidewalks and roads. Check out the large stormwater planters on the sidewalks in Downtown Seattle.

Stormwater Planter Benefits and Challenges

Stormwater planters are a cheap and easy solution to too much stormwater – it doesn't take very much time to build and the materials are affordable and sometimes free. Planters are a good choice for spaces with hard surfaces like asphalt or compacted (hard-packed) soil. It doesn't take up much additional space and can be placed out of the way near the sides of buildings or houses.

Amount of space needed: low

Amount of money needed: low

Time for building and maintaining: low

Solution: Stormwater Planters

How it works:

Stormwater planters collect rainwater from roofs and help prevent flooding onto nearby playgrounds, sidewalks, roads, or parking lots. Planters can be all different shapes, sizes, and materials depending on your space and budget. The soil, gravel, and plants help slow stormwater down, absorb it, and clean it. By using native plant species these planters can also provide habitat for wildlife and pollen for bees. In a heavy rainstorm, too much runoff can cause planters to overflow. An outflow pipe can drain out excess water the planter can't hold.

