

Column: The Lifecycle of a Raindrop - Why it Matters to You

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It's raining hard. You need to get to an important appointment. You're halfway to your destination when you hit a roadblock. The intersection is flooded, wind gusts have downed electrical wires and there's no end in sight. You have no choice but to return home, where there's no electricity.

Scenarios like this—and much worse—are playing out in communities around the country. Climate change is causing more destructive conditions nationwide, turning every street into a potential flood zone. From earthquakes to severe storms and flooding, Americans are increasingly seeing startling images of cars disappearing into sinkholes, widespread power outages and destroyed homes and neighborhoods. Everyday stressors and extreme weather are pushing local infrastructure to the brink.

Where Do the Raindrops Go?

Do you ever wonder where a raindrop goes? Normally, rainfall is absorbed into the ground or it flows into rivers, lakes and oceans to replenish the water cycle. Once land is developed, a stormwater management plan

needs to be implemented. This ensures that water that lands on an impermeable surface—pavement, concrete or a roof—is captured, conveyed to where it can be stored and then treated before it is returned to the environment. Without a comprehensive stormwater management system, excess water increases the potential for flooding, which can damage crops and property.

According to Brian King, EVP of Marketing and Sustainability at Advanced Drainage Systems, the lifecycle of a raindrop begins from the moment rain falls from the sky. From that point, it is critical to start planning for how this precious resource is managed, to maximize its positive impacts and minimize its destructive power.

- Capture—Stormwater enters basins and filters work to remove sediment and debris.
- Convey—Pipes direct water away from parking lots, freeways and fields so areas stay dry and neighborhoods stay safe.
- Store—Chambers ensure water flow is managed appropriately, guarding against flooding.
- Treat—Water quality products clean water before returning it to lakes and streams.

An optimal stormwater system manages surface water from rainwater events to prevent or reduce flooding and safeguard communities. Yet, many U.S. municipalities aren't equipped to manage ever-increasing stormwater. It has become critical to find solutions that reduce impacts associated with ongoing climate change. Extreme storms and everyday stressors are here to stay and they have extensive consequences for the health and the well-being of our communities.

Extreme Weather is Wreaking Havoc

As temperatures rise, heavy storms produce excessive rainfall because warmer air holds more water vapor. When precipitation rates exceed the infiltration capacity of soils and the drainage capacity of the stormwater infrastructure, flooding can cause catastrophic damage.

Warm weather states, such as Florida, California and Texas, have experienced coastal flooding, storm surges, hurricanes and even mudslides. Municipalities often don't have time to recover from one storm before another strikes. Back-to-back atmospheric rivers, which are columns of airborne moisture, make recovery difficult.

Consider the following examples:

- Florida: Florida is seeing an uptick in extreme rainfall events, with tropical storms and deadly hurricanes, resulting in storm surge. Extreme weather is taxing the state's aging stormwater system, which compounds flooding. According to data from the National Oceanic and Atmospheric Administration (NOAA), extreme rainfall from Hurricane Ian, the second-deadliest storm to strike the continental U.S. this century, produced a 1-in-1,000-year rainfall event in some places.

- California: Extreme weather means that California swings from periods of drought to periods of excess water in a matter of days. The extended time between rain events and the increasing volume of water puts stress on aging infrastructure. Intense downpours are causing levees to fail and state reservoirs simply don't have capacity. Excess water needed in periods of drought flows back to the oceans. Just one atmospheric river can down power lines, wash away highways and flood homes.
- Texas: Fueled by warming oceans, hurricanes have become more frequent and powerful in Texas, and rising sea levels make communities increasingly vulnerable to storm surges. Communities endured as much as 60 inches of rain during Hurricane Harvey, with over \$125 billion in costs. In early spring 2022, Texas experienced extreme events, ranging from tornadoes to the loss of tens of thousands of acres from wildfires.

Major storms are considered 1-in-50 or 1-in-100-year storms. –However, over five-weeks in the summer of 2022, five 1-in-1,000-year rain events occurred across the country. In many cities, stormwater infrastructure is not equipped to handle this much water. There is a critical need for more resilient systems that create greater capacity above and below the ground.

Everyday Stressors in the Buried Infrastructure

A resilient infrastructure requires large investments in assets that are designed to operate over the long term. The \$1.2 trillion Bipartisan Infrastructure Law enacted in 2021 funds a significant public investment in U.S. transportation networks. While much of the focus for the funds is on visible structures, the performance of roads and highways depends on a healthy infrastructure beneath the ground. This “buried” infrastructure includes buried drainage systems, including culverts, storm drains and pipe.

The next time it rains or storms, you may think differently about what's going on below the surface, allowing you to go about your everyday life. The lifecycle of a raindrop is significant to us all.

Advanced Drainage Systems is a leading manufacturer of innovative stormwater products and services that deliver solutions for the most persistent and challenging water management problems. To learn more, visit www.adspipe.com.