MSD faces big challenges in reducing sewage overflows into Mississippi

By Jo Seltzer, Special to the Beacon

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The Mississippi River that flows by our town may get cleaner faster as a result of a recent Environmental Protection Agency decision. In fact, the federal government is requiring Missouri to make the river along its entire 195-mile stretch on the Missouri border suitable for "whole body contact" -- meaning it should be both fishable and swimmable.

This decision does not mean that we can take a dip as soon as warm weather arrives. A Mississippi River in which folks would want to swim is a long-term goal that presents great challenges to the state and the city. Everyone will be asked to play a role in developing solutions, including businesses large and small and even homeowners.

In late October, the EPA ordered the Missouri Clean Water Commission to adopt more stringent water quality standards for the 28.6 miles of the Mississippi that flows past St. Louis. The decision came in the wake of a suit filed by the Missouri Coalition for the Environment. That means that the area will have to get a better grip on handling stormwater runoff that overwhelms the region's sewer systems.

Every year billions of gallons of raw sewage mixed with water from Saint Louis area storm sewers pour into the Mississippi. Some of the sewage goes directly into the river, and some into tributaries like the River Des Peres. These sewer overflows happen when it rains; the amount of sewage depends on the severity and duration of the storm.

In dry weather, the waterways are protected. All collected sewage goes to one of the two wastewater treatment plants, Bissel Point and Lemay. The water is cleaned up and returned to the river.

During some severe rains, however, much of the sewage does not make it

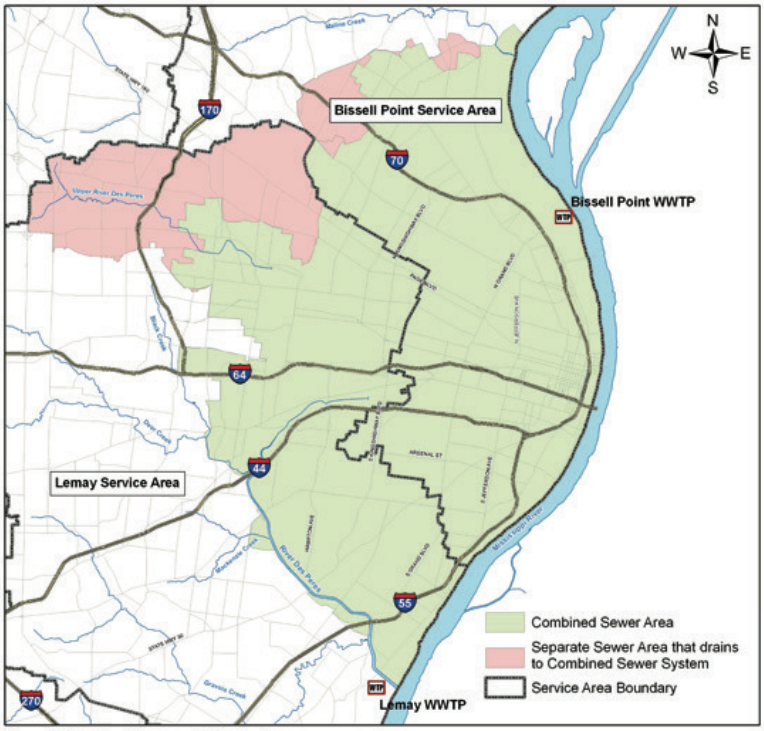

Figure 3-1 Combined Sewer and Tributary Areas

In the green areas, sewage and storm water runoff drain into the same pipes. In the pink areas, sewage and storm water pipes are separated, but drain into the combined sewer system.
Map courtesy of Metropolitan Sewer District.

to the treatment plant. Instead, thanks to the structure of the sewers in the older parts of the metropolitan area, it combines with runoff water from the storm sewers and exceeds the capacity of the treatment plants. The barriers that divert sewage to the treatment plants are overwhelmed, and the overflow mixture goes straight into the Mississippi and its local tributaries.

The first St. Louis sewers

How did such an unhealthy situation develop? It took time. (The following history was taken from MDS's long term plan for combined sewers, available on tits website.)

Before 1850, when most homes didn't even have indoor plumbing, all sewage and stormwaters drained into waterways or sinkholes. The sinkholes became "slough ponds" full of disease-causing microbes. So the city of Saint Louis decided to build sewers that would remove sewage from the areas where people lived and convey it directly into the Mississippi. Construction of the first sewer began in 1849.

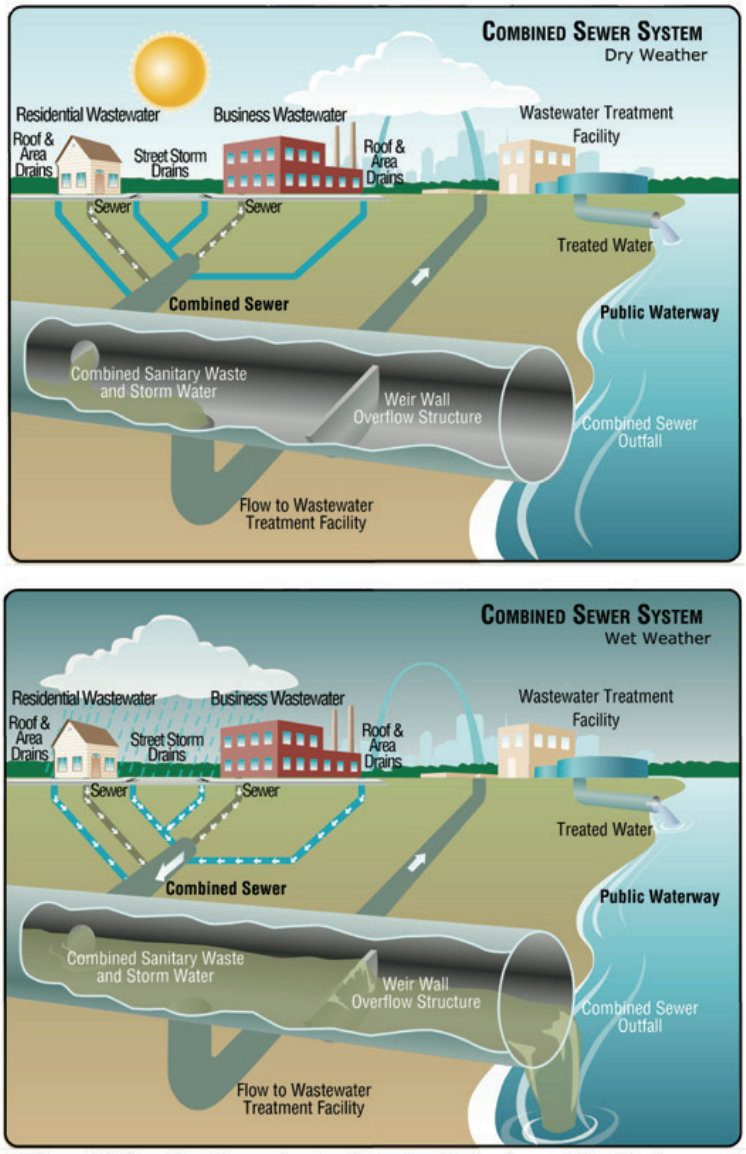

Figure 1-2 Combined Sewer System Operation During Dry and Wet Weather

Drawing courtesy of Metropolitan Sewer District.

As the city grew, more sewers were built. These "combined" sewers carried both waste and storm overflow together. Dilution in the Mississippi and its tributaries seemed a sufficient health measure. By 1920, with 870 miles of combined sewers serving the area, an "interceptor" sewer was constructed beneath the River Des Peres. This interceptor worked in dry weather to channel sewage from the River Des Peres into the Mississippi. During storms the River Des Peres became smelly as storm water runoff overwhelmed the interceptor system.

As the city and county continued to grow in the mid-twentieth century, it became clear that the sewer system was inadequate. In 1954, when the Metropolitan Sewer District was established, about 120 billion gallons of

wastewater went into local ditches, streams and rivers.

In the following years, MSD built a series of "interceptor" sewers to divert sewage toward wastewater treatment plants. The Lemay plant went online in 1968, followed by the Bissell plant in 1970. Both have subsequently been modified for two stage treatment, and other major improvements have been made. Today, the estimated overflow had been reduced to "only" about 13 billion gallons annually.

What, beside poor design of the 160 year old sewers, has caused this mess?

- The growing population produced more personal waste.
- Houses have indoor plumbing with multiple bathrooms, washing machines and dishwashers, and lawns that get watered and often over-watered.
- Every home and every development and every road paves over soil that could absorb rainwater. Decreased absorption leads to increased water runoff during rainstorms.
- Trees, with thirsty roots, are cut down with development. The leaf canopy of a full grown tree can prevent as much as 300 gallons of rainwater a year from even reaching the surface.
- Even climate change seems to add to the problem. Storms that used to be considered "50 year events" now occur as 5-25 year events. For example, October, 2009, attained historical wetness.

Saint Louis is not alone. Most of the country's older cities have similar situations—when it rains, the sewer infrastructure is simply not adequate to handle the volume.

Plans to reduce overflows

The Clean Water Act requires that combined sewer overflows be greatly reduced.

MSD has approximately $4 billion of improvements already planned for and underway, states spokesperson Lance LeComb. The wastewater treatment plants are being expanded and upgraded. Its long term plan for combined sewers, completed in August, will put another $1.9 billion into the mix. If it passes regulatory approval, most of the money will go to "gray" improvements such as a new treatment facility and a diverter storage tunnel at the upper River Des Peres.

Most of the improvements will concentrate on greatly reducing the number of combined sewer overflows into the River Des Peres, its tributaries and other small local streams. Combined sewers that empty into the Mississippi would receive less attention. In fact, the annual number of combined sewer overflows directly into the Mississippi would not be reduced.

If the recent EPA decision on making the local Mississippi suitable for whole body contact stands, the plan will need to be modified. Combined sewer overflows into the Mississippi will need to be addressed. The engineering solutions will be costly. Possibly some of the planned projects will be delayed in favor of projects with a more direct impact on the big river.

Green practices can help

The good news is that "green" measures can do a great deal to alleviate the problem. Both Kathleen Logan Smith of the Missouri Coalition for the Environment and LeComb of Metropolitan Sewer District emphasize the importance of these measures.

What are these green measures? Some of them, like rain barrels and rain gardens, will be contributions by individual homeowners. Others, like paving with permeable surfaces, and utilizing public plantings to absorb runoff, will require cooperation from planners and developers.

Rain gardens and rain barrels

According to June Hutson of the Missouri Botanical Garden's Kemper Center, a rain garden "offers the homeowner an opportunity to help the environment by reducing the amount of water that goes into the sewer system." Each rain garden will be unique to its site and soil, but basically they consist of plantings in a somewhat sunken area that can catch and absorb rainwater before it gets into storm sewers. Usually they are planted with deep-rooted native plants, but the Kemper Center's demo uses ornamentals as well. The plants not only take up the water, but also purify it by picking up pollutants.

The rain garden at the Missouri Botanical Garden Kemper center features a mix of native and ornamental plants. The concave area is built up (bermed) at the bottom of the bowl to retain rainwater longer.
Photo courtesy of Missouri BotanicalGarden

Rain gardens are a focus of the citizen-driven Deer Creek Initiative to clean up the Deer Creek watershed that empties in the River Des Peres in Maplewood. The group is creating demonstration rain gardens, the largest at Mount Calvary Church. The Garden, MSD and the Missouri Department of Natural Resources were recently awarded the Rain Bird Award for Intelligent Use of Water as a result of their work with the Deer Creek Initiative.

The ShowMe Rain Gardens Coalition, with many partners drawn from business, government, and organizational sources has information about how to build rain gardens and what to plant on their web site www.showmeraingardens.com.

Installation of rain barrels is a relatively inexpensive way for individuals to reduce the local impact of storms. A rain barrel is simply a large container—usually holding 55 gallons—that collects the water from a roof downspout, instead of channeling that runoff water into the storm sewer. Drainage from a 1/4 inch rainfall will fill the barrel, assuming a roof area of about 400 square feet. Obviously the collected water can be used later to water a garden, wash a car, etc., but its immediate use is to mitigate the "whoosh" of rainwater into the sewer.

Various community organizations are working to get homeowners to install rain barrels. For example, the River des Peres Watershed Coalition and University City are cooperating in a pilot project in which 100 families get a free rain barrel in exchange for a monthly report on its use. In another pilot, MSD sold 1500 barrels at a reduced cost last year, and plans on another 2000 this year.

Green solutions on a larger scale

Bruce Litzsinger, Manager of Environmental Compliance for MSD, emphasizes that increased awareness of the impact of storm water runoff means that builders and engineers need to think in new ways. The "green" part of "green practices" means that living plants are involved. Thus, MSD, the Missouri Botanical Garden, and the "Grow Native" program sponsored by Missouri's Departments of Conservation and Agriculture have developed a Best Management Practice landscape guide to manage stormwaters.

It comes down to educating people to do things differently. As an example, take parking lots. Logan Smith and Litzsinger both spoke about plantings in parking lots or on street medians. Trees with a curb around them or raised planters do not collect the rainwater that sheets off of paved surfaces during a storm. In fact, they usually require regular watering. With green design, the tree plantings on parking lots would either be sunk below the surface, or would have curbs with openings to allow drainage into the soil instead of into the storm sewers.

Green practices seem especially urgent in St. Louis City and the inner ring suburbs, where combined sewer overflows have an immediate environmental impact. Municipalities and developers are gradually becoming aware of how new development and redevelopment can incorporate designs to minimize the impact of storms.

Logan Smith is that "The ball is rolling now. The important thing is that we need to start taking our water situation seriously. It's ironic—we have plenty of water, but we do not have plenty of sewers."