No more watering!

Make best use of rainwater to grow plants
A school ground project how-to guide

Made possible with Heritage Fund

The Brecks

The Brecks Fen Edge & Rivers Landscape Partnership Scheme was a National Lottery Heritage Fund (NLHF) funded Landscape Partnership Scheme for the Brecks.

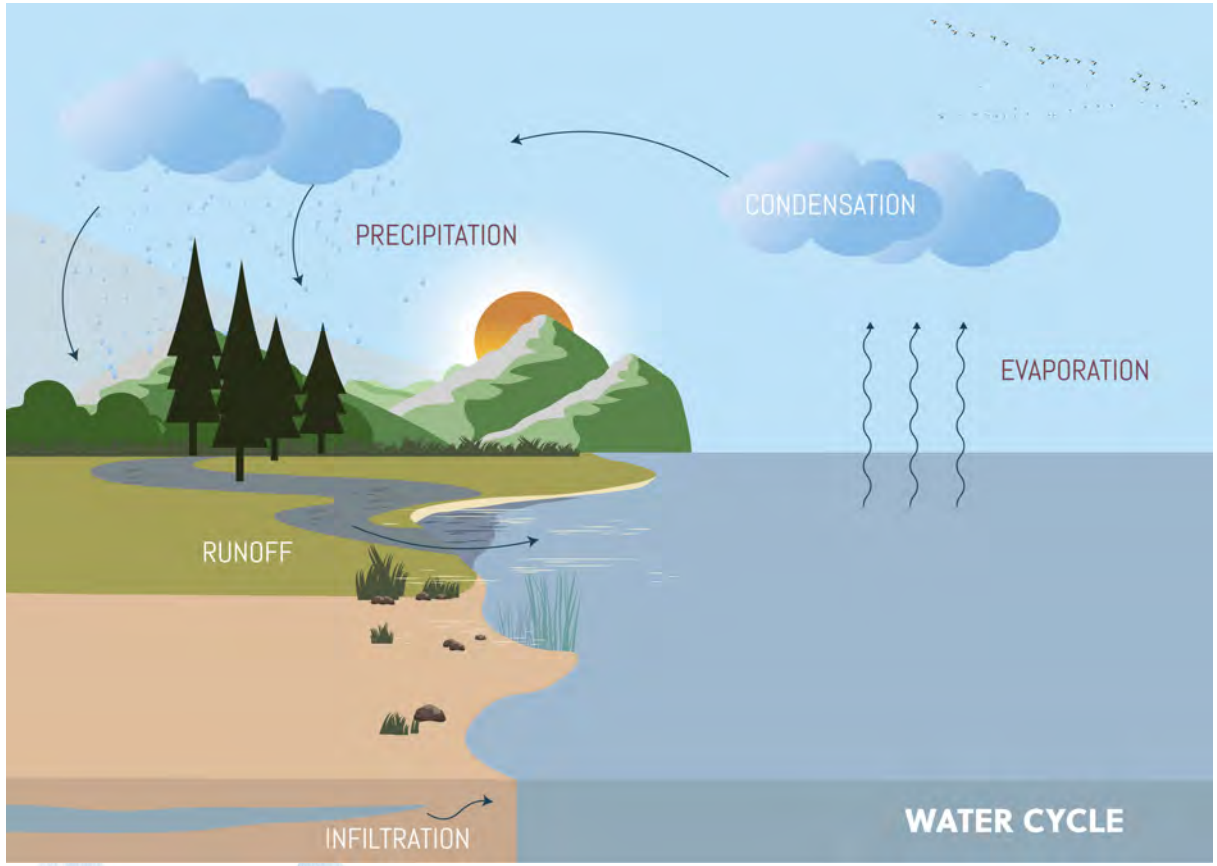
BFER ran between 2020 - 2024 and was hosted by Suffolk County Council and delivered a series of exciting community-based landscape and heritage conservation projects, focusing on the Brecks' fen edge and river corridors. The partnership was made up of regional, national and local organisations with an interest in the area, community groups and members of the community.

The Scheme outputs have concentrated on the key Fen Edge and Freshwater habitat areas within the Brecks, with the aim of delivering real understanding of water-based heritage and conservation issues, and positive conservation changes on the ground. This area encompasses a unique landscape in Britain with an incredible and much overlooked heritage and biodiversity.

Engaging with schools was a key part of this landscape scheme. Four schools in the heart of the Brecks were involved in a Rainwater Planter Project which focused on water sustainability. The planters help schools reuse natural rainwater collected from their school roof, and feed it down directly into the planter.

This document is a summary of the work completed and a how-to-guide to be used by other schools who wish to install rainwater planters in their grounds.

Water is always on the move



Water Cycle

The water cycle and weather are closely connected and influence one another.

Evaporation turns **liquid** water into **vapour** which rises into the atmosphere where it cools and turns back into droplets of liquid water which we see as clouds. The clouds are then blown over land where the water is released as rain, sleet or snow.

Climate Change

Temperatures are increasing around the world. This causes more water to evaporate from the sea, lakes and rivers. This causes storms or more intense rain to fall.

Question

What happens to water placed in a bowl outside in the sun over time?

So what happens to rain water?

Hard Surfaces

When rainwater falls on hard surfaces that are **impermeable** such as roads and roofs then the water flows to the lowest point. At the lowest point the water is collected through drains where it travels underground to an outlet such as a river or other water bodies.

There are more hard surfaces in urban areas compared with rural areas. Flooding is more common in built up areas.

Soft Surfaces

When rainwater falls on soft surfaces that are **permeable** such as lawns, fields, flower beds and forests then the water seeps into the ground which is a process called **infiltration**.

Sometimes puddles of water are created on soft surfaces. This happens when the soil has been compacted and therefore has become impermeable and is more common on clay soils. After prolonged periods of heavy rainfall the ground can also become **saturated** so the water level in the ground rises to the surface.

Activity

After rainfall can you find any puddles of water in your school ground? What surface is it, hard or soft? Why do you think the water has collected there?

Urbanisation and Flooding

There are a lot of hard surfaces in towns and cities where rainwater cannot drain away naturally through the ground. Instead the surface water enters a large network of underground drain pipes and is channelled into rivers and waterways.

Rain can be fun but too much rain can also be a problem and cause flooding. This happens when rainwater does not enter a watercourse or drainage system and instead collects on the surface. It can also happen if the drainage system does not have enough capacity to cope with the amount of water entering the system and overflows. Flooding is more common in urban areas where water cannot flow away naturally.

Activity

Look out for drain covers! Can you find any in your school ground? In what locations do you find them? On hard or soft surfaces? Are they on high or low ground? Why is that?

We need to help water flow more naturally!

Slow - Store - Soak - Move

We can not control the amount of water which falls from the sky but we can adapt how we deal with the water landing on the ground. Key is to SLOW the flow of water and ideally deal with the water AT SOURCE by letting it soak into the ground.

We can slow down the flow of water by temporarily storing it and once the heavy rainfall has passed then gradually release the water so it can infiltrate into the ground. We can store runoff from roofs in water butts and in underground storage tank. We can slow down the flow of water by directing runoff to a soak-away before it infiltrates into the ground.

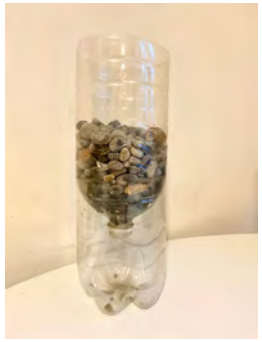
Question

Through which surface do you predict the water will flow the fastest? Gravel or soil? Why?

Let's Investigate!

Water will seep through permeable surfaces at different speed.

1. Cut off the top quarter of three 2-litre plastic bottles and plug the drink opening ends of each bottle with a cotton ball.
2. Next, fill one bottle with a permeable surface materials such as gravel or sand, and the second bottle with soil. Leave the third bottle empty with just the cotton ball plugging the end.
3. Measure out 400ml of water in a jug and slowly pour it into each bottle over the permeable surface, one at a time. Measure the time it takes for the water to filter through. Record your findings. Is there a difference?
4. Measure the volume of water which ran through the permeable surfaces. This water would naturally return to the watercourse. Some surfaces absorb water when filtering through. Which permeable surface material absorbs water? Out of the 400ml, how much water was absorbed?



Activity

Pour water through different permeable surfaces and measure the time taken for the water to filter through the surface. Record your results.

Rainwater Planter

Plants need Water

What did we learn with our investigation? We learnt that soil absorbs some of the water when it filters through. Like all living things, plants need water. Water in the soil is absorbed by the roots of a plant and travels through stems to the leaves. Water is constantly moving through plants. This is how plants get nutrients from the soil. If a plant doesn't get enough water, it will droop, wilt and possibly die. Water helps keeping plants upright.

Capturing the water and make use of it!

This is why we set out to create a rainwater planter and not just a water butt. Instead of only storing water, the water will also feed the plants and as a result less water will enter the underground drainage system and watercourses.

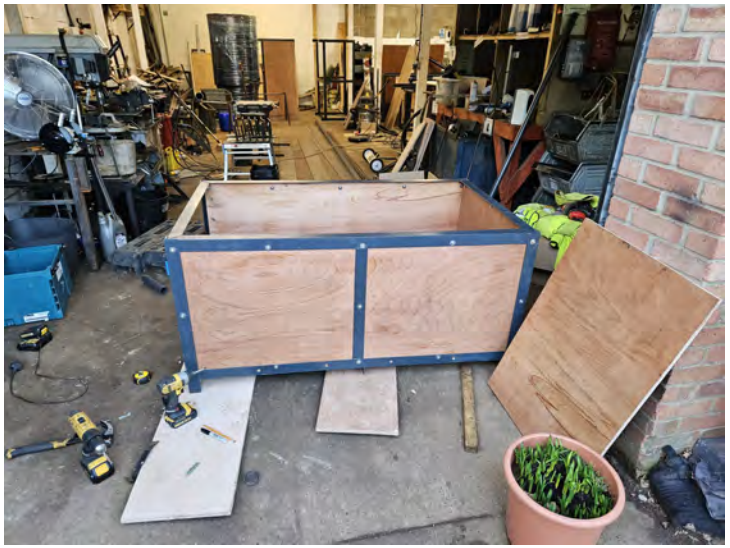
Rainwater Planter

Rainwater Planters

Five rainwater planters measuring 1.5m wide x 0.9m deep x 0.6m high designed to capture rainwater were fabricated by a local company as part of the project. They were made with a solid steel frame with marine plywood sides and lined with a butyl liner. A side polycarbonate window was added so that water levels can be observed and plant roots seen once they have established.

The planters have an inlet and an outlet for water. Connected to a down pipe, rainwater from a roof is captured to feed plants growing in the planter. The outlet can be controlled and left open to allow excess water to escape or closed to store water in the warmer summer months.

The locations of planters were carefully selected at each school. We want to avoid a windy location and we want to make sure there would be enough sun for plants to thrive. A suitable size roof was identified to feed the planter in a location where children could easily access and engage with the planter.



Activity

Have a look around your school building and note where down pipes are located. Is it connected to a drain in the ground? Consider if there is a way you can store some of the water which comes off the roof instead of letting it go into the wider drainage system. Can you install a rainwater planter? Or a water butt?

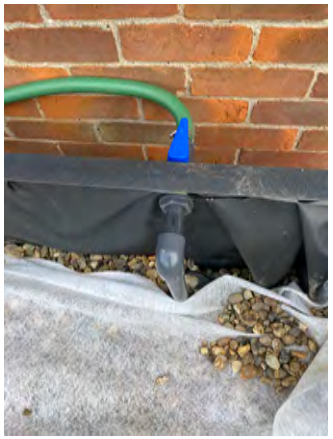
How Does the Planter Work?

1. A hole was cut into the rainwater downpipe to which the planter would be connected.

2. A welded attachment which takes around one third of the water was attached to the downpipe and connected to the planter using a flexible pipe.

3. A lever was added so water flowing into the planter can be turned off to prevent it from filling up with too much water.

4. The water entering the planter seeps into the substrate from the bottom through a perforated pipe.

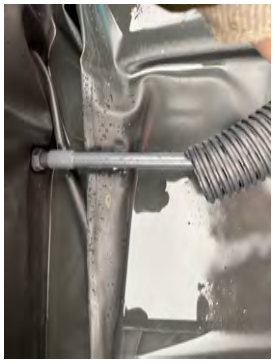


How Does the Planter Work?

5. At the base of the planter there is a perforated pipe connected to an outlet which can be opened or closed to suit weather conditions.

6. Once the planter was in place and connected it was filled with one third gravel and two thirds of a sandy soil/compost mix. These two layers of substrates are separated by a permeable geotextile membrane to prevent the soil from seeping into the layer of gravel.

7. Once filled it was time for planting!



What Plants to Choose?

Bergenia cordifolia ‘Purpurea’ *Elephant’s Ear*	
Vinca minor f. Alba ‘Gertrude Jekyll’ *Periwinkle*	
Persicaria affinis ‘Superba’ *Himalayan bistort*	
Astrantia major Gill Richardson Group *Masterwort*	
Helenium ‘Wesergold’ *Sneezeweed*	
Monarda ‘Gardenview Scarlet’ *Bergamot*	
Iris pseudacorus ‘Variegata’ *Flag iris*	

A wide variety of plants that can withstand occasional flooding are suitable for a rain garden planter. For this project we include nectar rich plants which flower to attract pollinators. Taller species were planted at the back and trailing species at the front. 13 plants were planted in each planter in total.
It is important to still water your plants in the first growing season during dry spells as the roots of the plants will take a while to grow to reach the water which is stored low down in the planter. There will also be some weeding required before the plants have grown and fill out the planter.

Managing a Rainwater Planter

The amount of water entering the planter will depend on the weather and amount of rainfall. In winter there is likely to be a lot of water and more than the plants need so it is recommended to turn the lever and the supply of water off. During drier months however and over the summer holidays it is recommended to keep the inlet open so the plants get as much water as possible.

Trouble shooting

If the planter fills up with more water than needed, then the lever at the outlet at the bottom can be opened to empty out surplus water. This water can be re-used to water plants elsewhere in the school ground.

Question

Plants need water to survive but what happens to plants if they have too much water?

The Brecks Fen Edge & Rivers Landscape Partnership Scheme

www.brecks.org

Participating Schools

Admirals Academy, Thetford
Rayleigh Infant School, Thetford
Norwich Road Academy, Thetford
The Bishop's CE Primary Academy, Thetford
Drake Primary School and Nursery, Thetford

Fabricator of planters

Vandenberg-Hider, Harleston, Norfolk, www.vandenberg-hider.co.uk

Compost

It is important the compost is free draining so a 80% loam and 20% compost soil mix is suitable. The planters had a layer of gravel at the base and we added 400L of the soil mix into each. The soil was supplied in 25L bags.
Supplier: Field Compost Ltd, Weston Colville, Cambridgeshire, www.fieldcompost.co.uk

Plants

The aim is to plant 5-10 species of plants in 2 or 3 clumps per square meter. A typical planting density is 6-10 plants per square meter. By planting several species you will be creating a rain garden that can still succeed even if one or two species do not thrive.
Supplier: Howard Nurseries, Wortham, Norfolk, www.howardnurseries.co.uk

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