Opinion Exchange

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In urban areas, rain that once seeped into the ground now falls on paved surfaces and carries pollutants straight into our waterways.

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INSTANT RUNOFF

WITH WATER IN MIND

AN OCCASIONAL SERIES

"With Water in Mind" is a long-term project by the Star Tribune's editorial page staff and online staff. The goal of the series is to examine issues surrounding water: efforts to protect it, pressures to exploit it, dangers that threaten it, its role in Minnesota culture and its meaning in our lives. **To see the entire series, visit startribune.com/water.**

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By LARRY BAKER

As the days lengthen and warm, spring rains gently cleanse the grime of winter from our streets — washing it straight into our streams and lakes. Urban storm water is highly polluted, and there is a lot of it.

Paving paradise profoundly changes the hydrology of a watershed. When rain falls on a natural landscape, less than 10 percent normally becomes surface runoff. The rest percolates downward to groundwater, which then seeps into streams during dry periods. Some pollutants, such as bacteria, are trapped in the soil as the water percolates downward. When rain hits an impervious surface such as a parking lot or street, 90 percent or more instantly becomes runoff. Urbanization makes streams "flashier," increasing peak flows during snow melt and rainstorms, while decreasing the flow during dry periods. The extreme fluctuations in stream flow caused by urbanization exacerbates downstream flooding and wreaks havoc on aquatic life. Roads and other hard surfaces become conduits for pollution.

The pollutants in urban storm water come from many sources. Runoff from lawns is rich in phosphorus, contributing to the eutrophication of local lakes. Automobiles shed copper from brake pads and zinc from tires. Erosion from poorly managed construction sites can be a thousand times higher than erosion from undisturbed landscapes. Road salt used for winter deicing enters streams and groundwater. Shingle Creek, which flows through parts of Hennepin County, is now considered "impaired" for aquatic life because of chloride contamination, and chloride concentrations in underlying groundwater are tenfold higher than background concentrations. Urban streams and lakes are frequently contaminated by fecal coliform bacteria, indicating contamination by sewage and animal wastes.

Baker continues: People are warned to stay out of Minnehaha Creek after a rain. **AA5** ►

Credit Credit

STORMWATER SOLUTIONS A rain garden at the Ramsey-Washington Watershed District's new office: Such gardens collect water and allow it to infiltrate the soil.

Porous pavers being used in a parking lot: In some situations, materials like these can reduce the amount of runoff that flows into rivers and streams.

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◂ BAKER FROM AA1

The Minnehaha Creek Watershed District now advises people to avoid direct body contact with Minnehaha Creek for three days after a rain, to avoid the risk of gastrointestinal illness (translation: the "runs").

Since we enacted the federal Clean Water Act 35 years ago, we've made major progress in cleaning up "point sources" of pollution, such as municipal sewage and industrial wastes. We have now turned our attention to the more difficult problem of "nonpoint" pollution, such as urban runoff. In the first stage of storm-water pollution control, the main approach has been to install "end-of-pipe" treatment systems, such as storm-water ponds, infiltration basins and wetlands. These structures are important, but will generally not clean up storm water to acceptable levels.

To reduce urban storm-water pollution to acceptable levels we must cut it off at the source. The volume of runoff can be reduced in some situations by using porous pavement or permeable pavers rather than conventional pavement. Rain gardens, which collect runoff and allow it to infiltrate downward, have become popular in the Twin Cities, and new, "low-impact" developments are being designed to minimize runoff.

MnDOT salt trucks now have onboard road temperature sensors to allow more precise salt delivery. Many of these trucks are also equipped to deliver brine solutions rather than dry salt, and they often "prewet" to prevent icing rather than melting ice after it forms. These measures greatly reduce the amount of salt needed to maintain safe winter driving. Unfortunately, many municipalities that once used both salt and sand for winter maintenance have shifted to a "salt only " policy, to reduce the amount of street sweeping needed during spring cleanup. Some municipalities also have "bare road" policies, even for low-speed side streets. These measures exacerbate the salt problem.

Finally, Minnesota's statewide restriction on the use of lawn fertilizers that contain phosphorus went into effect last year. Although its goal was to reduce the amount of phosphorus entering lakes, the law did not provide funding for research to study the long-term effect of decreased phosphorus use. One potential unintended consequence is that the phosphorus level in some lawn soils may become so depleted that turf quality will decline, resulting in increased erosion. Several ongoing studies to study the long-term impacts of the fertilizer restriction have faltered for lack of funds. The best course of action for homeowners is to test the phosphorus content of their soils and apply only the

rather than conventional pavement. Rain gardens, which collect runoff and allow it to infiltrate downward, have become popular in the Twin Cities, and new, "low-impact" developments are being designed to minimize runoff.

Efforts to reduce sources of contaminants have had mixed results. Over the past five years, thousands of people have attended training courses on erosion and sediment control at the University of Minnesota — an important first step — but enforcement of erosion control regulations is uneven. More consistent enforcement of erosion and sediment control regulations at construction sites would level the playing field among land developers and shift the cost burden from the taxpayers, who are now paying to trap and remove sediments from stormwater ponds downstream, to developers, who are producing the sediment pollution.

Minnesota's Department of Transportation (MnDOT) has started an ambitious program to reduce pollution from road salting. Many

ing in increased erosion. Several ongoing studies to study the long-term impacts of the fertilizer restriction have faltered for lack of funds. The best course of action for homeowners is to test the phosphorus content of their soils and apply only the amount of phosphorus indicated by the soil test (this is still legal).

We now know that reducing pollution at the source is often cheaper and more effective than cleaning it up afterwards. Experience has shown that bans on leaded gasoline, organochlorine pesticides and phosphorus in detergents have led to rapid declines in environmental concentrations of these pollutants. We have also learned that research, education and incentives have dramatically reduced erosion from farms.

The lessons learned should be applied to urban storm water: Source reduction should be the first thought, not an afterthought. The potential benefits are safer recreation, clearer lakes, higher property values for lakeshore homes and healthier ecosystems.

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