Combined Sewer Overflows in Missouri: Costs and Alternative Approaches

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Introduction

Combined Sewer Overflows (CSOs) are detrimental to water quality in Missouri and pose a significant health risk to humans. The effects of CSOs are not yet fully known and there is an ongoing effort to quantify their impacts. The prospect of correcting the problems posed by CSOs is a daunting task that will force decisions affecting CSO communities economically and socially. Currently, the State of Missouri does not provide a regulatory framework for effectively addressing CSOs (**See Report 27-2005 for more detail**).

Combined sewers carry both precipitation runoff and wastewater discharge in the same pipe. During dry periods (no rainfall), the wastewater is diverted to a nearby treatment facility and is safely treated. During wet periods (precipitation events) however, the volume of water within the pipe is so great that all of the water cannot be diverted to the treatment facility. This creates an overflow that discharges raw sewage water and runoff into nearby receiving streams. The unpredictability of these discharges not only endangers health and the environment, but it also makes regulating these discharges difficult for the CSO communities and the Missouri Department of Natural Resources (DNR).
In Missouri, St. Louis, Kansas City, St. Joseph, Moberly, Macon, Sedalia, and Cape Girardeau have combined sewer systems (Missouri Clean Water Commission Minutes September 2004). One of the problems associated with CSOs is that it is difficult to quantify their effects or occurrence without in-depth monitoring. Therefore it is difficult to determine the impacts of these CSOs throughout the state. A study by Wilkison, Armstrong, and Blevins determined that in a ten-mile stretch of the Blue River and Brush Creek in Kansas City, Missouri receives wastewater discharge from 220 CSO locations in the City (MARC 2005).

Options for Addressing Combined Sewer Overflows

Under Missouri's current system, CSOs are required to meet the same standards as those for treated wastewater discharges (MO Code of State Regulations 10 CSR 20-7.015). CSO communities in Missouri have argued that this method of regulation penalizes them because the raw sewage in combined sewers make it impossible for the overflow from CSOs to achieve the treatment criteria (Missouri Clean Water Commission Minutes, November 2004). When the overflows exceed the criteria, the cities must pay fines. These communities would like for the State to implement criteria that would be specific to each CSO site, and they are pushing for a regulatory framework similar to that recommended by the Environmental Protection Agency (EPA) because they believe that new criteria would lead to more effective CSO regulation and it would lessen the regulatory burden on the community

EPA's Combined Sewer Overflow Control Policy provides guidance for cities regarding technological and regulatory controls that would limit impacts of CSOs on water quality (EPA 2002). EPA recommends that CSO communities implement "nine minimum controls" that would minimize the impacts of CSOs. Figure 1 shows the nine minimum controls recommended by EPA.

Figure 1. Nine minimum controls recommended by EPA to minimize CSO impact

- Proper operation and maintenance for sewer systems and CSOs
- Maximum use of the collection system for storage
- Review pretreatment requirements to minimize CSO impact
- Maximize flow to treatment facility
- Prohibit combined sewer discharge during dry weather
- Control solid and floatable materials in CSOs
- Pollution prevention
- Public notification of CSO occurrences and impacts
- Monitor CSOs to characterize impacts and efficacy of CSO controls

Source: Guidance for Nine Minimum Controls, EPA 1995

EPA also recommends that CSO communities have a long-term control plan (LTCP) in place to guide CSO remediation efforts. These LTCPs should contain plans to monitor the impacts of CSOs, to assess viable alternatives, to determine economic costs, and to provide an implementation schedule (EPA 2002). Many CSO communities across the country have begun to utilize a LTCP and the nine minimum controls recommended by EPA with positive results.

Almost all remediation efforts associated with CSOs are extremely costly. Many times, the only options is to upgrade existing treatment facilities and to completely separate the sewer systems. The LTCP is intended to help communities identify the option that will have the greatest environmental benefits while minimizing economic impacts on the communities.

Example Regulatory Frameworks

The City of Lansing, Michigan, in cooperation with the Michigan Department of Environmental Quality, created a LTCP in 1992 to eliminate CSOs. Lansing's LTCP consisted of plans to upgrade the wastewater treatment facility and to fully separate 203 miles of sewers. They estimate the cost to be around $176 million over the 30-year construction period (City of Lansing 2003).

The City of Omaha, Nebraska implemented its own CSO Program in 1990 with the ultimate goal of minimizing and, if possible, eliminating CSOs in Omaha (City of Omaha 2004). During the period from 1990-1999, the City spent over $30 million on sewer projects to separate sewers and create pump stations to minimize overflows. The City has also identified 76 projects that will be completed by 2007 and will cost over $60 million. They will also start a new program in 2008 that will continue to address options for separating sewers (City of Omaha 2004).

Omaha was issued a permit in 2002 that will allow the city to begin the development of a LTCP and to utilize the nine minimum controls recommended by EPA. Omaha is an example of a city that chose to take the initiative regarding CSOs before any enforcement was required and has therefore made significant progress in terms of minimizing CSO impacts on water quality and human health.

The Massachusetts Water Resources Authority (MWRA) created a three-phase LTCP in 1988 (MWRA 2004). It has since been approved at both the state and federal levels. The implementation of this plan will span 30 years, which is the longest time period allowed by law, and will reduce the impacts of CSOs in Massachusetts by nearly 90%. Figure 2 shows the LTCP for the MWRA.

Progress in Kansas City

In Kansas City, CSOs are a problem whose impacts have only begun to be evaluated. Kansas City, Kansas has undertaken a 20-year, $55 million dollar plan to replace CSOs with more environmentally sound systems (Kind 2003). In Missouri, evaluations are underway. Preliminary estimates put the cost of minimizing CSOs at nearly $2 billion dollars. These estimates include consulting fees, sewer separation, additional treatment facilities and pump stations, and various other engineering controls that would be needed to eliminate CSO discharge (Kind 2003). Although the costs for these projects can be very high, the projects are necessary if CSO discharges are to meet state and federal water quality standards. Funding for these projects will be predominately from state and local sources, which will result in the need to balance taxpayer willingness to pay with federal and state environmental regulations.

Figure 2. The Massachusetts Water Resource Authority CSO LTCP

The MWRA CSO PLAN: 1988 – 2008		
1988 — 1992	PHASE I	• Add CSO treatment facilities • Improve Deer Island Treatment Plant's ability to pump wet weather sewage flows
	Results	• A reduction of CSO volume by 55% (over 1988 levels) • Treatment of 50% of remaining CSO flows
1992 — 2000	PHASE 2	• Upgrade CSO treatment facilities • Further increase the Deer Island Treatment Plant's ability to achieve full planned pumping and treatment capacity
	Results	• A reduction of CSO volume by 70% (over 1988 levels) • Treatment of 60% of remaining CSO flows
1996 — 2008	PHASE 3	• Separate combined sewers in some areas • Increase hydraulic capacity of the system in certain areas • Screening/disinfection/dechlorination for Reserved Channel • Construct storage facilities • Upgrade CSO facilities to improve treatment performance
	Goals	• Close 36 of 84 CSOs • Eliminate CSO discharges to swimming and shellfishing areas • Reduce CSO volumes by 88% over 1988 levels • Minimize untreated discharges • Treat 95% of remaining flow

Source: Massachusetts Water Resource Authority 2004

What Can Missouri Do?

It is obvious that CSOs present a major threat to water quality and human health in Missouri. There has been much debate over the proper way to regulate CSOs but there is a growing consensus that the Missouri Department of Natural Resources will have to consider alternative methods of regulation. The EPA recommended LTCP is one tool that CSO communities in Missouri would like to utilize to help control CSOs (Missouri

Clean Water Commission Minutes, November 2004). Massachusetts is one of many states that have shown that a properly developed LTCP can be effective in eliminating CSOs. Without a better regulatory framework in Missouri, CSOs will continue to violate state and federal water quality standards and CSO communities will continue to face penalties.

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Author Biography

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David Carani is a graduate research assistant in the Truman School of Public Affairs, University of Missouri – Columbia. He earned a bachelor's degree in Fisheries and Wildlife biology and will complete his master's in Public Policy in May 2005, both from the University of Missouri-Columbia. After receiving his master's degree, David will begin work on a master's degree in Water Quality at the University of Missouri-Columbia.

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