

Stormwater risks could rival sewage overflows

Key Message

Stormwater runoff itself—not just sewage overflows—presents an increased risk of waterborne disease. Actual risk will depend on exposure.

Human waste rightly stirs an emotional aversion in the public mind, and much attention is paid to sewage overflows for their potential health risk.

However, contaminated stormwater runoff could rival the disease risk from sewage overflows.

The public health risk of sewage overflows should be considered in comparison to risk from stormwater runoff in order to prioritize infrastructure investment.

Not Just Sewage Overflows

We know that sewage overflows are associated with high levels of human fecal bacteria in urban watersheds. Diarrhea-causing viruses have been detected in association with fecal bacteria.

But even in the absence of sewer overflows, researchers have found human fecal bacteria in urban river water following storm events. These findings suggest sanitary sewage contamination.

The “first flush” after a rain event has been implicated as bearing the brunt of fecal contamination. This is likely because pathogens harbor in sediments that get flushed through the system.

Storms are responsible for moving over 60% of all contaminants in cities, but we do not yet know the relative contribution of fecal contamination from stormwater versus sewage overflows since overflows themselves are also associated with heavy rain.

Runoff composition varies, underscoring the need to identify local problems in order to prioritize cost-effective solutions.

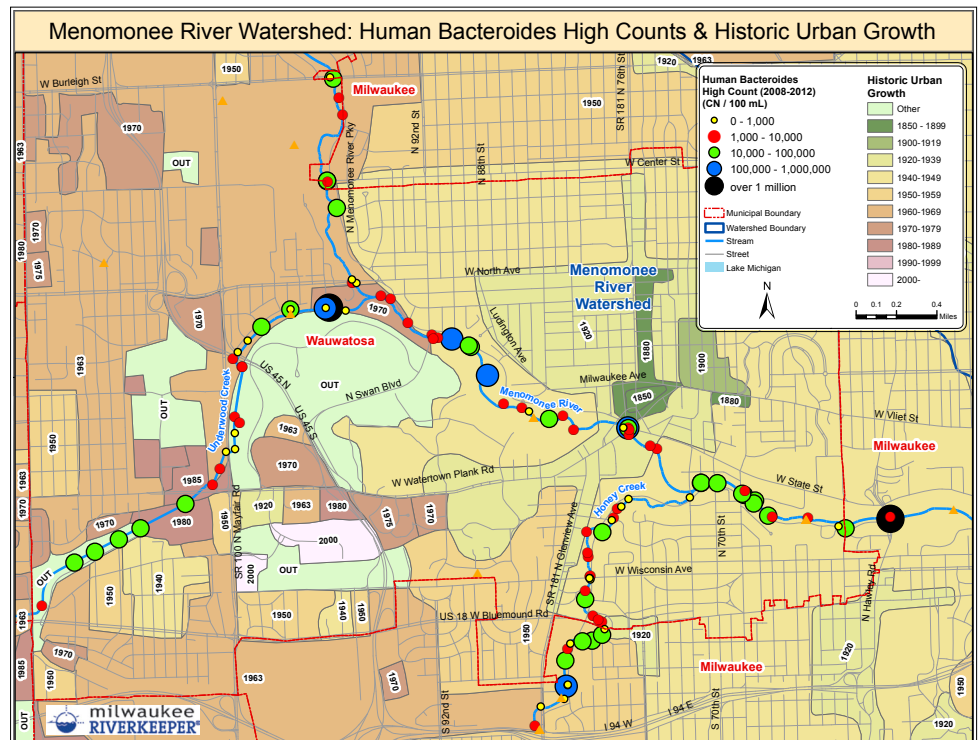
Sanitary sewage contamination of stormwater systems suggests “illicit” connections between sanitary and stormwater sewers and/or inflow and infiltration into pipes. Identifying sanitary inputs to storm sewers is a first step to limiting pollution.

Policy Recommendation

More research is needed to characterize the relative human health risks of stormwater versus sewage overflows.

Leaks, joints, cracks, and illicit connections promote the transport of fecal pathogens. Under extreme precipitation leading to excessive inflow or infiltration, sewage pipes can actually become pressurized, resulting in jets of contaminated water erupting through manholes or into surrounding sediment. Pressurized sewer pipes could become a source of contamination to nearby groundwater aquifers or water mains, both of which supply drinking water.

Wisconsin law requires sanitary pipes to be at least eight feet from water mains, but in reality many pipes may be closer. Depending on soil types and infrastructure integrity (in the event of low water main pressure), proximity means vulnerability.



Milwaukee Riverkeeper's \$100,000 study has identified human fecal contamination hotspots in the Menomonee River as it flows through Wauwatosa, Wisconsin.

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Based on the work of Jonathan Patz, UW-Madison; Henry Anderson, DPH; Kristen Malecki, UW-Madison; Mark Werner, DHS; Sandra McLellan, UW-Milwaukee; Megan Christenson, DHS; Mark Borchardt, USDA; Steve Vavrus, UW-Madison; Steven R. Corsi, USGS; Marc Gorelick, MCW; Ron Gangnon, UW-Madison; Jiale Xu, UW-Madison.

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Map: Milwaukee Riverkeeper 2013.