

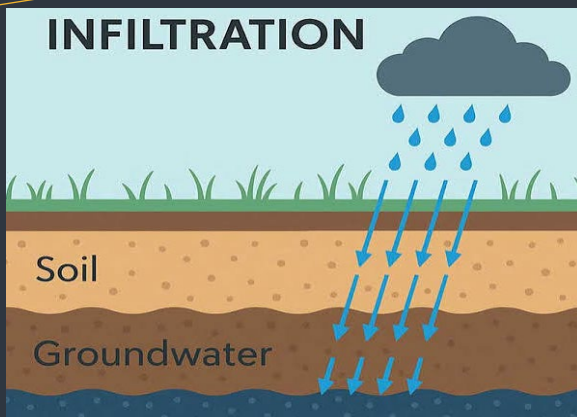
Whole Cycle Tuesday

Takeaway

Healthy soil is one of nature's most effective tools for managing and protecting water. By building organic matter and maintaining good soil structure, we can improve infiltration, reduce runoff, capture nutrients, and help protect the quality of the water beneath our feet.

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*"Nature does not hurry,
yet everything is
accomplished."*

— Lao Tzu

Soil...America's Largest Water Filter

When we think about water filtration, we often picture treatment plants, sand filters, membranes, and other engineered systems. But long before water reaches a treatment facility or underground aquifer, it passes through one of the largest and most complex filtration systems on Earth: soil. As rainfall infiltrates, soil begins physically, chemically, and biologically processing the water moving through it.

Healthy, well-structured soil contains a network of large and small pores. Larger pores allow rainfall to infiltrate rather than immediately becoming surface runoff, while smaller pores retain water for plants and soil organisms. Along the way, soil particles can trap suspended solids, organic matter can bind certain contaminants, and plant roots create pathways that help water move deeper into the soil profile and contribute to groundwater recharge.

Biology provides another layer of treatment. Billions of bacteria, fungi, and other microorganisms inhabit healthy soils, where they break down organic compounds and recycle nutrients. Nitrogen is a good example: microorganisms transform nitrogen between different forms, and under the right conditions, denitrifying bacteria can convert nitrate into nitrogen gas. Plants also capture nutrients through their roots

before they have an opportunity to reach groundwater or nearby waterways.

This natural filtration system depends heavily on healthy soil structure and organic matter. Compacted or eroded soils absorb less rainfall, increasing runoff that can carry sediment, phosphorus, nitrogen, and other pollutants into waterways. Practices such as maintaining vegetation, reducing compaction, and applying compost can improve aggregation, increase biological activity, and restore the soil's ability to absorb and retain water.

Healthy soil also supports diverse microbial communities and stronger plant root systems, creating a more resilient ecosystem both above and below ground. The better our soils function, the better they can withstand drought, heavy rainfall, erosion, and other environmental stresses

As communities invest heavily in stormwater and water-quality infrastructure, it is worth remembering the enormous natural system already beneath our feet. Healthy soil is more than a growing medium, it is part of our water infrastructure. Protecting and rebuilding our soils can slow runoff, reduce erosion, capture nutrients, support groundwater recharge, and help protect the water cycle itself.

