1. Meeting Agenda (PDF)

   Documents: AGENDA AND INFO - 12-13-12 (PDF).PDF
2. PowerPoint (PDF)

   Documents: POWER POINT- 12-13-12 (PDF).PDF

City of Springfield - Greene County, Missouri

Stormwater Management Task Force Meeting

Date: Thursday, December 13, 2012
5:00 to 7:00 p.m.

Location: Public Safety Center
330 West Scott Street
Springfield, Missouri 65802

Map to meeting site on page 2

Meeting purposes:

- Select guiding principles to assist the Task Force members to guide the recommendations developed.
- Provide background on Water Quality & Regulatory Compliance.

AGENDA

5:00 p.m.	Welcome	Co-Chair Fred Palmerton Co-Chair Dan Hoy
5:15 p.m.	Task Force Survey	Sheila Shockey, Shockey Consulting
5:50 p.m.	Water Quality & Regulations	Carrie Lamb, City of Springfield Kevin Barnes, Greene County
6:15 p.m.	Task Force Discussion	Sheila Shockey
6:45 p.m.	Next steps - Information needed for upcoming meetings	Sheila Shockey
6:55 p.m.	Closing Remarks	Co-Chair Fred Palmerton Co-Chair Dan Hoy
7:00 p.m.	Adjourn	

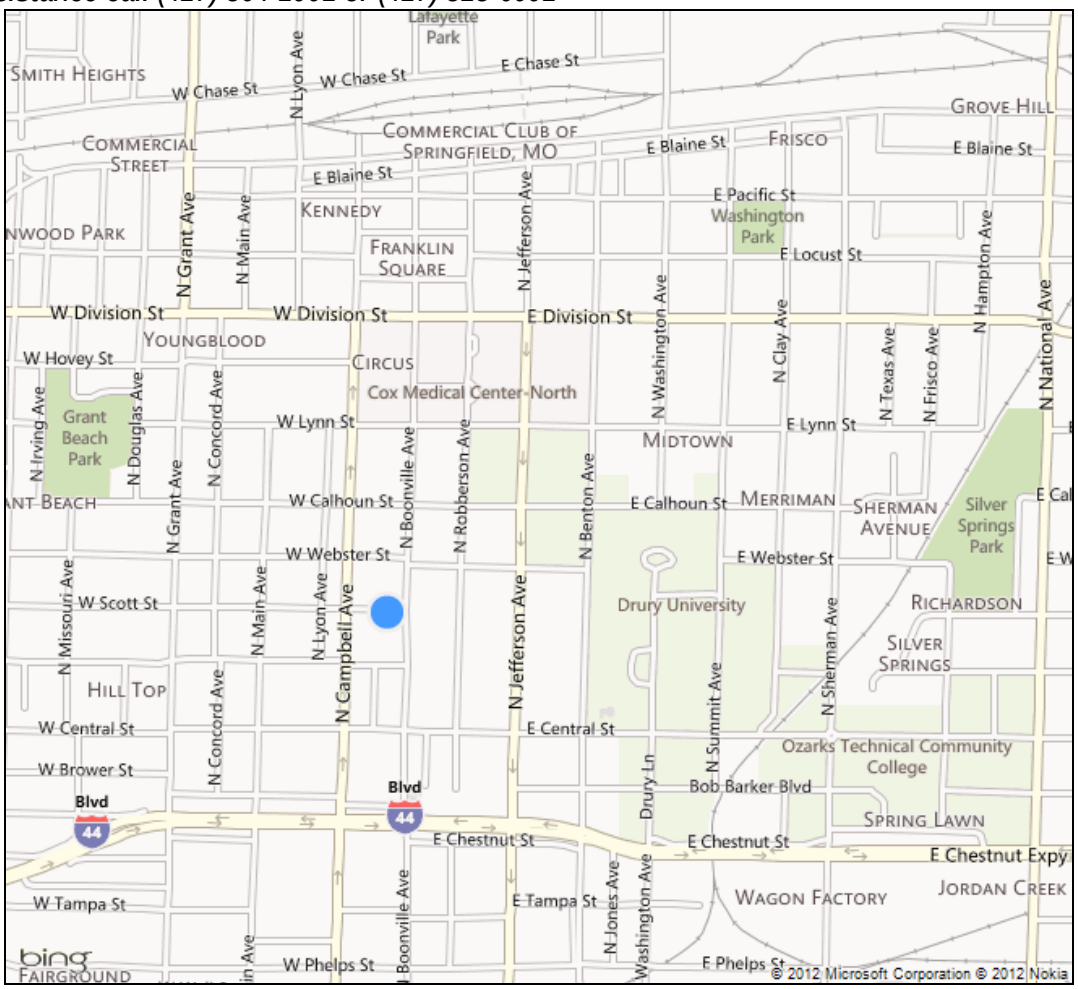
In accordance with ADA guidelines, if you need special accommodations when attending any City meeting, please notify the City Clerk's office at 864-1443 at least three days prior to the scheduled meeting.

Handouts:

1.	Task Force Meeting #2 Draft Meeting Notes	pages 4-9
2.	Water Quality Protection & Regulatory Compliance	pages 9-26
3.	Task Force Survey #2 Results	pages 27-32

Meeting Site:

Public Safety Center
330 West Scott Street
Springfield, MO 65803
For assistance call (417) 864-1901 or (417) 818-6091



Directions:

From the North: Travel south on N. Kansas Expressway to Chestnut Expressway. Turn left or east and travel to North Booneville Avenue. Turn left and proceed 3 blocks to Scott Street. The Public Safety Center is on your left.

From Highway 65: Take the Division Street exit. Turn west (right if coming from the north, left if coming from the south) and travel to Booneville Avenue. Turn left and travel about 5 blocks to Scott Street. The Public Safety Center is on your right.

From the west and I-44: Take the Chestnut Expressway east to Booneville Avenue. Turn left onto Booneville Avenue and travel 3 blocks to Scott Street. The Public Safety Center is on your left.

Task Force Commitment

The Stormwater Management Task Force will meet approximately eight times from October 2012 through April 2013. Meetings will be held approximately every three weeks except during the holiday season for up to two hours.

Remaining meeting dates are Thursdays from 5:00 to 7:00 p.m. on:

- January 17
- February 7
- February 28
- March 21 (consider changing to March 28)
- April 4

Contacts

Please contact the Project Team whenever you have questions or concerns.

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Springfield/Greene County, Missouri
Stormwater Management Task Force Meeting #2
Meeting Notes
November 15, 2012

DRAFT

Welcome & Introductions

The Springfield/Greene County, Missouri Stormwater Management Task Force met in the Greene County Public Safety Center. The meeting commenced at 5:00 p.m.

Co-Chair Fred Palmerton welcomed the committee members, discussed housekeeping items, and asked if there were any objections to the Meeting Notes from October 25 or any additions to the agenda for tonight. None were noted. Each task force member and attendee introduced themselves.

Task Force

Stacey Armstrong
Matt Bailey
Bill Bretall
Geoffrey Butler
Eric Dove
Tiffany Frey
Casey Haynes
Ronda Headland
Dan Hoy
Jerany Jackson
Chris Macioce
Dave Murray
Fred Palmerton
Brian Perdue
Matthew Pierson
Rick Scarlet
Daniel Beckman
Fred Schlegel
Harlan Hill
Tom DeWitt

Absent: Aaron Wahlquist, Karen Spence, Dana Elwell, Patrick Harrington, Patty Hamilton, Erik Fjeseth, Chris Carson, King Coltrin, Andy Hosmer, Tom Kissee

City and County Staff

Kevin Barnes
Vanessa Brandon
Phil Broyles
Chris Coulter
Carrie Lamb
Barbara Lucks
Cody Marshall
Fred Marty
Sheila Shockey
Jon Williams
Tim Smith
Todd Wagner
Kimberly White

Community Stakeholders:

Tammy Trantham
Amos Bridges
Emily Austin

Facilitator Sheila Shockey introduced the topic of discussion which was Flood Damage & Risk Reduction and presented the results of the Guiding Principles survey that task force members took after the last meeting. A total of 24 task force members responded to the survey. The results showed agreement on the following survey topics with some of them showing "neutral" responses: Innovation/Planning, Understandability/Public Education, Public Acceptance, Conservation, and Environmental Stewardship.

Question: Is there going to be another avenue to get public input besides the task force?

Response: We would like the task force's input on the level of public input we should get and how.

The survey results showed some disagreement on the following survey topic: Public Benefit

Comments:

There was discussion about rewording the Public Benefit guiding principle.

- The benefit doesn't need to be to me personally, but to the community as a whole.
- Public won't actually be able to see the benefit from maintenance of underground system.
- We need more education of the public about the benefits and should focus on tangible benefits such as greenways.
- Perception is important. The public should perceive a benefit from their investment.
- Sometimes the benefit is the absence of something, such as no flooding.

There was general agreement to change the wording. Instead of "the public should see benefits", it should say "the public should benefit from."

Sheila Shockey summarized the members' comments that were received in the survey about the biggest stormwater challenges. The comments generally fit into the following areas:

1. Public education about stormwater issues and water quality
2. Policies that allow sustainable development
3. Aging infrastructure
4. Effective technology and Best Management Practices(BMPs) for maintenance and water quality
5. Funding

Sheila asked if there were any additional challenges not submitted in the surveys.

Comments:

- A challenge is that the public is sometimes uncomfortable with new methods of managing stormwater because of their aesthetics. Educating them about the function may help. An example is a swale with tall native grasses. The perception is that it's just not being mowed, when in reality it's intentional because the grasses are providing a function.
- A lot of the public is just not interested in stormwater. How do you reach them and get them to vote.
- Who will be educating them?

- Even if you educate them about the benefits, they still may not want a naturalized or native landscape because of the way it looks. Need design flexibility for them.
- The public needs to be educated that stormwater is not an isolated issue, it is connected with economic development and public health.
- Stormwater funding has other competing needs such as public school system and traffic.
- Who should be the messenger in educating the public -- government or non-profits? Sometimes there is suspicion of government.

Sheila asked what are the challenges related to funding?

Response: Getting people to vote for it.

Response: Promise of no new taxes for five years.

Response: Those at the top of the hill don't perceive that there is a problem and that they are contributing to it. Convincing them that their share in funding the needs is equitable to their contribution to the problem.

Response: The wish list is overwhelming and we can't fund all of it. We need to figure out what we should fund and how. Life safety and mandates should be priorities. Prioritizing the list is where we should start.

Response: What are the challenges to reallocating existing taxes/funds that are being spent on other things to fund stormwater? Is there a mechanism to do that?

Response: A challenge is not creating new problems. I know people who didn't use to have flooding problems and now they do because of new development upstream.

Presentation on Flood Damage & Risk Reduction

Todd played a KSPR TV news clip from a 2009 flood at Chestnut & National. He explained what the City and County are doing to address flooding and prevent new problems from being created. This includes ordinances/regulations/standards, good planning, acquisition of flood properties, participation in the National Flood Insurance Program (NFIP), and building improvements. He explained that unlike water quality which is strictly regulated by federal/state law, the state laws related to flooding are based on "Reasonable Use" and case law. Cities establish ordinances/standards that are reasonable and we look at the national standard of practice to do that.

The City/County requires stormwater detention. There are 4 progressive levels: Flood Control, Channel Protection, Water Quality, and Low Impact Development (LID). Currently, the City and County require the first three and LID is voluntary. The first three address peak flow and water quality but do not address stormwater volume. LID addresses stormwater volume. Todd gave a local development example where it is being voluntarily implemented to prevent downstream flooding in a sinkhole area. Todd described the standards and common design storms for each of these 4 levels and how they affect peak flows and volume compared to pre-development runoff on a hydrograph. The City/County are both facing the following future requirements which are largely being driven by federal/state water quality regulations but will affect our flood control/detention requirements as well: Redevelopment standards, LID, BMP construction inspections, and long-term BMP operation and maintenance.

Our practices related to good planning at the site and watershed level include applying codes/regulations, development review, permits and inspections. Planning at the watershed level has been limited but may become more important if our focus is on building projects that address multiple issues.

Question: What scale and partners would you use for watershed planning?

Response: Some might be small-scale for watersheds wholly within the city limits but we may look at a larger scale that would involve Greene County and perhaps Christian County.

Question: Would those plans be different than the EPA 9-element watershed plans?

Response: Yes, they would be more specific and address the three elements we are talking about – flood damage & risk reduction, water quality, and infrastructure maintenance.

Todd discussed flood acquisitions, explaining that over $10 million had been expended on purchasing flood prone properties and floodplain/riparian corridors for trails.

Kevin Barnes explained that NFIP is an insurance program that the City and County have participated in since the 1980s. It requires that municipalities adopt and enforce a floodplain ordinance. By participating, any citizen is able to buy federally-backed flood insurance regardless of what flood zone they are in. The maps were updated in 2010 and the City and County have helped affected citizens with elevation certificates and Letters of Map Amendment.

Todd discussed building improvements to address flooding and showed a list of major projects that are currently funded with remaining funding sources and reserves. What remains to be accomplished includes:

1. Federal/state water quality requirements for volume reduction, redevelopment, and BMP inspections/maintenance are anticipated or proposed and we will need to adopt ordinances to address those. A stream buffer ordinance is not anticipated to be a requirement but is a good practice that we would like to see and is common in other areas.
2. Watershed master planning to identify riparian areas for protection, flood-prone areas to be addressed, maintenance needs, and areas to retrofit for water quality.
3. Continued acquisition of floodplain structures, continued pursuit of FEMA grants, and more education of public about flood risk and insurance.
4. Continuing to address services requests related to flooding in a prioritized way. It is estimated that 400 of 4,100 requests have been fixed. Our latest assessment of unfunded needs after removing what has been fixed is $650 million.

Kevin discussed that the County's 2005 estimate of unfunded needs was $25 million. We don't have updated figures at this time.

Todd discussed the Renew Jordan Creek project and an area of Fassnight Creek that floods as examples of projects that could be designed in a way that addresses all three objectives of flood damage & risk reduction, water quality, and infrastructure maintenance, while reducing project cost.

Todd showed a graph of the City's annual stormwater funding from 1995-2013 and its decline to current minimal levels.

Open Discussion

Question: What's being done to address Infiltration/Inflow of stormwater into the sanitary sewer which causes backups into homes?

Response: At the recommendation of the Wastewater Task Force, sewer rate increases were recently passed to fund the City's consent judgment to address this issue. It is a $50 million program over 7 years is currently underway including lining sewer pipes, fixing leaky manholes, and disconnecting private downspouts and sump pumps from the sewer.

Comment: It's good to have flood insurance no matter where you live because flooding can occur from blocked culverts, etc. and homeowners insurance doesn't cover it.

Question: What is the best direction to go for funding?

Response: Options are property tax, sales tax, and user fee. Many programs use a combination.

Sheila asked the members what things we should do going forward.

Comment: More signage at street crossings which are prone to flooding should be installed.

Response: We only have 1 bridge in the City with a sign. It's the Bennett Bridge at Fassnight Creek which floods pretty frequently. The frequency at other crossings is so low that the public may not take signage seriously.

Comment: We should acquire more properties since it is usually a lower cost solution than building a project that would protect the property.

Question: What is the average age of homes that flood?

Response: 1920s-1960s

Question: Why do we have to do anything to address those? It's been happening for years.

Response: One consideration is reduction in property values from repetitive damages.

Comment: In some cases, maybe they didn't used to flood. It was brought on or worsened by development upstream.

Comment: There are public health issues with flooding.

Comment: It's better to address our flooding problems locally rather than being reactive to disaster and need federal aid.

Comment: Some homes obviously should not have been built there in the first place.

Comment: Property owners may have purchased without knowledge of flooding issue because there was a lack of disclosure.

Comment: It's an issue of public welfare.

Comment: It's a question of community ethics. Government's purpose is the protection of human health, safety and welfare.

Question: Is there a way to incentivize good behavior?

Response: There is a rain barrel rebate program but the community would need a lot of rain barrels to make a difference.

Response: Larger scale rainwater harvesting at each house would help but is expensive.

Response: There is a way to use incentives through a stormwater utility but it would have to be above and beyond what is required.

Response: That doesn't address existing development.

Response: These are community problems with a regional scope. We all live downstream. Blighted homes are a problem for future generations.

Response: We need staff to help us understand mandates as part of prioritizing the wish list.

Comment (Sheila Shockey): We will talk more about mandates and water quality at the next meeting, followed by infrastructure maintenance, and more about funding options.

Meeting adjourned at 7pm.

Water Quality & Regulations

Managing stormwater quality is important in protecting our area water resources for drinking water supply and recreational uses that are so vital to our regional economy. Not only must stormwater quality be protected for public health, quality of life and our regional economy, it is also regulated through implementation of the federal Clean Water Act (CWA). Federal and state regulations specify what communities must do in an effort to minimize the potential negative impacts of stormwater runoff on the quality of waterways. Non-compliance with federal and state rules can result in costly legal actions against the City or County.

What are the City and County doing to meet regulations and protect water quality?

Springfield and Greene County have a history of commitment to water quality protection through proactive efforts, citizen-driven planning and priorities, and ongoing support and partnerships with local non-profit watershed groups.

What waterways are we trying to protect?

Springfield is located on top of a major watershed divide. The area south of about Division Street drains south into the James River (Figure 1) which flows into Table Rock Lake and the White River into Arkansas, and then into the Mississippi River. The area north of this line drains north to the Sac River (Figure 2) which flows into Stockton Lake and the Osage River system, which drains to the Missouri River in central Missouri, and eventually into the Mississippi. Within the larger James River and Sac River watersheds are many smaller streams that feed into them such as Wilsons Creek, Pearson Creek and Galloway Creek to the south, and Pea Ridge Creek and South Dry Sac to the north.

City Utilities public drinking water supply comes from surface water and groundwater from the following sources: Fellows Lake, McDaniel Lake, Stockton Lake, Fulbright Spring, deep groundwater wells, and the James River. Managing stormwater quality is important in protecting the quality of these drinking water sources. Stormwater management techniques such as rainwater harvesting can but also help conserve our drinking water supply. In addition to drinking water protection (both quality and quantity), managing

stormwater quality is important to ensure the quality of our waterways for fishing, swimming, boating, and other recreational uses. These water-related activities are primary drivers of the tourism industry that contributes greatly to the economy in the Ozarks. Table Rock Lake is a tremendous draw for tourists who desire a clear, clean lake for recreation. According to the Corps of Engineers, Table Rock Lake draws over 5 million visitors a year who spend over $50 million while they are here. Because the James River flows into Table Rock Lake, the quality of water leaving the Springfield/Greene County area can have a direct effect on the tourism industry.

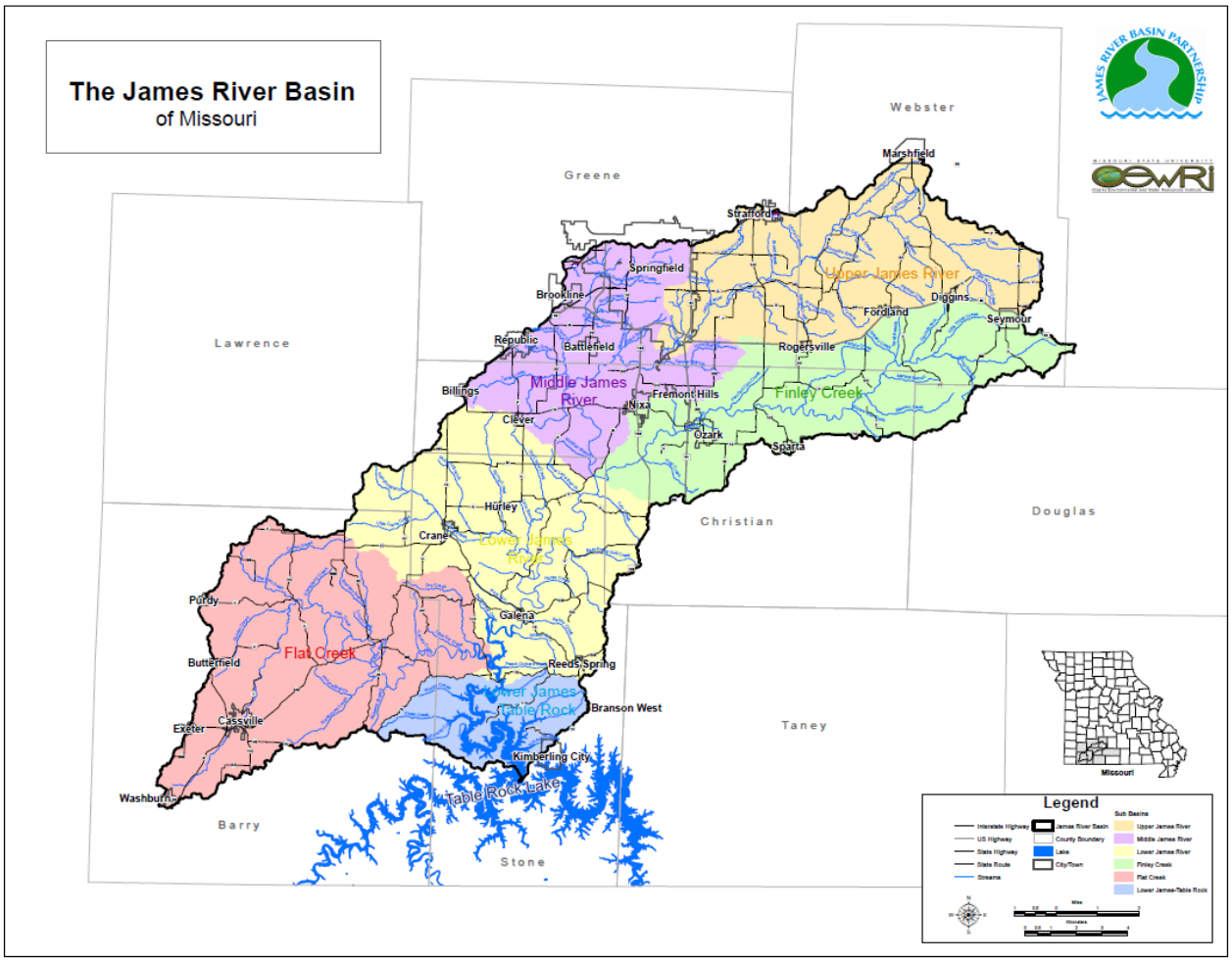


Figure 1: James River Basin

What are the Clean Water Act and the MS4 Permit?

The federal Clean Water Act (CWA) regulates the discharge of pollutants to waterways and sets water quality standards to protect them. The National Pollutant Discharge Elimination System (NPDES) program was established under the CWA to address "point" sources of pollution, including both wastewater and stormwater discharges. Regulated point sources include wastewater treatment plants, industries, construction sites, and municipal separate storm sewer systems (MS4s). Under the NPDES program, cities and counties across the nation are required to operate under an MS4 permit which requires the development and implementation of a program to address the water quality impacts of stormwater runoff. In most states, the federal Environmental Protection Agency (EPA) delegates its regulatory authority for the NPDES program to the state. In Missouri, the Department of Natural Resources (DNR) issues and enforces NPDES permits, including MS4 permits.

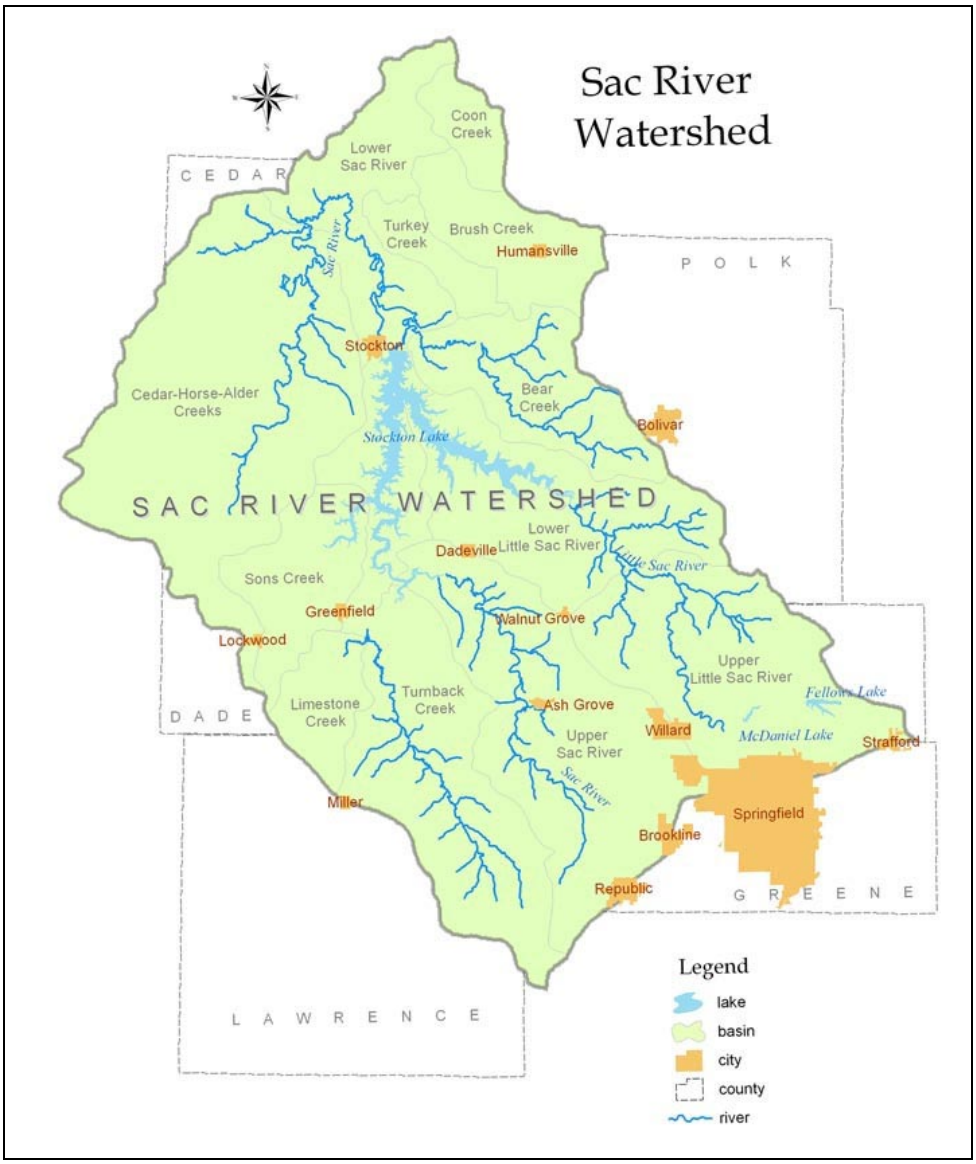


Figure 2: Sac River Basin

What is a Total Maximum Daily Load (TMDL)?

The CWA contains a step-by-step process (Figure 3) to ensure waterways in the U.S. are clean and healthy. Initially, the "beneficial uses" of a waterway are determined, which might be such uses as drinking water supply, aquatic life protection (fish, macroinvertebrates), and/or recreation (swimming, boating). Water quality standards are then developed to protect those beneficial uses. In Missouri, DNR establishes the beneficial uses of waterways and the corresponding water quality criteria to protect those uses, and is also responsible for determining if a waterway is not meeting those criteria. This is usually determined through water quality sampling that shows a specific pollutant (metals, bacteria, phosphorus) exceeds the numeric water quality criteria. However, there are also narrative water quality criteria, and a waterway may be determined as not meeting these narrative criteria due to conditions such as algae blooms or turbidity that affect beneficial uses such as recreation and fishing. A waterway that is not meeting the water quality

criteria for its designated beneficial uses is put on the State's "impaired waterways" list, also known as the 303d list, which refers to the section designation within the CWA.

Once a stream segment is put on the 303d impaired waters list, the next step is to develop a Total Maximum Daily Load (TMDL), which is a study of the maximum amount of the pollutant that the stream can handle and meet the water quality criteria. All of the sources of the pollutant are identified, including "point" sources such as wastewater treatment plants, industries, and MS4s, and "nonpoint" sources such as agriculture and runoff from suburban areas. Stormwater pollution from point sources and nonpoint sources is a challenging water quality problem. Unlike pollution from industry or sewage treatment facilities, which is caused by a discrete number of sources, stormwater pollution is caused by the daily activities of people everywhere. Rainwater and snowmelt run off streets, lawns, farms, construction and industrial sites, and pick up fertilizers, dirt, pesticides, oil and grease, and many other pollutants on the way to our rivers, lakes, and coastal waters.

The TMDL establishes a maximum "load" of the pollutant that the point and nonpoint sources can discharge into the stream, and allocates an allowable load to each source. The point sources are required to meet their load limits through their respective permits. If the entity that holds the discharge permit fails to reduce their pollutant discharge to the required level, then enforcement action by the permitting authority (DNR or EPA) can result. As part of MS4 permit requirements, both the City and County must comply with the TMDL requirements that have been developed and approved by DNR and EPA for waterways to which they discharge. The nonpoint sources are not regulated but there are grant funds and cost-share programs that allow DNR and other federal/state agencies and nonprofits to assist landowners with voluntarily reducing their pollutant loads.

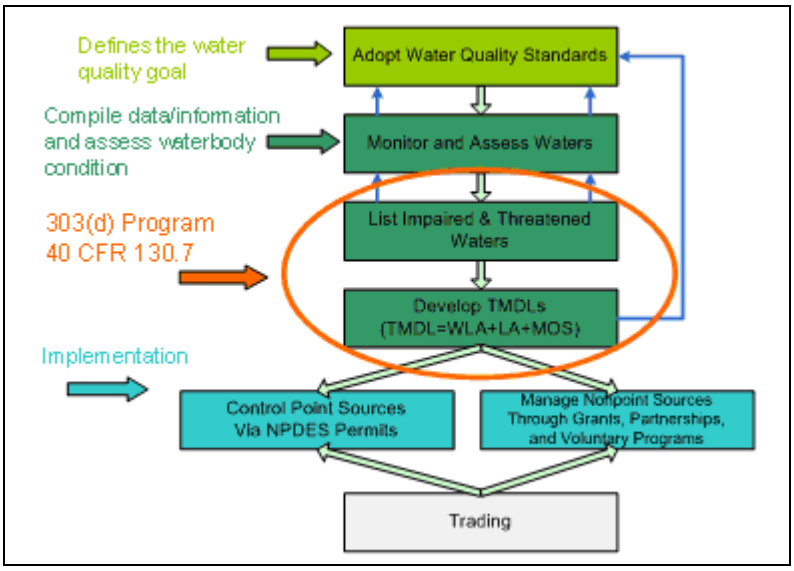


Figure 3: Clean Water Act "Water Quality-Based" Approach to Protect/Restore Nation's Waters

(Source: http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/intro.cfm)

Impaired waterways in our area are listed in Table 1. The James River and the Little Sac River were listed as impaired in 1998. The James River was listed as impaired due to excess phosphorus and nitrogen that caused significant algae blooms. The Little Sac River was listed as impaired because the levels of bacteria exceeded the water quality criteria. TMDLs were developed for the James River and the Little Sac River in 2001 and 2006, respectively, with an update to the James River TMDL in 2004. Requirements for

phosphorus removal at wastewater treatment plants in the James River watershed have dramatically decreased the phosphorus levels in the James River. This includes the City's Southwest Wastewater Treatment Plant which implemented phosphorus removal two years ahead of the required schedule. Efforts are ongoing to reduce the amount of phosphorus to the James River from stormwater runoff and agriculture. It is anticipated that numeric water quality criteria for nutrients will be promulgated by DNR in the near future that may be lower than the current target levels in the James River TMDL. This lower number could result in the James River being re-listed, as well as Springfield Lake, Table Rock Lake, and possibly other smaller streams being listed as impaired. The Little Sac watershed is largely rural and runoff from Springfield and the surrounding urbanized areas is estimated to account for only 2-6% of the bacteria in the river. Efforts to reduce bacteria will need to mostly focus on other sources which include springs, livestock, and wildlife. The City and County must address both of these TMDLs as part of their MS4 programs by conducting stream monitoring and focusing education and implementation efforts on best management practices that reduce nutrients and bacteria.

Pearson Creek, Wilsons Creek and Jordan Creek have also been determined by DNR to be impaired. Pearson Creek and Wilsons Creek were listed as impaired in 1998 because the diversity and abundance of macroinvertebrates (aquatic insects) are low compared with pristine streams such as Bull Creek and the North Fork River. Jordan Creek, a tributary of Wilsons Creek, was listed for the same reason in 2008. EPA or DNR must identify a specific pollutant causing the impairment in order to establish a valid TMDL. No specific pollutant was identified for these TMDLs. The TMDLs for these streams, issued by EPA in 2011, focus on stormwater runoff as a "surrogate" pollutant. The TMDLs propose reducing stormwater flows into these streams by about 40% for the 90-95th percentile storm, which is a size of storm that would generally fill a stream channel but is less than flood stage. Based on concerns that the TMDL was legally and technically flawed in its approach, and the potential excessive economic hardship this could place on the City and the citizens of Springfield, the City filed a legal challenge to these TMDLs and is currently negotiating a settlement agreement with EPA and DNR. It is anticipated that after the settlement agreement is finalized, the requirement to address the TMDLs through a process outlined in the agreement will be enforced through the City and County MS4 permits. In addition, Pearson Creek and Wilsons Creek were also listed as impaired by DNR in 2006 because the levels of bacteria exceed the water quality criteria. It is not known at this time what additional impacts that may have on the City and County MS4 permit requirements.

Table 1: Impaired Waterways & TMDL Status in the Springfield/Greene County Area

Waterway	Beneficial Uses	Impairment Pollutant	Pollutant Source	TMDL Status
James River	Irrigation, Drinking Water Supply (above Springfield Lake), Livestock & Wildlife Watering, Protection of Warm Water Aquatic Life, Protection of Human Health-Fish Consumption, Whole Body Contact Recreation (swimming), Secondary Contact Recreation (boating), Cool Water Fishery	Nutrients	Urban Point and Nonpoint Sources (e.g. wastewater treatment plants and stormwater runoff), Agricultural Nonpoint Sources	Issued 2001; Updated 2004
Little Sac River	Livestock & Wildlife Watering, Protection of Warm Water Aquatic Life, Protection of Human Health-Fish Consumption, Whole Body Contact Recreation, Secondary Contact Recreation, Cool Water Fishery	Fecal Coliform	Point and Nonpoint Sources	Issued 2006
Pearson Creek	Livestock & Wildlife Watering, Protection of Warm Water Aquatic Life, Protection of Human Health-Fish Consumption, Whole Body Contact Recreation	Unknown (causing low macroinvertebrate populations)	Unknown	Issued Jan 2011; Complaint filed by City in Sept 2011
		Bacteria	Multiple Point & Nonpoint Sources	Not Yet Issued
Wilsons Creek	Livestock & Wildlife Watering, Protection of Warm Water Aquatic Life, Protection of Human Health-Fish Consumption, Whole Body Contact Recreation	Unknown	Multiple Point Sources & Urban Nonpoint Sources	Issued Jan 2011; Complaint filed by City in Sept 2011
		Bacteria	Point Sources & Urban Nonpoint Sources	Not Yet Issued
Jordan Creek		Unknown	Urban Nonpoint Sources	Issued Jan 2011; Complaint filed by City in Sept 2011

What is the difference in the City and County MS4 Permit requirements?

EPA implemented the MS4 program in two phases. Under Phase I, cities and counties with a population of 100,000 or greater were required to apply for and obtain their MS4 permit. Springfield is a Phase I community and was the first community in Missouri to receive its MS4 permit in 2002. Under Phase II, the regulations were extended to cities and counties with populations between 10,000 and 100,000, and smaller communities located in census-defined urbanized areas. Greene County is a Phase II community and received its MS4 permit in 2003. Both the City and County MS4 permits require programs to address the following six elements:

- Public Education and Outreach on Stormwater Impacts – Educate citizens on what they can do to reduce pollutants in stormwater.
- Public Involvement – Actively seek public input on the development of the Stormwater Management Program Plan (SWMP), and consider other public involvement activities such as volunteer stream clean-ups.
- Construction Site Runoff – A program that requires erosion and sediment control and other stormwater pollution best management practices (BMPs) on construction sites, and includes plan reviews, inspections, and enforcement.
- Post Construction Stormwater Management in New Development and Redevelopment – A program that requires new development and redevelopment projects to address the long term quality of runoff from their property after initial construction is over by using BMPs that provide water quality treatment and/or reduce runoff. The current Phase II permit language requires that developments design their sites to reasonably mimic the pre-construction runoff conditions.
- Municipal Operations/Good Housekeeping – Projects undertaken by or for the MS4 regulated community must follow the same regulations they enforce. This element also includes requirements for street sweeping and minimizing pollution that may enter runoff from salt storage, vehicle maintenance, or other municipal operations.
- Illicit Discharge Detection & Elimination – Map and routinely inspect the storm drainage system to ensure that pollutants are not being dumped or discharged into it, and investigate and address citizen complaints of pollution.

In addition, both the City and County are required to conduct water quality monitoring. Water quality data such as the amount of nutrients, sediment, chlorides, etc. is collected from numerous sites over a long period of time to try and identify trends in water quality. Because the City is a Phase I community, its monitoring requirements are more extensive than the County. The other difference is that the City is required to have a program to address industrial runoff.

The City and County are both required to have a written Stormwater Management Program Plan (SWMP) that describes how each of these components is addressed and includes measurable goals for the program. The SWMP is a dynamic document that must be reviewed and updated periodically. An annual report is also required to be submitted to DNR. The City's annual reports can be found at www.springfieldmo.gov/stormwater/npdes_permit.html.

What are we doing to comply?

The following are some of the major City and County efforts and programs to comply with the MS4 requirements:

- City Code Chapter 96 Article II, adopted in 2002, prohibits the discharge of pollutants to the MS4, providing authority and enforcement measures to address illicit discharges and industrial runoff. The County established similar regulations in 2012 by amending Article IV, Section 25 of the Greene County Zoning Regulations to prohibit the discharge of trash and pollutants into the County stormwater system and providing authority to enforce these regulations.
- An average of 30-40 citizen pollution complaints (Figures 4 & 5) are investigated by City staff annually.
- During dry weather, 50 locations/year in the City's stormwater system are checked for illicit discharges (Figure 6). The County screens 95 stormwater discharge locations annually to check for illicit discharges.
- Stormwater samples are collected at 25 locations/year in industrial areas. If results indicate pollution, efforts are made to identify and correct the source through industry inspections and enforcement (Figure 7).

Figures 4 & 5: Pollution & Dumping Complaints

Figure 6: Dry weather screening

Figure 7: Industry inspections and enforcement

- Through City and County contracts with Missouri State University, the chemical and biological quality of the City's urban streams is monitored. The City's program includes collection and analysis of water samples 5 times per year from 12 streams during wet and dry weather, and collection/identification of macroinvertebrates twice per year from two streams. The County's program includes collection and analysis of water samples 5 times per year from 8 streams.

Figure 8: Water sampler in Jordan Creek

Figure 9: Macroinvertebrate sampling in South Creek

- Both the City and County have land disturbance permit programs to minimize the discharge of sediment and other pollutants from construction sites. The County's program has been in place since 1999. The City's program was implemented in 2009 (City Code Chapter 96 Article III). City and County permits are issued for land disturbances of 1 acre or greater. The permitting process for both the City and County requires the property owner to submit a Stormwater Pollution Prevention Plan, which gets thoroughly reviewed by staff before a permit is issued. The property owner must install, inspect and maintain the best management practices. City and County staff also conduct inspections and enforcement on a routine and complaint basis. Education and information is provided to assist the development community with compliance.
- Through the public improvement and building permit process, developments in the City and County are required to design their site using best management practices to provide water quality treatment and/or runoff reduction for the 1" rainfall. Development plans are reviewed and approved for compliance with this requirement.
- The County partnered with Habitat for Humanity on the design and initial maintenance of the Legacy Trails subdivision (Figure 10), which demonstrates low impact development (LID) design. This type of design mimics the pre-construction runoff through a combination of minimizing land disturbance and impervious area, and using best management practices that promote infiltration, evapotranspiration, and rainwater reuse. Reasonably mimicking pre-construction runoff is a requirement that developments in regulated Phase II MS4 communities are supposed to meet. Many communities have begun to require LID designs to meet this requirement. Legacy Trails is a successful attempt to demonstrate how these practices can be utilized in the Springfield/Greene County area.
- The City seeks to use green infrastructure options as part of its capital improvements program. Acquisition and preservation of riparian corridors, replacing and minimizing the use of "hard" infrastructure (concrete channels, pipes) by using green infrastructure such as vegetated channels, and retrofitting detention basins to provide more water quality benefits are all integral parts of the City's capital improvements program. The

Jordan Creek North Branch Daylighting Project is one example, which removed a box culvert and constructed on open channel system with native plants and a greenways trail (Figure 11).

Figure 10: Legacy Trails subdivision

Figure 11: Jordan Creek North Branch

- The City conducts street sweeping and storm drain grate cleaning to remove accumulated trash and debris from the streets before it enters the stormwater system. The Greene County Highway Department also conducts sweeping of county roads within the Urban Services Area.
- Plans have been developed and implemented to ensure that good housekeeping and other best management practices are in place to minimize pollution from City and County operations and facilities, including the construction of a joint City/County Southwest Salt Facility to provide additional covered storage for road salt.
- Both the City and County support and work with the Watershed Committee of the Ozarks (WCO), James River Basin Partnership (JRBP), and Project WET (Water Education for Teachers) to provide programs to educate kids and teachers through field trips, classroom lessons, and teacher workshops (Figures 12 & 13). For example, WCO hosts over 25 field trips per year at the Watershed Center, providing a valuable opportunity for students to learn about water. City and County staff and partners educate the public about stormwater issues and practices through public speaking engagements and by providing information at community events.

Figure 12: Field trip at the Watershed Center

Figure 13: Classroom stormwater pollution lesson

- Homeowners and landscape professionals learn about environmentally responsible lawn care practices through the Show-Me Yards & Neighborhoods Program.
- The City and County help fund the rain barrel education and rebate program in partnership with JRBP, which has sold over 1200 rain barrels since 2007 (Figures 14-16).
- Special projects such as Storm Drain Reveal, a City-JRBP project, are a creative and successful way to engage and educate the public about stormwater through art (Figure 17).
- Through the City's Adopt-A-Stream program, volunteers conduct over 20 stream cleanups per year, removing hundreds of bags of trash, tires, and other items from our urban streams (Figure 18).

Figures 14-16: Rain barrel education and rebate program

Figure 17: Artist painting mural for Storm Drain Reveal

Figure 18: Adopt-A-Stream volunteers

How do the City, County, & Nonprofits cooperate in compliance efforts?

The City and County have strong partnerships with Watershed Committee of the Ozarks, James River Basin Partnership, and Project WET to carry out the Public Education component of the program. The City allocated $40,000/year for educational partnerships with these nonprofits for the last 5 years through the now expired Parks/Waterways sales tax. This funding has been utilized for school field trips to the Watershed Center at Valley Water Mill, classroom lessons, teacher workshops, rain barrel education and rebates, Storm Drain Reveal, informational materials development, and other activities that help to fulfill the City's MS4 permit requirement for public education. The County likewise has budgeted to fund these three organizations with a total of $31,500 annually. These non-profit organizations were established with the express purpose of protecting the Springfield/Greene County water resources in part by educating the public. They have the trained staff and experience to facilitate very effective public education programs. The City and County get a better educational product through these partnerships than attempting to do all the required educational activities themselves. The City and County also partner with these organizations and other partners on other water quality efforts in addition to complying with regulations, as described in the next section.

What are the City and County doing to protect water quality in addition to complying with regulations?

Through cooperation, the City, County, and nonprofits are able to successfully leverage grant funding for projects to address water quality. Previous grant projects have included the following:

- The City partnered with James River Basin Partnership in 2007 on a $25,000 Stewardship Ozarks grant through the Community Foundation of the Ozarks. The City provided matching funds through the now expired Parks/Waterways sales tax as well as Public Works in-kind labor for the construction of rain gardens on Weller Avenue (Figure 19) and at the First Unitarian Universalist Church, and for a stormwater public education campaign (Figure 20).
- The City applied for and received a $4,500 grant from the Missouri Department of Conservation in 2008. The City provided matching funds through the now expired Parks/Waterways sales tax as well as Public Works in-kind labor for a rain garden, infiltration swale, and native plants on a city-owned lot.

Figure 19: Rain gardens on Weller Avenue

Figure 20: Pollution reporting bus ad

- The City partnered with James River Basin Partnership in 2010 on the City's first "green streetscape" which included a rain garden and pervious pavement on Park Central East and West (Figures 21 & 22). JRBP provided $10,000 through their Water Quality Improvement Plan grant and the City provided matching funds through the ¼-cent Capital Improvement Program sales tax and Community Development Block Grant funds.

Figure 21: Rain garden on Park Central East

Figure 22: Pervious pavement on Park Central West

- In connection with the Shadowood Neighborhood flood buyout, in 2007 the County partnered with the Missouri Department of Conservation, Missouri State University, Watershed Committee of the Ozarks, and Twin Oaks Country Club to obtain a $164,000 federal grant and a $15,000 grant from the Conservation Heritage Foundation to stabilize 1,000 feet of eroding stream bank on the Ward Branch (Figure 23). Stream stabilization prevents sediment and nutrients from entering the stream. Figure 24 shows the stabilized stream.

Figure 23: Ward Branch stream bank erosion

Figure 24: Ward Branch after stream bank stabilization

Currently, the City and County are partnering with Watershed Committee of the Ozarks, James River Basin Partnership, Project WET, the Ozarks Environmental & Water Resources Institute, and Ozark Greenways on the Springfield-Greene County Urban Watershed Stewardship Project (nicknamed Big Urbie). Cooperation was the key to successfully applying for and receiving $1 million, the maximum grant award possible, through the federal Section 319 Nonpoint Source Implementation Program administered by DNR. Through this grant, practices such as rain gardens, pervious pavement, and rainwater harvesting will be

implemented on public property and in partnership with schools and private partners. Detention basins will be retrofitted to improve water quality, and monitoring will provide important data on the effectiveness of these practices. Public education efforts will focus on the benefits of low impact development and other practices. The City is providing $470,000 in matching funds through the now expired Parks/Waterways sales tax and Level Property Tax. The City and County are also providing in-kind engineering and technical assistance valued at $65,000. Many of these projects will be designed to meet multiple objectives, not only addressing water quality but other needs as well. For example, the Robberson Elementary (Figure 25) and Boyd Elementary (Figure 26) projects currently underway in partnership with Springfield Public Schools will reduce runoff while also improving the functionality and aesthetics of the Robberson School's courtyard for use by the students and community. The Boyd Elementary project will reduce runoff and help alleviate a parking lot flooding problem. Other potential projects in the works include large-scale rainwater harvesting to reduce runoff, but also save money for the user and reduce the use of drinking water for non-potable uses.

Figure 25: Robberson Elementary Courtyard

Figure 26: Boyd Elementary Courtyard

To protect the region's surface and ground water, the County has had an on-site wastewater system inspection program in place for many years. This program ensures that all on-site wastewater treatment (septic) systems are properly designed and installed. Sewage effluent from failing on-site wastewater treatment systems can pollute streams through surface runoff and can contaminate springs and wells when improperly treated wastewater effluent reaches the groundwater system. This program has had a significant impact on water quality in the areas that are not served by sanitary sewer. The On-site Wastewater Training Center at Valley Water Mill is an educational partnership between Greene County and the Watershed Committee of the Ozarks to conduct training classes for proper installation of on-site wastewater systems.

The City has done a variety of other things over the years to protect water quality. The purchase and preservation of over 200 acres of riparian corridor has protected these natural areas and allowed them to be utilized for greenway trails. The Jordan Creek North Branch Daylighting Project was an innovative project that daylighted an underground stream and constructed an open channel system and greenways trail with native plants and trees to improve water quality and recreation. The recently completed projects at Doling Park and Dickerson Park Zoo incorporated rain gardens, water quality basins, and a constructed wetland to catch and filter runoff. The Fassnight Park and Sequiota Park projects addressed severe stream bank erosion that was contributing sediment and nutrients to the streams.

What are the unique features and geology of our area that impact our efforts?

In this area we have what is called karst topography (Figure 27), which is characterized by limestone bedrock that is easily dissolved by water. Karst features include caves, sinkholes, "losing" streams that lose their water through porous bedrock into the subsurface groundwater system, and springs through which groundwater emerges. Because of the potential for groundwater contamination, sinkhole collapses and flooding, it is important that we have regulations in place to restrict building in sinkholes and protect them from pollution since sinkholes are the primary way that surface water enters the ground water. Because of the interconnected drainage system of sinkholes, caves, and springs, surface water that carries pollutants can easily enter the groundwater without any treatment or filtration by the soil. This makes our groundwater especially susceptible to contamination. Protecting sinkholes is a critical means of protecting the water quality of springs and wells. Private wells are the drinking water source for many homes in the County, and City Utilities also relies on Fulbright Spring and wells for a portion of the public drinking water supply.

Although Greene County had some sinkhole regulations in place prior to 1999, it was then that the County's current sinkhole standards were adopted as part of the Greene County Stormwater Design Standards. The County regulations restrict activities within sinkholes based on the principles of sinkhole avoidance, minimizing potential impacts, and mitigation of any impacts on flooding and water quality. With rare exceptions, no clearing, building, dumping or other development is allowed within delineated sinkholes. These sinkhole regulations are not required by DNR or EPA permits.

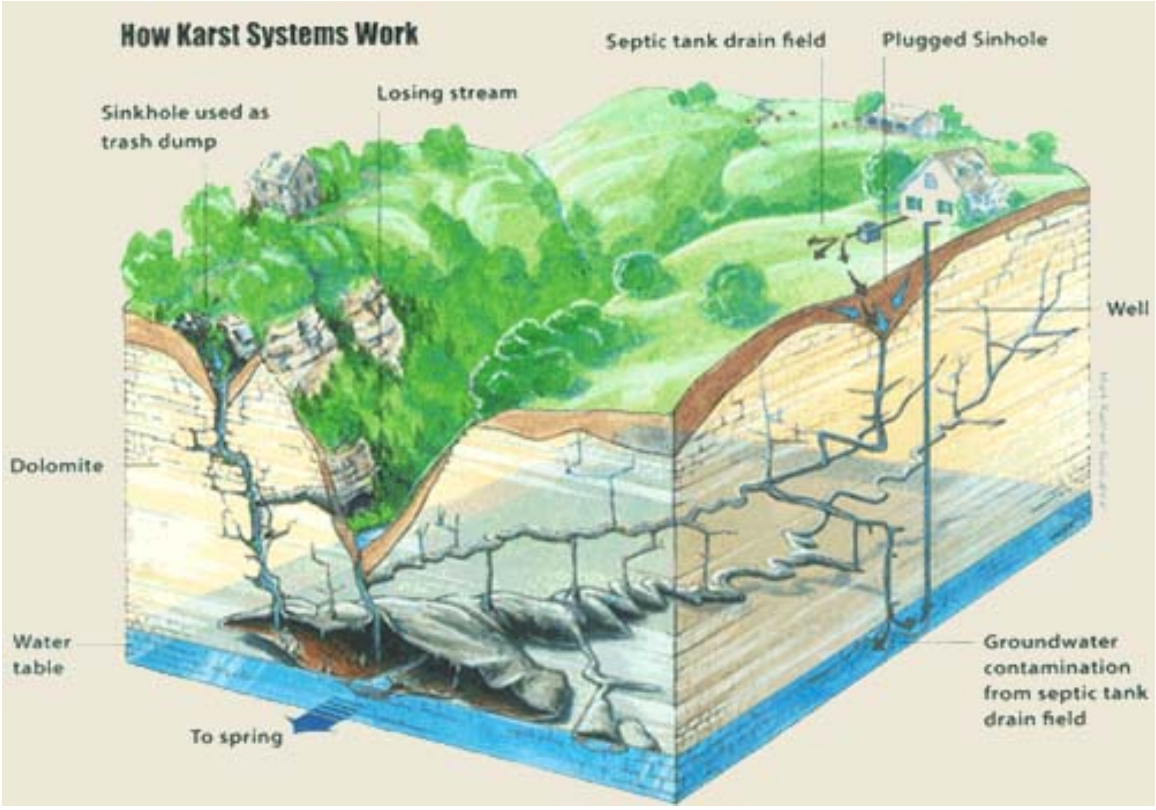


Figure 27: Karst Topography

The soils in the Springfield/Greene County area also pose a unique challenge to regulatory compliance. The MS4 permit requires increased use of infiltration to reduce the amount of runoff from new development and redevelopment sites. Although most of the surface soil (called the A-Horizon) in the area can absorb water readily, the subsoil horizons in this area can have very high clay content. Clay does not allow for the rapid infiltration and movement of water. Once the surface soil is removed for construction it can be very difficult to construct a stormwater BMP that can allow infiltration at a rapid enough rate to comply with the regulations. Once the clay particles are suspended in runoff water, it can be very difficult to remove them from suspension. Without chemical treatment, clay particles can remain suspended in water for weeks or months. This characteristic of local soils can make it difficult to comply with future numeric turbidity limits that are expected from the EPA in the next 2-3 years.

Infiltration of stormwater is also complicated by the karst geology that is discussed above. In some areas, shallow bedrock and/or a groundwater table that is close to the surface can limit the effectiveness of infiltration practices to reduce runoff. Sinkhole collapses are caused by the movement of water through the soil and into channels in the limestone bedrock. When increased volumes of runoff from development move down through the soil, the potential for creating sinkhole collapses increases. There are numerous examples in Springfield and Greene County of sinkholes collapsing in detention basins where the increase in downward water movement accelerated the rate of sinkhole development.

How will regulations impact our community in the future?

What are the future regulatory changes?

The following are federal and state regulatory changes on the horizon that will have an impact on City and County regulatory compliance and the community.

- Both the City and County are currently working with DNR on the renewal of their respective MS4 Permits. To comply with proposed permit changes, the City will need to implement programs to inspect the construction of stormwater BMPs on new development/redevelopment, and ensure the long-term operation and maintenance of privately-owned and publicly-owned BMPs. It is likewise expected that the County's renewed Phase II MS4 permit will place greater emphasis on construction and long-term maintenance of permanent post-construction BMPs on both private and public projects.
- The City and County will need to comply with requirements to address the Pearson, Jordan, and Wilsons Creek TMDLs. The City is currently negotiating the TMDL challenge with EPA and DNR so the exact requirements are unknown at this time.
- EPA has initiated a national rulemaking to strengthen the stormwater program and intends to propose a rule by June 2013 and complete a final action by December 2014. This rulemaking could impact the City and County new development/redevelopment standards and require a program to retrofit existing developed areas with stormwater practices to address water quality. These changes could result in the need for additional City and County staff to ensure compliance with the new rules. As part of this rulemaking, EPA is also considering expanding the geographic areas that must comply with MS4 regulations.
- EPA is considering numeric limits for the turbidity of runoff leaving a construction site. Turbidity is a measure of water clarity. The limits that are expected from EPA will most likely require construction site operators to use chemicals to treat their runoff water to achieve the anticipated limit. The City and County will be responsible for enforcing these limits.

- DNR is considering changes to the state's water quality standards that would greatly expand the number of small streams in the City and County that have beneficial uses and water quality criteria automatically assigned to them. The City and County would need to devote staff time and resources to evaluating and documenting the condition of these streams in order to remove beneficial use designations that are incorrect. These changes may also result in additional streams being listed as impaired by DNR, followed by TMDLs that the City and County would need to address in their MS4 permits.
- As explained in the TMDL section, it is anticipated that numeric water quality criteria for nutrients will be promulgated by DNR in the near future that may result in the need for increased efforts to address the James River TMDL and could also result in Springfield Lake, Table Rock Lake, and possibly other smaller streams being listed as impaired for nutrients. Lowering the allowable pollutant level for metals and other water quality criteria are being considered by DNR as well.

How much does it cost to comply now vs. future?

The City's current annual cost to comply with its MS4 permit is approximately $450,000. The City is working with DNR on the revision and reissuance of its permit. MS4 permits are written with a 5-year expiration date. This allows DNR to revise the permit language every 5 years to incorporate new federal or state rules or regulations, or make other changes it sees as necessary. Rather than making any changes to the City's permit when it expired in 2007, DNR administratively continued its use so that the City has been operating under the same permit since 2002. It is anticipated that DNR will issue a revised permit to the City in early 2013. Based on the City's current knowledge of the proposed revised permit, a minimum and maximum range of projected annual costs for compliance with the MS4 permit for the next five years is given in Table 2. The range represents minimum and maximum estimates for some permit requirements that cannot be definitively estimated at this time. This does not include the cost of complying with requirements to address the Pearson, Wilsons, and Jordan Creek TMDLs. Not much is known yet about what the cost of compliance with these TMDLs will be, so best estimates of a potential minimum and maximum range of annual costs are shown in Table 2. Combining the projected costs of MS4 permit and TMDL compliance gives a projected total cost range for the City's regulatory compliance of $950,000 to $1.3 million in fiscal year 2014, increasing annually to a range of approximately $3.1 million to $6.7 million in fiscal year 2018. Beyond this 5-year projection, it is anticipated that the cost of MS4 permit compliance will at least remain at this level if not increase. The cost of TMDL compliance may increase or decrease depending on the effectiveness of efforts to address current TMDLs, as well as requirements to meet additional TMDLs that may be issued in the future.

Table 2: 5-Year Projection of the City's Regulatory Compliance Cost

	Year 1 (FY14)		Year 3 (FY16)		Year 5 (FY18)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
MS4 Permit	$850,000	$1,000,000	$950,000	$1,325,000	$1,075,000	$1,675,000
TMDL Compliance (Unknown)	$100,000	$300,000	$1,000,000	$3,000,000	$2,000,000	$5,000,000
Total	$950,000	$1,300,000	$1,950,000	$4,325,000	$3,075,000	$6,675,000

Greene County currently spends about $300,000 per year for compliance with its MS4 permit. This includes salaries for staff and financial support of non-profits for public education. It is anticipated that the new emphasis on post construction BMP maintenance and stormwater infiltration will require inspection, maintenance, and retrofitting of existing basins. If EPA's rulemaking expands the geographic area that falls under MS4 regulation, this will have a proportionately greater impact on the County as more residential and rural areas are regulated. These uncertainties make cost estimation difficult but based on the changes that are expected in the County's new MS4 permit that will be issued in 2013, a minimum and maximum range of projected annual costs for compliance with the MS4 permit for the next five years is given in Table 3.

Currently $20,000 per year is spent on stream monitoring for the James River TMDL to gather water quality data. It does not address the TMDL load reduction requirements. If EPA changes the water quality standards for the James River as expected, the cost of complying with nutrient load limits will increase significantly. Attempting to meet the stormwater flow reduction requirements in the Pearson, Jordan and Wilsons Creek TMDLs may involve the construction of numerous regional retention and infiltration basins within these two watersheds. Until a settlement is reached between the City, EPA and DNR, the full scope of what will be necessary for TMDL compliance is unknown. A best estimate of the range of TMDL compliance costs for Greene County is given in Table 3. Combining the projected costs of MS4 permit and TMDL compliance gives a projected total cost range for the County's regulatory compliance of $460,000 to $675,000 in fiscal year 2014, increasing annually to a range of approximately $2.2 million to $5.1 million in fiscal year 2018.

Table 3: 5-Year Projection of the County's Regulatory Compliance Cost

	Year 1 (FY14)		Year 3 (FY16)		Year 5 (FY18)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
MS4 Permit	$375,000	$425,000	$500,000	$650,000	$700,000	$1,050,000
TMDL Compliance (Unknown)	$85,000	$250,000	$850,000	$2,500,000	$1,500,000	$4,000,000
Total	$460,000	$675,000	$1,350,000	$3,150,000	$2,200,000	$5,050,000

NEXT STEPS

What are the next topics for the Task Force to consider?

Meeting #4 – Maintain Infrastructure Investment in Existing System.

Meeting #5 – Funding Options

City of Springfield - Greene County, Missouri
Stormwater Management Task Force
Guiding Principles Survey Results

GUIDING PRINCIPLES SURVEY #2

As part of the stormwater management process, the Stormwater Management Task Force had the opportunity to respond to a survey to develop a discussion regarding guiding principles for stormwater management.

Twenty three Stormwater Management Task Force members completed the survey, which comprised of a series of 10 questions where respondents were asked their "level of agreement." Five response options were provided strongly agree, agree, neutral, disagree and strongly disagree.

The results have been categorized in terms of statements with

- Strong support: majority of respondents strongly agreed and agreed; and
- No clear consensus/split vote.

Statements with Strong Support

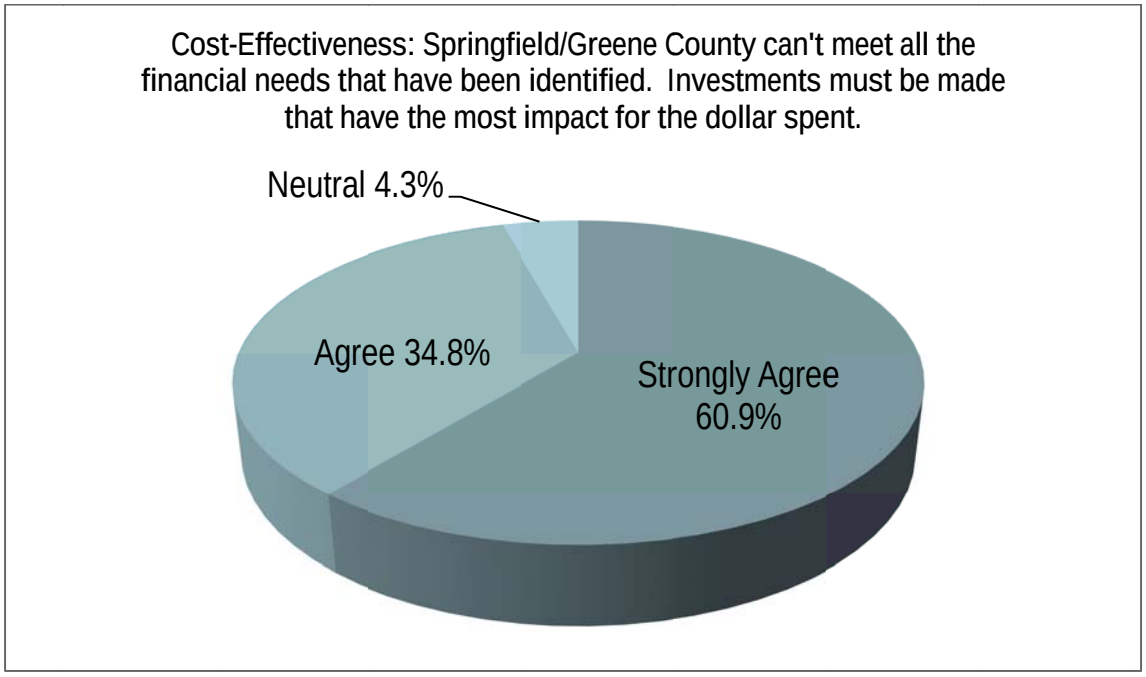
1. *Cost-Effectiveness*: Springfield/Greene County can't meet all the financial needs that have been identified. Investments must be made that have the most impact for the dollar spent.
2. *Innovation/Planning*: It is important to develop good plans before implementing projects so funds are spent wisely.

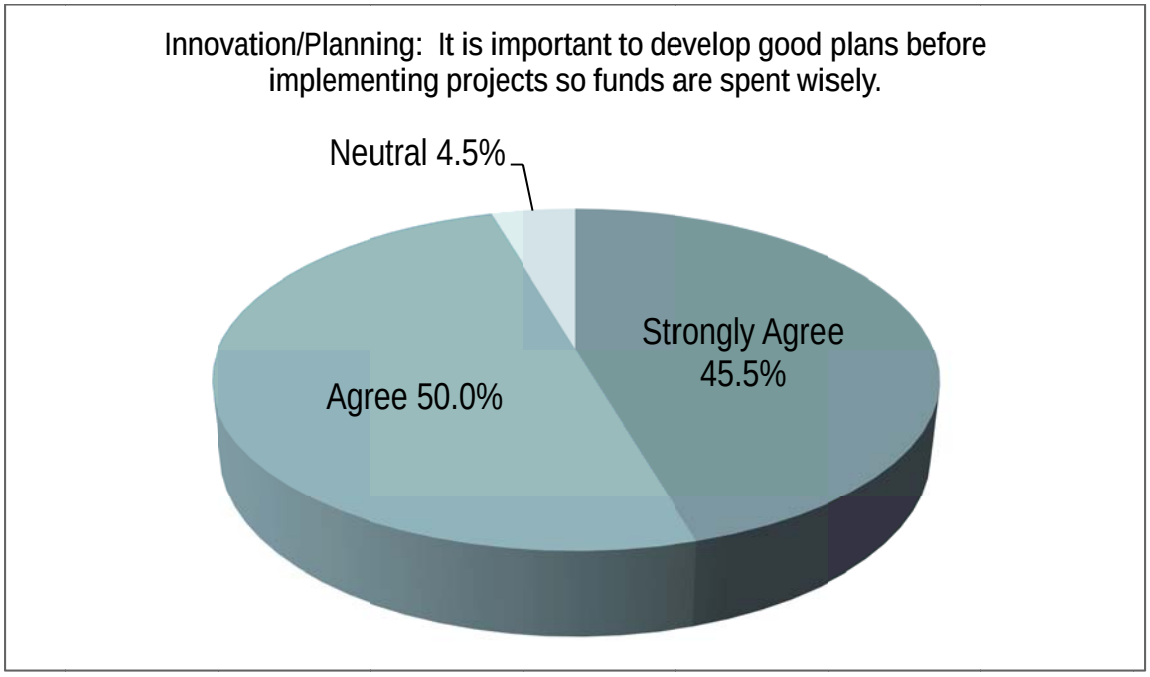
Statements with No Clear Consensus/Split Vote

1. *Environmental Stewardship*: Springfield/Greene County should meet all regulatory requirements designed to protect water resources for drinking and recreation.
2. *Environmental Stewardship*: Springfield/Greene County should exceed regulatory requirements if needed to protect water resources for drinking and recreation
3. *Financial Burden*: Springfield/Greene County should spend whatever it takes to reduce flood damage to properties - even with a heavy financial burden on a citizen
4. *Financial Burden*: Springfield/Greene County should spend whatever it takes to protect water quality -even with a heavy financial burden on citizens.
5. *Financial Burden*: Springfield/Greene County should spend whatever it takes to protect water quality - even with a heavy financial burden on citizens.
6. *Innovation/Planning*: Master plans of capital improvements should be developed collaboratively on a watershed basis rather than by political jurisdiction.
7. *Innovation/Planning*: It is important that projects selected for funding are located in all parts of the community.

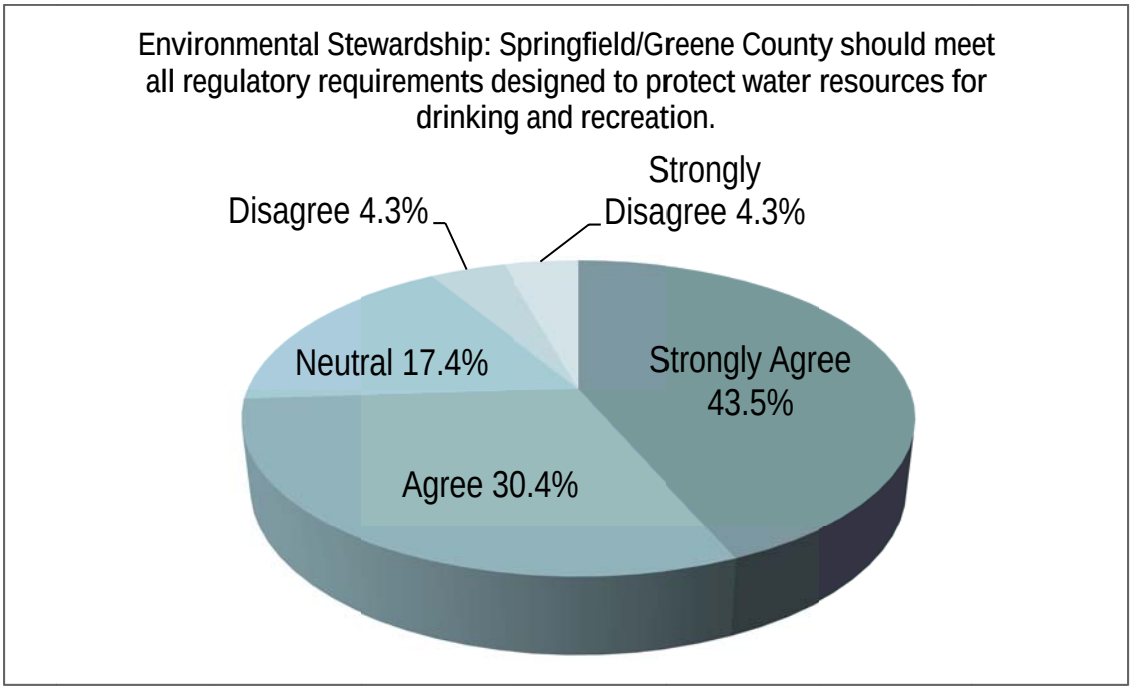
8. *Innovation/Planning*: It is important to build projects early in the funding program rather than spend the majority of funds on planning. Citizens need to see progress early on in the program.

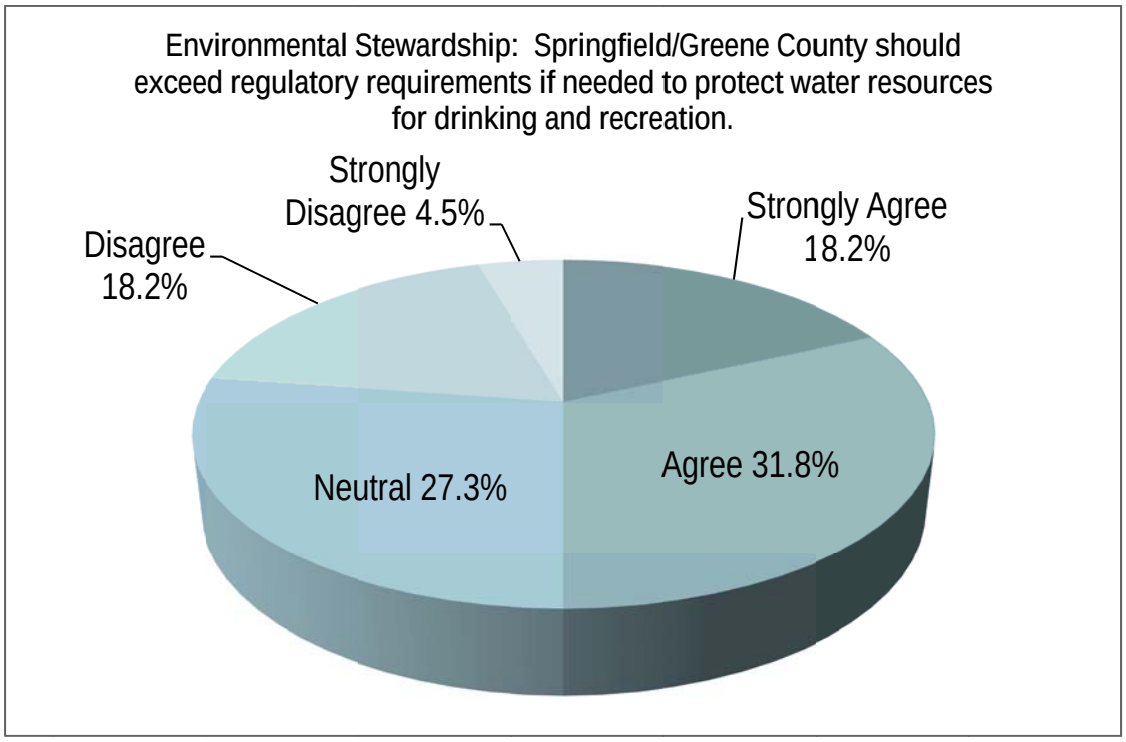
Strong Support

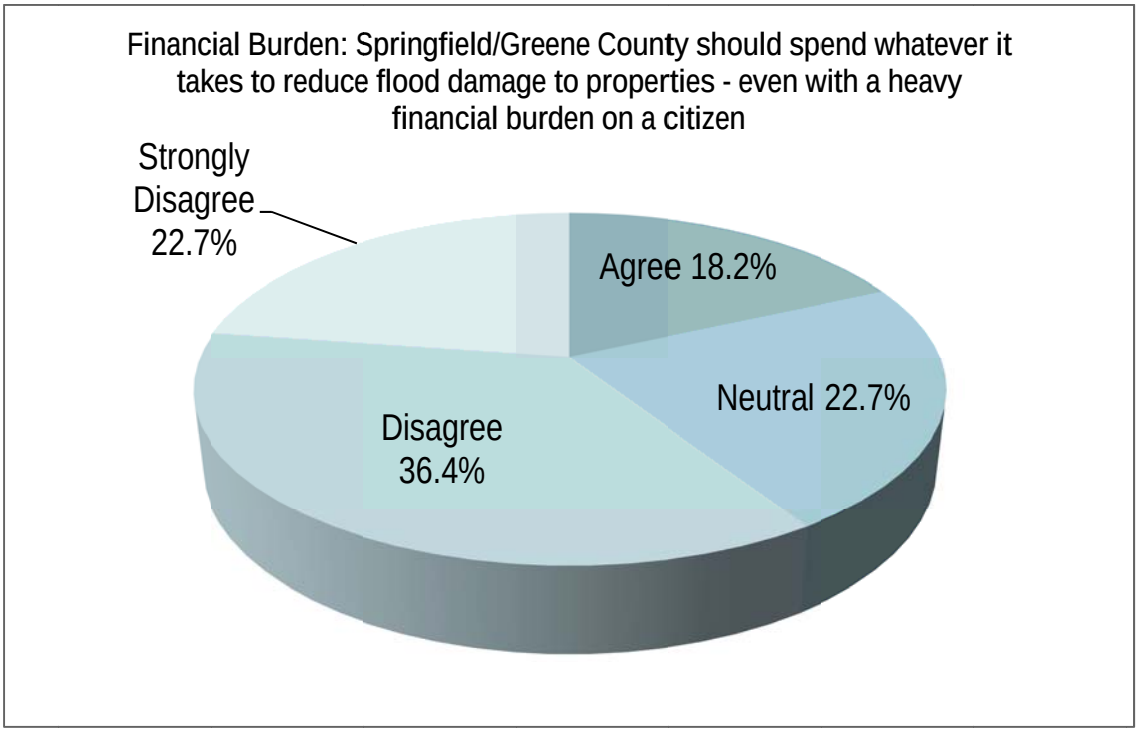


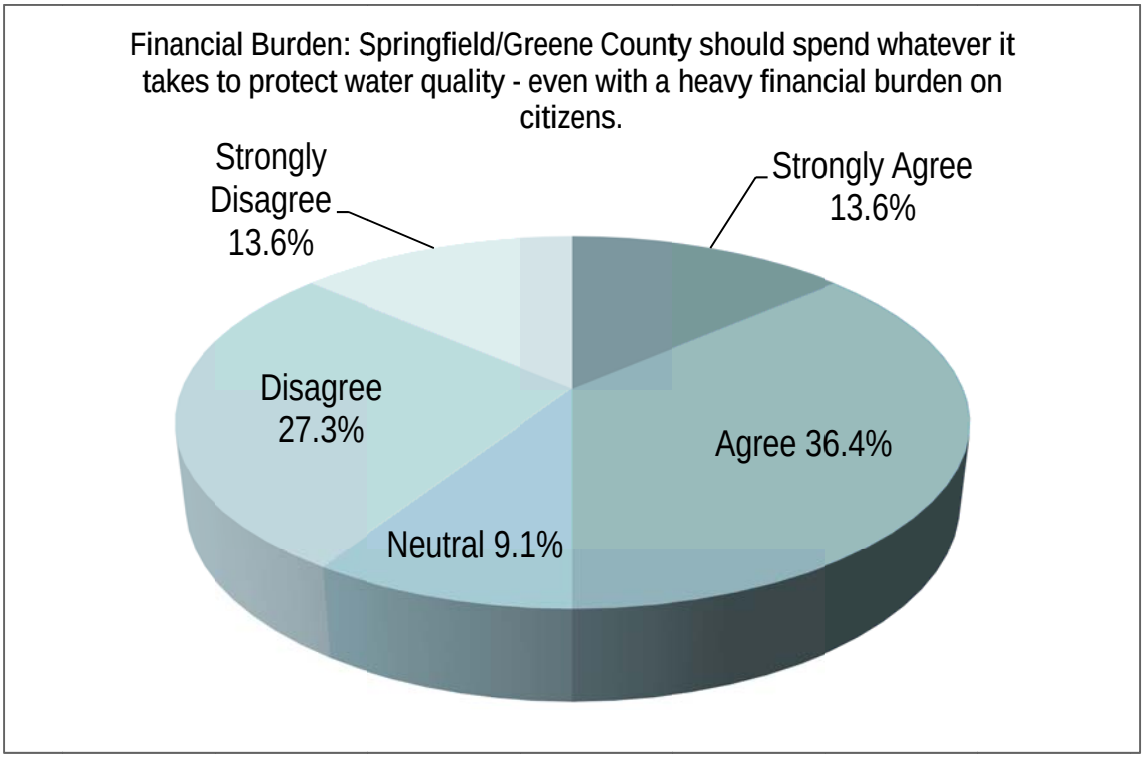


No Clear Consensus/Split Vote

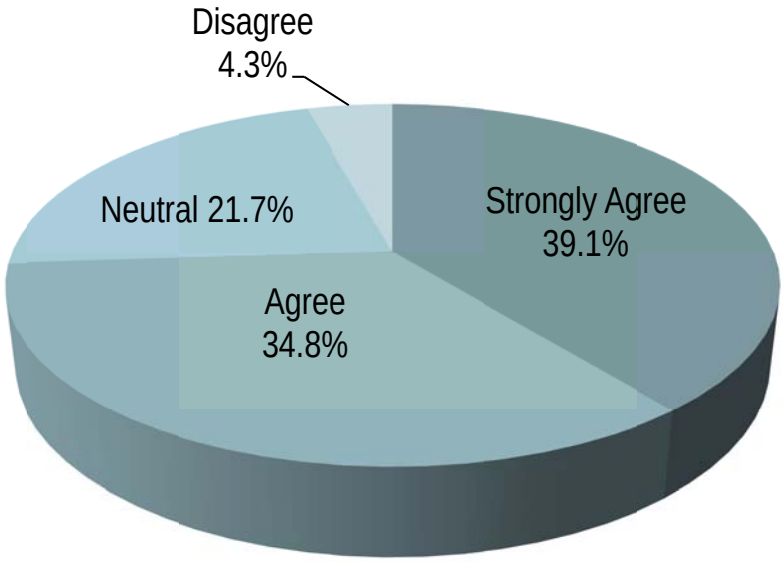

Environmental Stewardship: Springfield/Greene County should meet all regulatory requirements designed to protect water resources for drinking and recreation.
Strongly Disagree 4.3%
Disagree 4.3%
Neutral 17.4%
Strongly Agree 43.5%
Agree 30.4%


Environmental Stewardship: Springfield/Greene County should exceed regulatory requirements if needed to protect water resources for drinking and recreation.
Strongly Disagree 4.5%
Strongly Agree 18.2%
Disagree 18.2%
Agree 31.8%
Neutral 27.3%

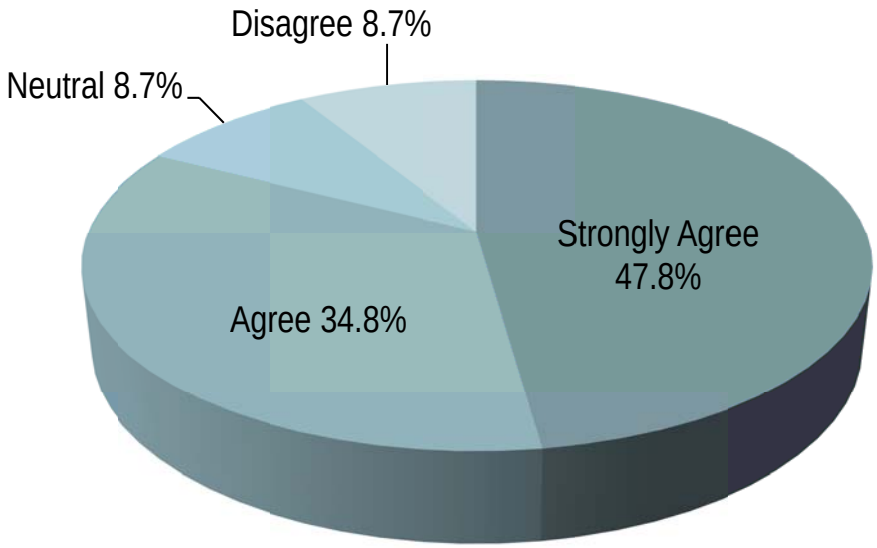

Financial Burden: Springfield/Greene County should spend whatever it takes to reduce flood damage to properties - even with a heavy financial burden on a citizen
Strongly Disagree 22.7%
Agree 18.2%
Neutral 22.7%
Disagree 36.4%


Financial Burden: Springfield/Greene County should spend whatever it takes to protect water quality - even with a heavy financial burden on citizens.
Strongly Disagree 13.6%
Strongly Agree 13.6%
Disagree 27.3%
Agree 36.4%
Neutral 9.1%

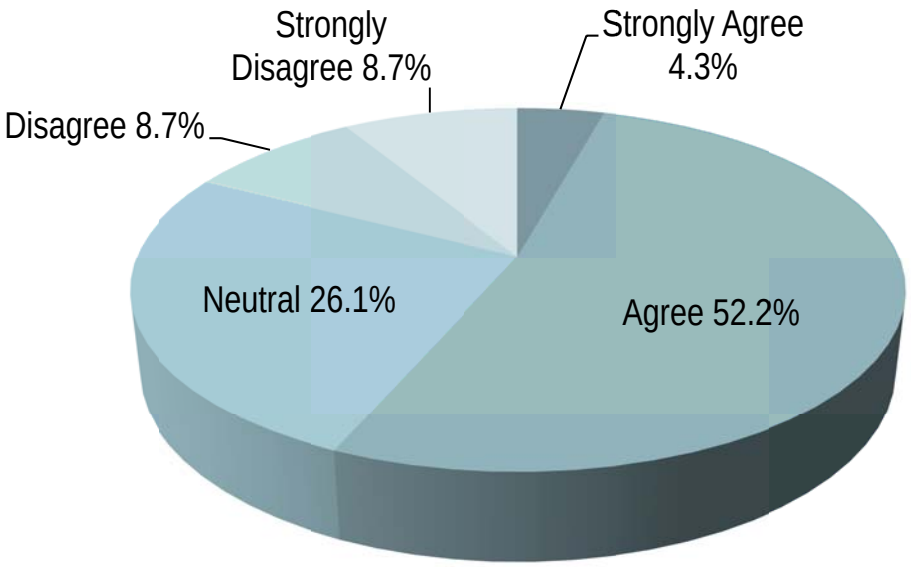
Financial Burden: Springfield/Greene County should invest in stormwater management programs that are affordable and don't impose a heavy financial burden on citizens.



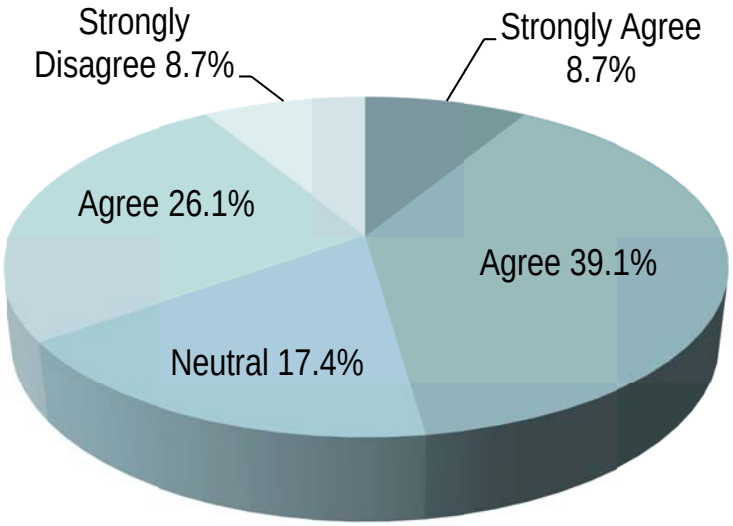
Innovation/Planning: Master plans of capital improvements should be developed collaboratively on a watershed basis rather than by political jurisdiction.



Innovation/Planning: It is important that projects selected for funding are located in all parts of the community.



Innovation/Planning: It is important to build projects early in the funding program rather than spend the majority of funds on planning. Citizens need to see progress early on in the program.



Springfield/Greene County Stormwater Management Task Force

December 13, 2012

Facilitator: Shockey Consulting

Staff Support:

City of Springfield
Department of Public Works
Stormwater Engineering

Greene County
Resource Management

Welcome and Introductions

Task Force Agenda

Water Quality & Regulations

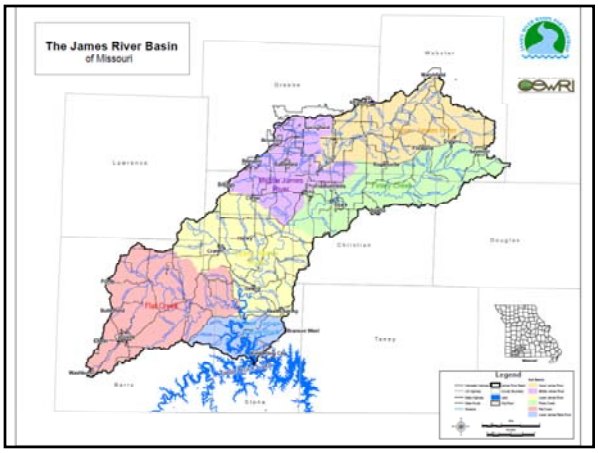
Task Force Survey

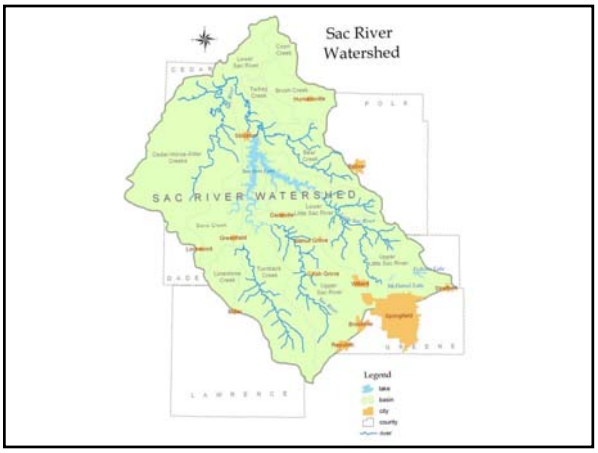
Task Force Discussion

Water Quality & Regulations

What waterways are we trying to protect?

- Area south of Division street flows into:
  - James River ➡ Table Rock Lake ➡ White River, Arkansas ➡ Mississippi River
- Area north of Division street flows into:
  - Sac River ➡ Stockton Lake & Osage River system ➡ Missouri River ➡ Mississippi River

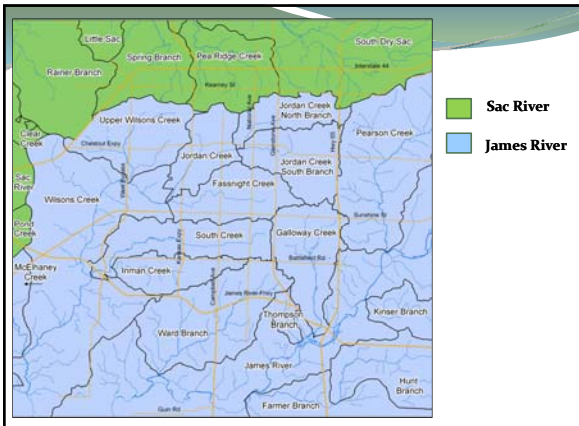


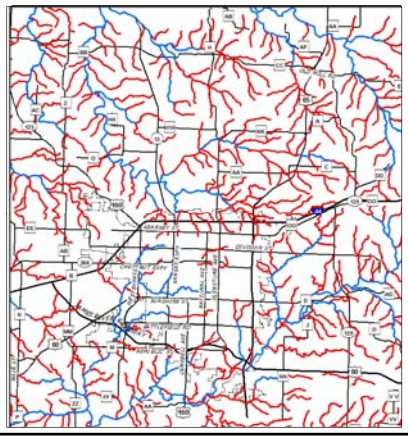


Public Drinking water supply
- Fellows, McDaniel, Stockton Lakes
- Fulbright Spring
- Deep groundwater wells
- James River (above Lake Springfield)

Private drinking water wells

Recreation & Tourism – economic driver
- 5 million visitors/year at Table Rock Lake, spend $50 million while they are here





Federal Clean Water Act (CWA)

CWA regulates the discharge of pollutants to waterways and sets water quality standards to protect them.

- National Pollutant Discharge Elimination System (NPDES) program
  - Municipal Separate Storm Sewer System (MS4) permits
  - Wastewater, industrial, land disturbance permits
- Water Quality Standards – Developed by states, approved by EPA
  - Stream classification
  - Beneficial uses (drinking, swimming/boating, aquatic life protection)
  - Water quality criteria
  - Antidegradation
- 303d impaired waters & TMDLs

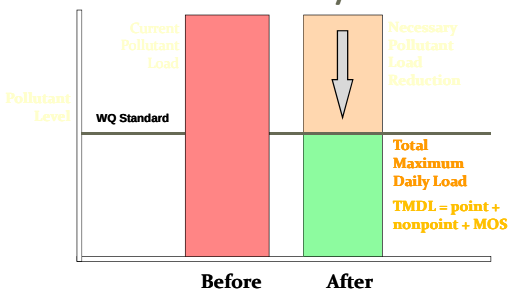
Total Maximum Daily Load

Amount of pollution a waterbody can handle and still meet water quality criteria.

Point sources – regulated through permits
- Treatment plants
- Industries
- MS4s (urban runoff)

Nonpoint – not regulated; voluntary programs
- Suburban runoff
- Agriculture

Total Maximum Daily Load



Waterway	Impairment Pollutant	TMDL Status
James River	Nutrients	Issued 2001; Updated 2004
Little Sac River	Fecal Coliform	Issued 2006
Pearson Creek	Unknown (causing low macroinvertebrate populations)	Issued Jan 2011; Complaint filed by City in Sept 2011
	Bacteria	Not Yet Issued
Wilsons Creek	Unknown (causing low macroinvertebrate populations)	Issued Jan 2011; Complaint filed by City in Sept 2011
	Bacteria	Not Yet Issued
Jordan Creek	Unknown (causing low macroinvertebrate populations)	Issued Jan 2011; Complaint filed by City in Sept 2011

Algae Bloom: James River Arm of Table Rock Lake prior to SW treatment plant phosphorus removal

Pearson, Wilsons, and Jordan Creek TMDLs

- Low macroinvertebrate populations
- No specific pollutant was identified by EPA/DNR
- EPA issued TMDLs Jan 2011 (court-ordered deadline)
- Focus on stormwater runoff as a "surrogate" pollutant
- Propose reduction of stormwater flows by ~40%
- City filed legal challenge; currently negotiating

City and County MS4 Permits

Federal NPDES Program Phase 1: Population >100,000
Phase 2: Population 10,000-100,000 and smaller communities in census-defined urbanized areas.

City and County MS4 Permits require programs to address:

- Public education and outreach
- Public involvement
- Construction site runoff
- Post construction stormwater management in new development and redevelopment
- Municipal Operations/Good Housekeeping
- Illicit discharge detection & elimination
- TMDL monitoring
- Stormwater Management Program Plan
- Annual Reports

Additionally, City MS4 Permit requires:

- More extensive monitoring
- Industrial runoff program

What are we doing to comply?

Public Education/Involvement

Nonprofit funding support & partnership projects – Watershed Committee of the Ozarks, James River Basin Partnership, Project WET

- Educating kids - Watershed Center field trips & classroom lessons
- Teacher workshops
- Rain barrel education and rebate program – 1200 barrels since 2007
- Storm Drain Reveal – 3rd year in a row
- Displays at community events
- Public speaking engagements

Public Education/Involvement

- Show-Me Yards & Neighborhoods
- Adopt-A-Stream program – volunteers conduct over 20 cleanups/year

Illicit Discharge Elimination

- City and County ordinances prohibiting illicit discharges
- Investigate 30-40 citizen pollution complaints/year
- Dry weather screening – 50 locations/year in City and 95 in County

Industrial Runoff

- City samples 25 locations/year in industrial areas
- Industry inspections
- Enforcement

Construction Site Runoff

- City and County ordinances
- Issue land disturbance permits to sites that disturb 1 acre or greater.
  - SWPPP review
- Inspection & enforcement
- Education/training

Post-Construction Runoff

Requirements for New Development and Redevelopment to address impacts of runoff from their site once construction is completed.

- Design criteria and standards
- Plan review
- BMP construction inspections (future)
- Long-term operation & maintenance agreements and inspections (future)

Municipal Operations

- Street sweeping
- Municipal facilities and activities
- Stormwater system cleaning

Flood Control Projects & Retrofits

- Water quality design for flood control projects
- City detention retrofits (study now; future implementation)
- Federal stormater rule may require other retrofits

Water Quality Monitoring

City (contract with MSU-OEWRI)

- Water quality sampling - 12 streams 5x per year
- Macroinvertebrate sampling – 2 streams 2x per year

County (contract with MSU-OEWRI)

- Water quality sampling – 8 streams 5x per year

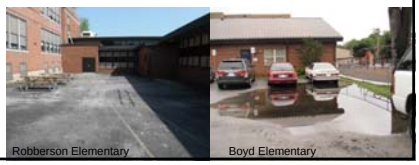
What are we doing to protect water quality in addition to regulatory compliance?

Grant Projects – City, County, and nonprofits have leveraged over $1.5 million in grant funds just since 2007. Requires local match.

- $25,000 CFO Stewardship Ozarks grant (JRBP/City)
- $4,500 MDC Grant (City)
- $10,000 WQIP grant (JRBP/City)
- $164,000 federal grant (County, WCO, MDC, MSU)
- $15,000 CHF grant (County, WCO, MDC, MSU)
- $1 million 319 Big Urbie grant (WCO, City, County, JRBP, OEWRI, Project WET, Ozark Greenways)
- $350,000 319 SMY&NFR grant (JRBP, City, County, MDC, SWCD)

Big Urbie Grant

- WCO, JRBP, City, County, Project WET, OEWRI, Ozark Greenways
- $1 million
- City $470,000 matching funds
- City/County in-kind assistance valued at $65,000
- www.bigurbie.org



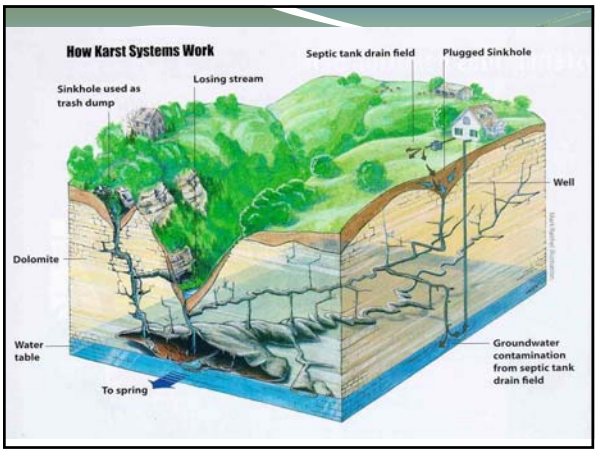
On-Site Wastewater Program

- County program to inspect on-site wastewater (septic) systems
- Sewage effluent from failing on-site wastewater systems can contaminate springs, wells, and waterways
- On-site Wastewater Training Center at Valley Water Mill – partnership with WCO

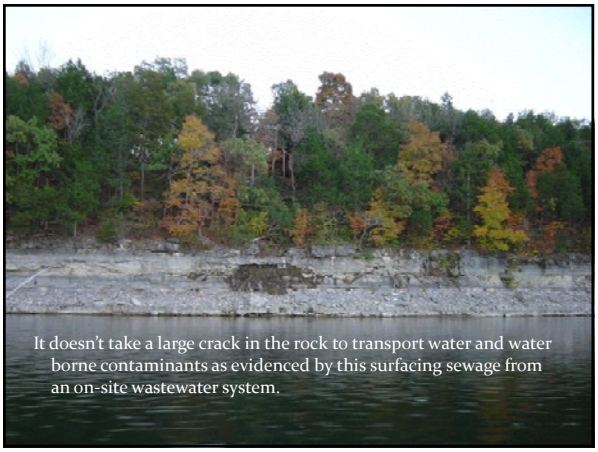
Unique Features

Unique features that impact efforts to protect water quality

- Karst geology
- Predominantly clay soils



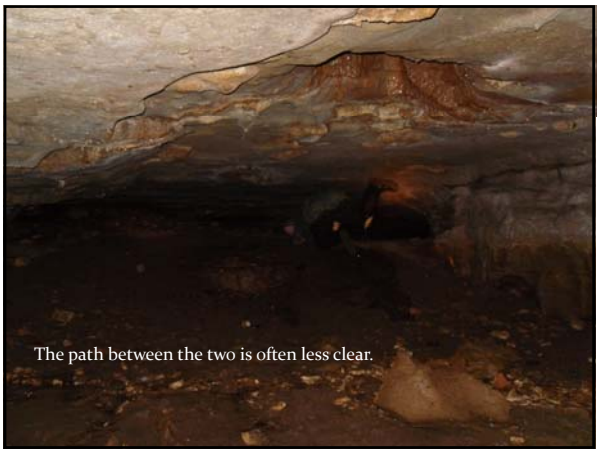
Joints and bedding planes provide weak points in the rock that, over time, become complex and intricate underground drainage systems.



It doesn't take a large crack in the rock to transport water and water borne contaminants as evidenced by this surfacing sewage from an on-site wastewater system.

In Karst systems, water is collected in sinkholes…

and flows to springs.

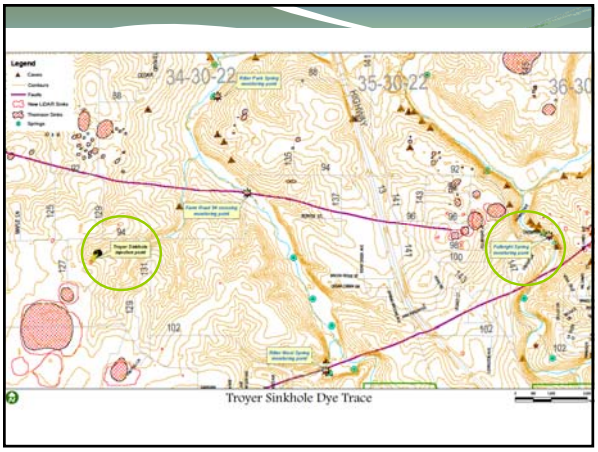


- Interconnectivity of sinkholes, caves, and springs means that surface water can quickly contaminate groundwater supplies, springs and wells.
- Greene county has sinkhole regulations in place that
  - Prohibit dumping, grading, filling in sinkholes
  - Restrict building utilities and structures within sinkhole rims
  - Guides repair of sudden sinkhole collapses

2005 (21 ft.)

2009 (73 ft.)

2012 (87 ft.)

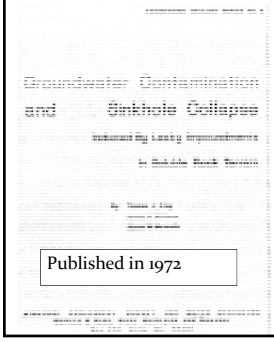


Troyer Sinkhole Dye Trace

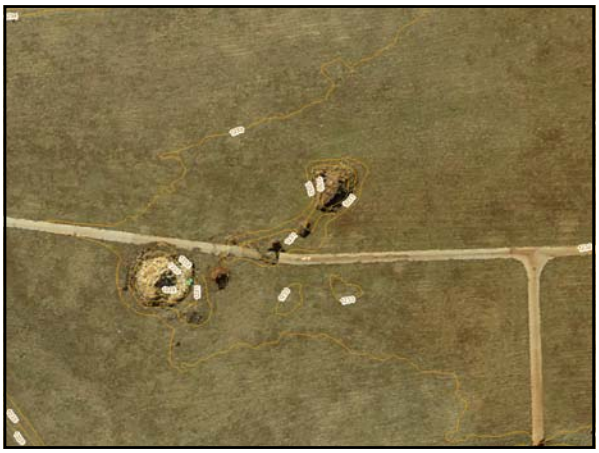
Karst & Infiltration

- Karst complications to stormwater infiltration requirements
- Increasing water flow through soil can speed the development of sinkhole collapses

Learning Things We Should Already Know



Published in 1972



Future Regulatory Changes

- City/County permit renewals in 2013 $$$
- Pearson, Wilson, Jordan TMDLs $$$$
- EPA National Stormwater Rulemaking $$
- EPA construction site turbidity limits $
- State Water Quality Standards:
  - Stream classifications $$$$
  - Nutrient Criteria $$$$

Cost to Comply - City

Current: $450,000/year

5-Year Projection of the City's Regulatory Compliance Cost

	Year 1 (FY14)		Year 3 (FY16)		Year 5 (FY18)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
MS4 Permit	$850,000	$1,000,000	$950,000	$1,325,000	$1,075,000	$1,675,000
TMDL Compliance (Unknown)	$100,000	$300,000	$1,000,000	$3,000,000	$2,000,000	$5,000,000
Total	$950,000	$1,300,000	$1,950,000	$4,325,000	$3,075,000	$6,675,000

Cost Breakdown

	Current	Year 1 (FY14)		Year 3 (FY16)		Year 5 (FY18)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Programs	$350,000	$590,000	$590,000	$600,000	$600,000	$635,000	$635,000
Education	$50,000	$65,000	$65,000	$80,000	$80,000	$95,000	$95,000
Monitoring	$50,000	$45,000	$45,000	$45,000	$45,000	$45,000	$45,000
Maintenance/Cleaning	$0	$100,000	$200,000	$150,000	$400,000	$200,000	$600,000
Retrofits	$0	$50,000	$100,000	$75,000	$200,000	$100,000	$300,000
TMDL Compliance (Unknown)	$0	$100,000	$300,000	$1,000,000	$3,000,000	$2,000,000	$5,000,000
Total	$450,000	$950,000	$1,300,000	$1,950,000	$4,325,000	$3,075,000	$6,675,000

Cost to Comply - County

Current: $300,000/year

5-Year Projection of the County's Regulatory Compliance Cost

	Year 1 (FY14)		Year 3 (FY16)		Year 5 (FY18)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
MS4 Permit	$375,000	$425,000	$500,000	$650,000	$700,000	$1,050,000
TMDL Compliance (Unknown)	$85,000	$250,000	$850,000	$2,500,000	$1,500,000	$4,000,000
Total	$460,000	$675,000	$1,350,000	$3,150,000	$2,200,000	$5,050,000

Cost Breakdown

	Current	Year 1 (FY14)		Year 3 (FY16)		Year 5 (FY18)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Programs	$220,000	$225,000	$ 225,000	$ 230,000	$ 230,000	$230,000	$230,000
Education	$34,000	$50,000	$50,000	$60,000	$60,000	$70,000	$70,000
Monitoring	$46,000	$50,000	$50,000	$60,000	$60,000	$60,000	$60,000
Maintenance/Retrofits	$0	$50,000	$100,000	$150,000	$300,000	$340,000	$690,000
TMDL Compliance (Unknown)	$0	$85,000	$250,000	$850,000	$2,500,000	$1,500,000	$4,000,000
Total	$300,000	$460,000	$675,000	$1,350,000	$3,150,000	$2,200,000	$5,050,000

Discussion

Next Steps:

What are the next topics for the Task Force to consider?

- Meeting #4 – Maintain Infrastructure Investment in Existing System
- Meeting #5 – Funding Options

Closing Remarks