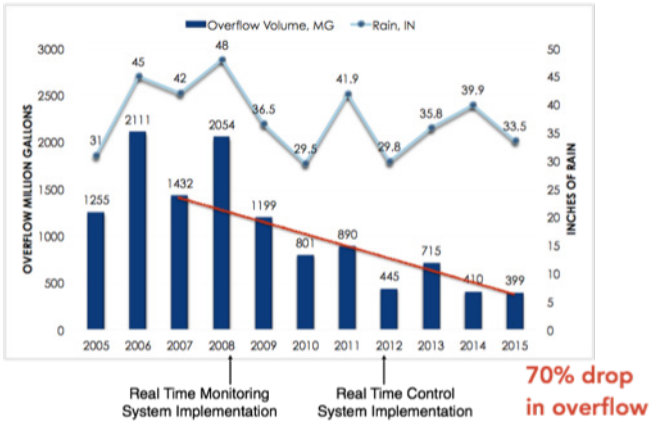
Utility: **South Bend, IN, Department of Public Works**
Topic Area 8 - Integrate Water Quality, Policy and Performance: **Real Time Decision Support**
Team: **South Bend Staff, EmNet, Greeley & Hansen**
Dates: **2008-present (Case Study prepared in October 2016)**

BACKGROUND/DESCRIPTION OF CHALLENGE

Prior to 2008, South Bend, IN was one of the largest CSO polluters per capita in the Great Lakes Watershed at a population of little over 100,000 people with CSO volumes of 1-2 billion gallons per year and 25-30 dry weather overflows per year. Had the City simply followed the prescribed projects in its long term control plan, the total cost of mitigating its CSO problem was estimated at roughly $800 million.

RESPONSE/SOLUTION IMPLEMENTED

In 2008, the City of South Bend installed and commissioned a real time monitoring system of more than 120 sensor locations throughout the city. In 2012, after thorough data review and site selection, the City along with EmNet, Greeley and Hanson and local construction firms, installed and commissioned a distributed, globally optimal real time control system consisting of 9 auxiliary throttle lines with valves, governed by an agent based optimization strategy, where distributed computing agents trade available conveyance capacity in real time, similar to a commodities market.



The original operational objective of South Bend's RT-DSS was to maximize conveyance capacity utilization throughout the Saint Joseph interceptor line. The RT-DSS serves information to a number of staff members throughout the organization. This is done through a variety of methodologies: SCADA screens for the operators, smart phone and tablet PCs for field staff, and customized websites jointly developed with the client's engineering staff. Operations staff have the ability to override the automated controls in the system and take over valve and gate operation at any time.

Since 2012, the City has added additional sensor locations and rain gauges bringing the total number to 152 sites. It also added automated gates at several storm water retention basins to better control when and at what rate storm water is released downstream into the combined system. From 2008 through 2014 South Bend eliminated illicit dry weather overflows and reduced its total CSO volume by roughly 70% or about 1 billion gallons per year in just the last 6 years. This program is estimated to reduce the ultimate LTCP budget by $300-$400 million.

OUTCOME/LESSONS LEARNED

The outcome of the City's RT-DSS program was originally predicted to simply reduce CSO volume by roughly 25%. The elimination of dry weather overflows, reducing wet weather overflows by 70% and providing operations and maintenance crews with a real time asset management and condition based maintenance system were all unanticipated wins provided by the program. The City is currently working to discern the remaining solution set and renegotiate its LTCP in order to take South Bend to Clean Water Act compliance.

References/Links:
www.southbendin.gov/government/department/public-works, www.emnet.net, www.greeley-hansen.com, pubs.acs.org/doi/abs/10.1021/acs.est.5b05870