



**Stream Team Academy Fact Sheet Series**

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Collect this entire educational series for future reference! Contact us at 1-800-781-1989 if you'd like a copy of previous Fact Sheets or a binder for storing them.

# WHERE DOES THE RAIN GO?

## An Educational Series For Stream Teams To Learn and Collect

*By Larry O'Donnell, President, Little Blue River Watershed Coalition*

Moisture falls from the sky as rain, snow, and hail. In pre-settlement times, much of what fell from the sky soaked into the ground and less than 10% ran across it. Since then, humans have made significant changes to the landscape. We have plowed up the prairie, cut down trees, and built impervious (nonporous) surfaces, like houses, streets, and parking lots. These activities have decreased infiltration, or the capacity of the landscape to absorb precipitation, in many areas causing a larger portion of water to run off the surface. Runoff has also increased in rural areas where we have compacted and disrupted soils, contoured hills, and put drains under fields. This surface runoff is known as stormwater.

Today, 80% of the U.S. population lives on only 10% of the land, primarily in coastal and urban areas. Much of the rural and suburban land left is under significant development pressure as urban areas continue to push outward to accommodate the growing population. Negative impacts to waterbodies from increased stormwa-

ter runoff have been noted in watersheds with impervious surface coverage as low as 10%. It is estimated that a typical city block generates over five times more runoff than a forested area of similar size.

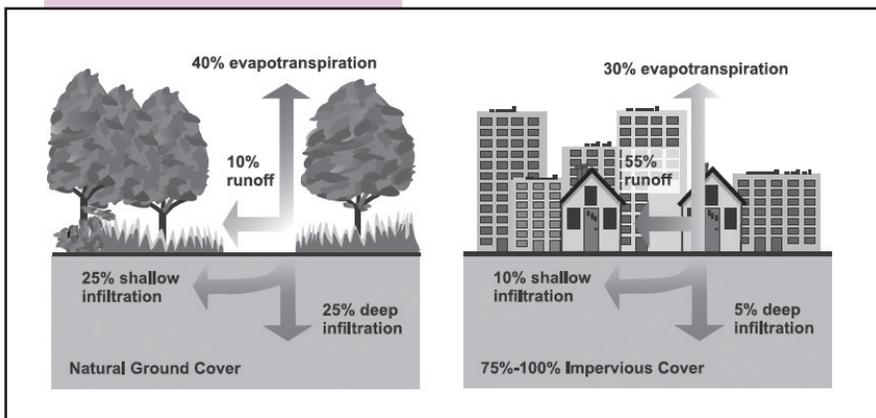
### SO WHAT'S THE PROBLEM?

Increased stormwater runoff causes changes in water quantity and quality. Streams are at the lowest point in the landscape and recharge from groundwater. A reduction in infiltration means less groundwater is available to recharge streams, leading to low or dry streams in dry months. However, increased runoff from impervious surfaces also means that more water reaches streams more quickly in urban and suburban areas. This leads to what is known as flashiness, where streams experience higher, more frequent floods with water levels rising and falling rapidly.

Stormwater runoff can also cause increased erosion in the watershed and along banks. Storm drainage systems exacerbate these problems by rapidly moving runoff directly to waterways, along with chemicals, debris, and sediment. Stormwater from dark surfaces, such as pavement or rooftops, can also be much warmer than surface water causing increases in water temperature and decreases in dissolved oxygen levels. All of these changes can significantly impact a waterbody's ability to support aquatic life.

### IF IT'S ON THE GROUND, IT'S IN THE WATER

Many causes of pollution in waterways come from stormwater runoff, which enters our streams, rivers, and lakes without treatment. As runoff moves across the landscape, it picks up pollutants and



Human changes to the landscape can significantly impact the amount of water that runs off the surface during storms, which can have serious negative consequences for aquatic resources.

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deposits them into waterbodies. This is known as nonpoint source (NPS) pollution, or pollution originating from many sources. The U.S. Environmental Protection Agency (EPA) consistently ranks nonpoint source pollution as the number one threat to our nation's waters. According to the U.S. Geological Survey (USGS), "More than 200 million Americans live within ten miles of a river, lake, or estuary that is considered impaired because it cannot fully support its biological communities or conform to water quality standards."

There are more than 40,000 impaired waterbodies nationwide. Excess sediment, nutrients (nitrogen and phosphorus), and pathogenic microorganisms are the leading causes of these impairments. About one quarter of all U.S. streams have elevated levels of nitrogen or phosphorus, primarily from nonpoint sources like pet wastes and fertilizers from residential lawns and agricultural lands. Stormwater also contributes a variety of chemicals to waterways. It is not uncommon for heavy metals, pesticides, and oil to make their way to waterbodies in stormwater runoff.

### FIXING THE PROBLEM

In 1972, as a response to heavily polluted rivers, Congress passed the Clean Water Act and tasked EPA with making our wa-



*Most storm drains deliver stormwater directly to surface waterbodies without treatment.*

ters fishable and swimmable by addressing the cause of impairments. Stormwater impairments are difficult to address due to the many sources of pollution and potentially high cost of installing infrastructure retrofits or performing restoration projects. However, many cities, counties, and states are taking action through community education, regulations designed to minimize the impact of stormwater, and institution of Best Management Practices (BMPs).

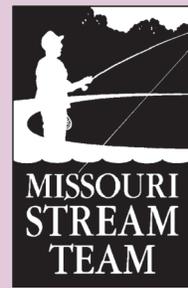
BMPs are management or conservation practices that help control the movement of stormwater and prevent degradation of water resources by holding stormwater where it falls and encouraging infiltration. Stormwater BMPs include detention basins or ponds, bioswales, pervious (porous) paving, low impact development, and planting and maintaining riparian buffers. Additionally, there are many things you can do every day to help:

- ✓ Landscape with native plants to help rain soak into the ground.
- ✓ Never discard trash or yard waste down storm drains or in the street.
- ✓ Apply lawn and garden chemicals sparingly and according to manufacturer directions.
- ✓ Redirect downspouts to drain onto lawns and gardens where water can soak in, or consider installing a rain barrel.
- ✓ Dispose of pet waste properly.
- ✓ Wash your car in a grassy area or at a carwash. Never let water from washing your car run into the street.
- ✓ Never dispose of oil, antifreeze, paints, or other household chemicals in storm drains.
- ✓ Mark storm drains in your area to educate your community about the link between stormwater and water quality.

Don't forget to send your questions to [streamteam@mdc.mo.gov](mailto:streamteam@mdc.mo.gov) or call 1-800-781-1989.

### Sources:

- Elder, Don, Killam, Gayle, and Paul Koberstein. 1999. The Clean Water Act: An Owner's Manual. River Network, Portland, OR.
- U.S. Environmental Protection Agency. 2000. Atlas of America's Polluted Waters, EPA 840-B-00-002. Office of Water (4503F), United States Environmental Protection Agency, Washington, D.C.
- U.S. Environmental Protection Agency. 2003. Urban Nonpoint Fact Sheet, EPA 841-F-03-003. Office of Water (4503F), United States Environmental Protection Agency, Washington, D.C.
- U.S. Geological Survey. Various dated. National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 9, Chaps. A1-A9.



*Trash, debris, sediment, and chemicals enter our streams, rivers, and lakes via stormwater.*