1. Meeting Agenda (PDF)

   Documents: AGENDA AND INFO - 10-25-12 (PDF).PDF
2. PowerPoint (PDF)

   Documents: POWER POINT- 10-25-12 (PDF).PDF

City of Springfield - Greene County, Missouri

Stormwater Management Task Force Meeting

Date: Thursday, October 25, 2012
5:00 to 7:00 p.m.

Location: Watershed Center
2450 E. Valley Water Mill Road
Springfield, Missouri 65803

Map to meeting site on page 2

Meeting purposes:

- Orient Task Force members regarding their role, process, and issues to be addressed.
- Provide background on:
  - What is stormwater management and why is it important to our community?
  - How did we fund the stormwater management programs in the past?
  - What was accomplished with the investment made?
  - What are the current and future needs?

AGENDA

5:00 p.m.	Welcome & Introductions	Greg Burris, City of Springfield Tim Smith, Greene County
5:10 p.m.	Task Force Orientation	Sheila Shockey, Shockey Consulting
5:20 p.m.	What is stormwater management?	Carrie Lamb, City of Springfield
5:45 p.m.	How was stormwater management funded in the past?	Sheila Shockey
5:55 p.m.	What was accomplished with the investments made?	Kevin Barnes, Greene County
6:15 p.m.	What are the current and future needs?	Todd Wagner, City of Springfield
6:50 p.m.	Next steps	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 Guide for Members — pages 3-6
2. Stormwater Management 101 — pages 7-27
3. Recorded Subdivisions Southwest Greene County by Decade — page 28
4. Stormwater Projects Map — page 29

Meeting Site:

Watershed Center
2450 E. Valley Water Mill Road
Springfield, MO 65802
For assistance call (417) 864-1901 or (417) 818-6091

Directions:

Go north of I-44 on Glenstone to Valley Water Mill Road. Turn right onto Valley Water Mill Road. Travel east to the "T" at Barnes Avenue and turn left. Go north on Barnes Avenue and turn right onto Farm Road 102, next to Valley Water Mill dam. As you drive along Valley Water Mill Lake, turn right into the driveway and follow it to the Watershed Center.

Go north on U.S. 65. North of I-44 take the first exit for Valley Water Mill Road or Farm Road 102. Turn left onto Farm Road 102. Travel west and immediately after the road takes a sharp turn to the right, take the next left into the driveway for the Watershed Center.

City of Springfield - Greene County, Missouri

Stormwater Management Task Force
Guide for Members

Thank you for agreeing to serve on the Stormwater Management Task Force. As a member of the Task Force, your input will help guide decision-making regarding stormwater management for Springfield and Greene County, Missouri. This guide document is designed to help you be an effective participant in this important community effort.

Task Force Purpose

Springfield and Greene County have experienced stormwater water quality and quantity issues in the past. Property damage and inundated roadways have resulted from stormwater runoff. Both entities must make additional investments in its stormwater system to continue meeting regulatory requirements and to protect water quality. The Stormwater Management Task Force will help shape the work of both agencies in the future by developing a set of recommendations for both governing bodies to consider. To assist with the process, the project team will prepare the following information for the Task Force:

1. What is stormwater management and why is it important to our community?
2. How did we fund the stormwater management programs in the past?
3. What was accomplished with the investment made?
4. What are the current and future needs?
5. What are the potential funding sources?

Through a facilitated process, the Task Force will answer the following questions in their recommendations:

1. What principles should guide the community stormwater management programs?
2. What investments should be made in stormwater management?
    a. What amount of capital investment should be made over what time period?
    b. Should a permanent dedicated source of funding be implemented for required programs and maintenance?
    c. Should the capital funding source have a sunset and specific projects identified?
    d. What type of maintenance program should be implemented?
    e. Should water quality programs be developed to comply with regulations or exceed standards?
3. How should we prioritize capital investments made?
4. What source(s) of funding are desired?

5. What level of funding is desired?
6. How should we explain the issues and task force recommendations to the community?

The Task Force will provide the County Commissioners and the Mayor/City Council written recommendations regarding these questions.

Task Force Membership

The Stormwater Management Task Force is a working group that includes representatives from various stakeholder groups, including:

- Citizen representationfor each City council zone
- Environmental Groups or Organizations
- Business and Industry
- Development
- Engineering and Financial experts
- Citizens that have experienced flood damage
- Institutional Interests (i.e. schools, hospitals)
- County citizens

While the Task Force membership was designed to reflect a balance of interests, you are encouraged to think about all sides of the issues. To facilitate such thinking, the Task Force meetings will be structured to provide an opportunity for deliberation on all topics with the goal of developing a shared understanding of the issues and alternatives to aid in better decision making.

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.

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

1. October 25
2. November 15
3. December 13
4. January 17
5. February 7
6. February 28
7. March 21
8. April 4

Roles and Responsibilities

Task Force

- Provides a community-wide view from the stakeholder perspective;
- Develops an understanding of issues and provides constructive feedback on information presented;
- Develops guiding principles that serve as a foundation for decision making related to the community's stormwater management programs;
- Provides recommendations to the Mayor/City Council and County Commissioners;
- Advises project team and staff on stakeholder outreach; and
- Serves as a resource for the project team for stakeholder outreach activities.

Task Force Support Team

- Frames the problem;
- Identifies potential solutions;
- Evaluates potential solutions based on agreed upon criteria;
- Collaborates with the Stormwater Management Task Force, stakeholder groups and the general public;
- Develops final recommendations document for consideration of the Task Force;
- Builds a partnership with the media so to educate and involve the public; and
- Implements the stakeholder engagement plan.

Mayor/City Council/County Commission

The County Commission and Mayor/City Council will ultimately make the decisions regarding funding, programs and policies to improve the community's stormwater management.

Effective Participation Tips

As a member of the Stormwater Management Task Force, you are being asked to:

- Share information and provide feedback about information collected by the Project Team;
- Provide input to the Project Team about potential options; and
- Assist the Project Team by sharing information with your neighbors and supporting the final recommendations.

To be an effective participant, it is important to read materials in advance of meetings, come to the meeting ready to ask questions and participate in all discussions.

You will be provided a meeting calendar, including all meeting dates and locations so you can plan your schedule. Agendas and background information will be provided in advance of meetings. And, the Project Team is always available to answer questions and explain anything that you don't understand or isn't clear.

At the meetings, we ask that you follow these simple ground rules:

- Share your best thinking;
- Share and explore differences;
- Agree to disagree, but don't be disagreeable;
- Be respectful of other's perspectives by listening first for understanding and then speaking so that your perspective is understood; and
- Think about what is best for your entire community beyond your own interests.

Contacts

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

- City Project Team contact
  Todd Wagner, PE, Principal Stormwater Engineer, City of Springfield, Missouri
  twagner@springfieldmo.gov
  (417) 864-1932

- County Project Team contact
  Kevin R. Barnes, PE, Greene County Stormwater Engineer
  kbarnes@greenecountymo.org
  (417) 868-4147

- Media inquiries
  Cora Scott, Public Information Officer
  cscott@springfieldmo.gov
  (417) 864-1119

- Project Team contact
  Sheila Shockey, Shockey Consulting Services
  Sheila@shockeyconsulting.com
  (913) 515-4365

City of Springfield - Greene County, Missouri
Stormwater Management 101

INTRODUCTION

The City of Springfield and Greene County have invested time, energy, talents, and money to provide a safe, healthy, and quality community for their citizens. A September 1993 flood raised the need for improved stormwater management to the forefront of community planning. Managing stormwater runoff in our growing community continues to be challenging - to control flooding, protect property and public safety, to improve and protect our water resources, and to maintain compliance with federal and state requirements.

The City of Springfield and Greene County are convening a community task force to provide input and recommendations on how the City and County should continue to address its stormwater management issues, including aging infrastructure, flood control, and water quality. Effective stormwater management is vital to the community's health and economy, and to maintaining the City's and County's compliance with federal and state stormwater regulations.

The Task Force is charged with providing recommendations for the following:

1. What principles should guide the community stormwater management programs?
2. What investments should be made in stormwater management?
    a. What amount of capital investment should be made over what time period?
    b. Should a permanent dedicated source of funding be implemented for required programs and maintenance?
    c. Should the capital funding source have a sunset and specific projects identified?
    d. What type of maintenance programs should be implemented?
    e. Should water quality programs be developed to comply with regulations or exceed standards?
3. How should we prioritize capital investments made?
4. What source(s) of funding are desired?
5. What level of funding is desired?
6. How should we explain the issues and task force recommendations to the community?

The Task Force will provide the County Commissioners and the Mayor/City Council written recommendations regarding these questions.

A series of questions and answers are presented in this document to the Task Force as background for their work:

- What is stormwater?
- What is a watershed?
- Why is good stormwater management important to our community?
- Has stormwater been a problem in our community?
- Who and what causes the problems associated with poor stormwater management?
- What was accomplished with the investment made in stormwater management in the past?
- How were these stormwater management investments funded?
- What are current and future program needs?
- What are the potential funding sources?

BACKGROUND

What is stormwater?

Stormwater is runoff water that results from precipitation events. It may also be used to apply to water that originates with snowmelt that enters the stormwater system. Stormwater that does not soak into the ground or evaporate becomes surface runoff. Stormwater runoff either flows directly into surface waterways or is channeled into the storm system, which eventually discharges to receiving waters, such as area creeks, streams, rivers and lakes. The stormwater system is separate from the wastewater system. Stormwater typically receives little or no treatment prior to entering receiving waters.

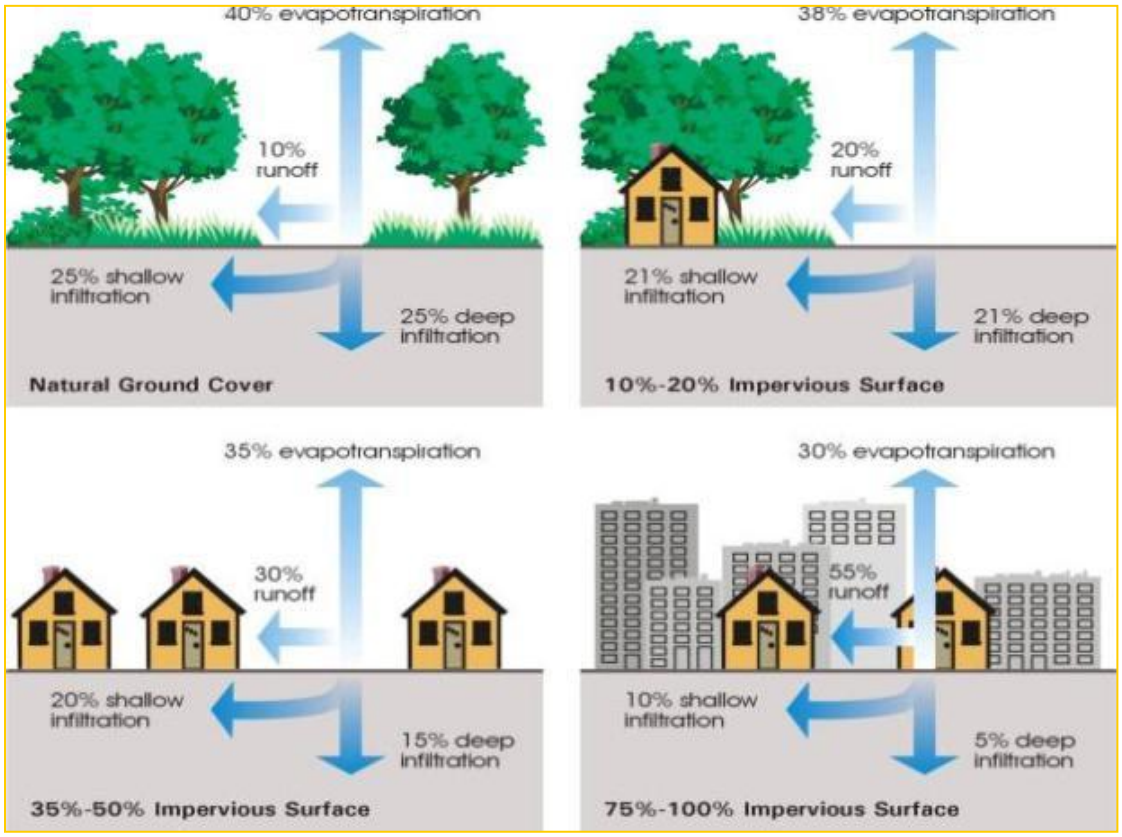
Stormwater is of concern for two main issues: one related to the increased volume and timing of runoff water, which can result in flood-related damage to property and receiving water bodies, and the other related to potential contaminants that the water is carrying (water pollution).

Stormwater management is the planning, design, construction, operation and maintenance of a system to infiltrate or evaporate rainwater before it becomes runoff, or to convey, store, treat and release rainwater after it becomes runoff. Stormwater management in an urban setting is particularly challenging, due to several factors, including:

1. Buildings and parking lots create hard or impervious surfaces that can dramatically increase the amount of stormwater that does not soak in, and results in stormwater runoff.
2. Human activities, such as the use of vehicles and fertilizers, and industrial activities can create sources of pollutants that are carried to our lakes, rivers and streams by stormwater runoff.
3. Buildings in the natural drainage ways are subject to flood damage.
4. Roadways are often designed to carry stormwater runoff. Sometimes too much stormwater floods the streets or overtops a bridge making travel dangerous.

Before development of the land, the majority of precipitation would soak into the ground (infiltration) or evaporate into the air (evapotranspiration). This is called the natural hydrologic process. **Figure 1** illustrates how urbanization can significantly impact the natural hydrologic processes of shallow and deep infiltration, evapotranspiration and runoff. As the land is developed, harder (impervious) surface in form of streets, sidewalks, roofs, and driveways are causing more stormwater to runoff rather than soak in or evaporate. Sometimes, this can be as much as five times the amount of runoff in a natural environment. The effect of these changes typically results in flood damage to property and flooded roadways causing safety issues for the public. It can also result in more pollution being carried to area lakes, rivers and streams. More stormwater runoff can cause stream bank channel and bank erosion, loss of trees and vegetation along rivers, polluted water resources and loss of aquatic life habitat.

Figure 1. Illustration of How Urbanization Effects Natural Hydrologic Processes



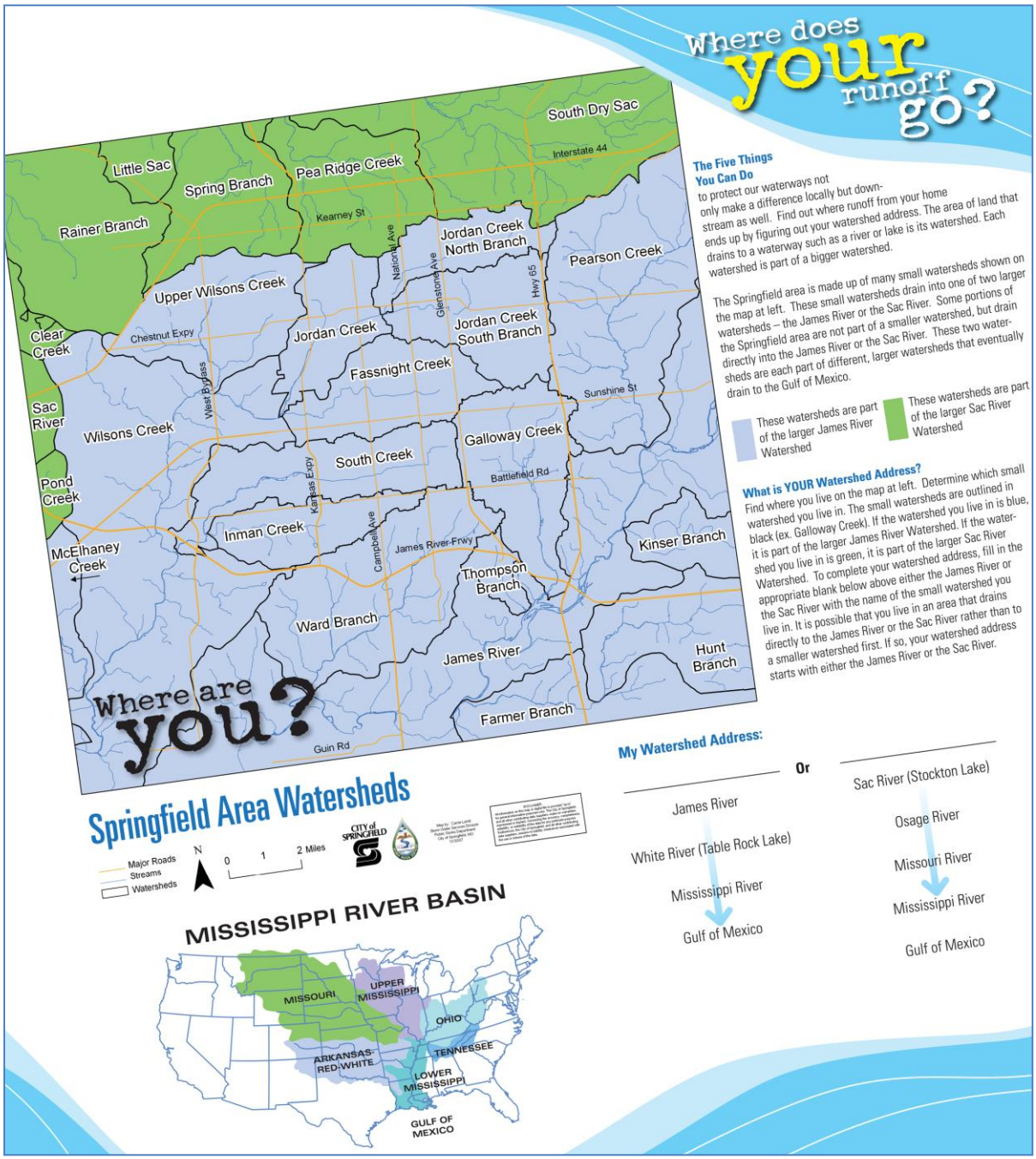
The karst geology in southwest Missouri which is evident in our many caves, springs and sinkholes, complicates the interaction between runoff, shallow groundwater and deep groundwater. Karst geology can provide direct conduits for surface runoff to reach springs and groundwater more quickly than through normal infiltration through soil. This could result in pollution of our natural springs.

What is a watershed?

The degree of flooding or water quality degradation along a waterway is typically related to the condition of the watershed. A watershed is the land that stormwater runs across to a common point such as a lake, river or stream. Watershed boundaries are formed by the natural topography of the land and are rarely modified significantly by human activity. **Figure 2** shows the major watersheds in the urban service area of

Springfield. It is interesting to note that Springfield is located on top of a major watershed divide. The area south of about Division Street drains south into the James River 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 South Dry Sac River and Little Sac River which flows into Stockton Lake and the Osage River system, which drains to the Missouri River in central Missouri, and eventually into the Mississippi.

Figure 2. Springfield Watershed Map



Source: http://www.springfieldmo.gov/stormwater/watershed.html

Why is good stormwater management important to our community?

Excessive stormwater can be a menace to a community if it is not managed properly. Some of the obvious negative impacts are public health and safety issues, damage to property, devaluation of property and neighborhoods, degradation of waterways and riparian habitat and negative impacts to our regional economy. Good stormwater management practices can address the potential negative impacts and convert stormwater runoff into a public asset through development of attractive recreational spaces central around quality water resources. The result can be both an improvement in quality of life in the community and improved economic development opportunities.

Not only must stormwater quality be protected for public health 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. Typical pollutants from land areas can be picked up and carried by stormwater runoff into area streams, rivers, and lakes include oil, grease, and antifreeze from vehicles; heavy metals from tires and brake linings; sediment from construction sites; nutrients from fertilizers and pesticides applied to lawns and crops; bacteria from animals (dogs, geese, horses, cattle); chemicals found in air pollution; and litter.

Sound stormwater management provides numerous benefits to the community. These benefits include, but are not limited to, the following:

- Increased public safety by reducing flooding of streets and private property;
- Increased public safety by ensuring that stormwater infrastructure is structurally sound and not prone to failures;
- Enhanced environmental quality, including protection of area streams, rivers, lakes and drinking water sources;
- Opportunities for greenways and multi-use recreation areas;
- Enhanced local recreation and tourism economy;
- Reduction of potable water usage through rainwater collection and reuse;
- Reduced cost of wastewater treatment by keeping stormwater and wastewater system separated;
- Improved air quality;
- Reduced risk of regulatory action against the City and County;
- Reduced urban heat island; and
- Improved wildlife habitat.

Has stormwater been a problem in our community?

Historic flood events in the community have defined Springfield's and Greene County's stormwater management programs during much of the past twenty years. Defining events include the following.

- **September 1993:** The community experienced a flooding event from 8.5 inches of rain over 30 hours. The Ferguson sinkhole (south of Battlefield and between Kansas and Campbell Avenues) filled quickly and did not drain for several days. Many other sinkholes in the City and County filled and major rivers like the James experienced major flooding. Because the rain was more gradual over a longer period of time, flooding on smaller tributaries in Springfield was minor. This flood resulted in voter passage of the first Level Property Tax Stormwater Bond Issue.
- **July 2000:** The community experienced 6-8 inches of rainfall in 3-6 hours over much of the City and south of the City in the County, causing severe flash flooding on all tributary streams. Just south of the City in Shadowood Subdivision, homes were severely damaged and even pushed off the foundations. As a result, a property buyout in the Shadowood subdivision in Greene County was initiated to prevent a similar occurrence in the future. This flood resulted in voter passage of additional bonds funded by the Level Property Tax. These bonds were passed in 1995 - $14 million; 1999 - $14 million; 2001 - $15 million; and 2004 - $13 million.
- **July 2001:** The community experienced 4-5 inches of rainfall in one hour on a small area near Republic Road and Scenic Avenue causing severe flash flooding in Hidden Valley Subdivision just outside the City. A project to buy out properties and construct improvements was initiated in 2007 and continued over several years. This project was funded with Parks and Stormwater sales tax.

Fortunately, no lives were lost during these flooding events.

Figure 3. 1993 Flood at Ferguson Sinkhole

Figure 4. 2000 Flood at Chestnut Expressway near OTC

Figure 5. 2000 Flood in Shadowood Subdivision. Note missing wall on damaged home.

Figure 6. 2001 Flood in Hidden Valley Estates Subdivision. Note water level on sliding glass door.

Who and what causes the problems associated with poor stormwater management?

Who causes the problems associated with poor stormwater management? We all do, because we live here. As our communities grow, we change the landscape and alter places for rain water and snow melt to soak into the ground or evaporate. The harder (impervious) the surface, the more stormwater runoff. Poor stormwater management is a problem for:

- People who live or work in flood prone areas;
- People who drive during rain events on flood prone streets;
- People who need emergency services during rain events;
- Everyone who cares about the quality of water resources in the Ozarks.

An example of how the landscape changes over time is illustrated in the development map for southwestern Greene County, from before 1980 to the present (see **Figure 7**). The subdivisions developed in the 1980'sand prior have little or no stormwater infrastructure (dark brown color). The subdivisions developed in the 1990s (tan color) are better but the only subdivisions meeting the current standards are those developed after 2000 (yellow color).

Figure 7. Recorded Subdivisions Southwest Greene County by Decade

What was accomplished with the investment made in stormwater management in the past?

The focus of much of the stormwater program in the past 15 – 20 years, by the City of Springfield and Greene County, was correcting issues that caused flooding, while in the last 5-10 years the focus has begun to shift more toward water quality multi-purpose projects.

City of Springfield:

The City has completed approximately 100 significant projects over this period. The City has also completed over $10 million in voluntary buyout of flood-prone properties to stop the cycle of repeated flooding. Some example projects the community has completed include:

- ✓ Erie Sinkhole to Ferguson Sinkhole Flood Buyout and Stormwater Improvements (south of Battlefield Road and west of Campbell Avenue)
- ✓ North Branch of Jordan Creek multi-purpose "daylighting" project for flooding and water quality and trail development (near National Avenue and Division Street)
- ✓ Floodplain buy-out program: approximately 150 properties
- ✓ Fassnight, Sequiota and Doling Park renovations for flooding, infrastructure and water quality improvements

A map of projects completed to-date and their locations are attached (see page 29).

The City's website www.springfieldmo.gov/stormwater (click on Projects & Studies), provides descriptions and pictures of the numerous investments made over the past two decades. A few are illustrated below, as examples of the investments made to improve water quality and build assets for the community.

Figure 8. South Family Y Regional Detention greatly reduced downstream flooding in 2000, near Glenstone Avenue and Republic Road

Figure 9. Erie Sinkhole to Ferguson Sinkhole Flood Buyout and Stormwater Improvements, south of Battlefield Road and west of Campbell Avenue

Figure 10. Rain Garden at the Downtown Square

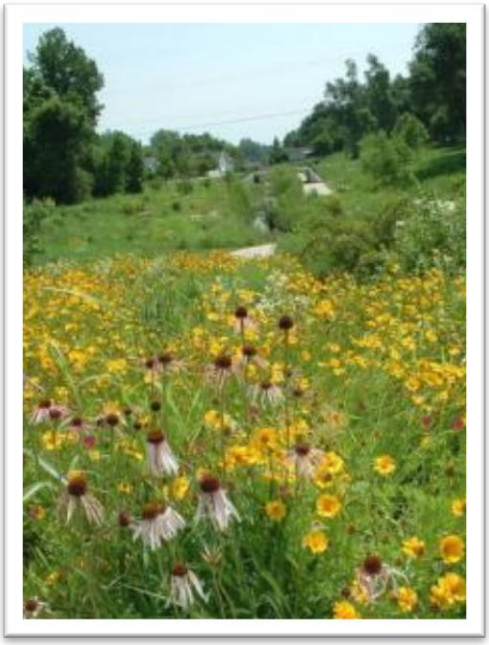


Figure 11. North Branch of Jordan Daylighting Project, near National Avenue and Division Street

Figure 12. Fassnight Park Stream Stabilization and Historical Preservation

Figure 13. Rain Garden Pilot Project

Figure 14. Rain Garden at Doling Park to improve lake water quality

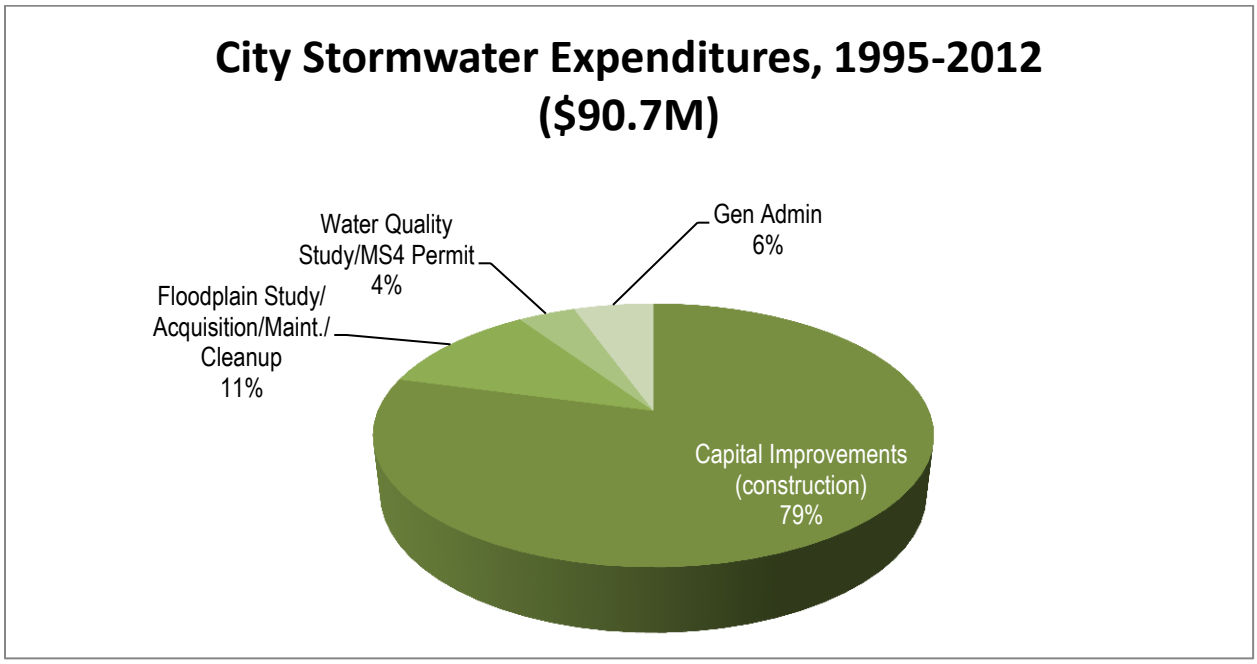
Springfield has invested $71.8 million into stormwater capital improvement projects in the past 18 years, since the 1993 flood. The City has invested over $10 million in the Voluntary Flood Buyout Program to stop the cycle of flooding of flood prone properties and reclaim the floodplain for public recreational use. Since the City received its state stormwater permit in 2001, it has spent $300,000 to $400,000 per year, for a total of $3,577,000, on permit requirements that address water quality issues, including public education, water quality monitoring, pollution investigations, permitting and inspecting

construction sites for erosion and sediment control, and other activities. A summary of how public funds have been spent in Springfield is provided in **Table 1** and **Figure 15**.

Table 1. City of Springfield, Missouri Stormwater Program Expenditure Breakdown

Capital Improvements (construction)	$71,811,000
Floodplain Study/Acquisition/Maintenance/Cleanup	$10,349,000
Water Quality Study/MS4 Permit	$3,577,000
General Administration	$5,000,000
TOTAL	**$90,737,000**

Figure 15. City of Springfield, Stormwater Expenditures



Greene County, Missouri:

Greene County has spent $4.4 million on the purchase of flood-prone properties and $800,000 on capital improvement projects. The County spends approximately $300,000 per year to meet stormwater permit requirements and another $250,000 per year for administration of other water quality related programs such as floodplain management and on-site wastewater system inspection.

City and County Water Quality Programs:

The City and County both have programs to manage stormwater quality to protect the community's water resources and comply with their respective Municipal Separate Storm Sewer System (MS4) permits issued by the Missouri Department of Natural Resources (MDNR). The permits include requirements for policies,

ordinances, public education and participation efforts, inspection activities, stream monitoring, and capital improvement projects for water quality. The federal Clean Water Act requires that communities have a program with specific components to address the impacts of stormwater runoff on water quality. These requirements are implemented through MS4 permits issued to communities. In Missouri, these permits are issued and enforced by the Missouri Department of Natural Resources. Some highlights of the City and County programs are summarized below.

- Land Disturbance Programs, by both the City and County permit and inspect construction sites to minimize the discharge of sediment and other pollutants into the stormwater system. The program also provides education and training opportunities for engineers, developers, contractors, and others involved with managing construction site runoff.
- Numerous water quality and watershed activities are held in the area to educate and involve citizens. These activities include Storm Drain Reveal (a program to educate the public using storm drain murals) a rain barrel rebate program, rain garden technical assistance and workshops, Adopt-a-Stream volunteer program, and public speaking engagements with various community groups and classes. Partnerships with and support for Watershed Committee of the Ozarks, James River Basin Partnership, and others are vital to providing education and outreach on water quality issues in the community.

Figure 16. Adopt-a-Stream Program

Figure 17. Storm Drain Reveal mural

- Show Me Yards & Neighborhoods is a lawn and landscape education program the City of Springfield started over 10 years ago. The program provides training to home owners on sustainable lawn and landscape maintenance. The program also has over 100 trained professionals. The program participates in numerous community activities and events each year, partnering with other groups on water quality outreach in the community and region.

- Monitoring programs assess the quality of stormwater runoff and the chemical and biological health of our urban streams, as well as screening the stormwater system for illicit discharges.
- Development standards, for new developments, require the construction of best management practices such as pervious pavement, rain gardens, or water quality basins to reduce or treat runoff.

The following are some specific activities completed in 2011-2012 by the County as part of its program to address stormwater quality.

- 131 public contact events with 100,000 people in attendance.
- $93,528 was used toward educational partnerships with the Watershed Committee of the Ozarks. These funds were used for 38 classroom field trips, 31 classroom lessons, and 8 events. The programs contributed 800 volunteer hours. Funds were also contributed to the construction of the Watershed Center.
- $5,000 per year goes toward educational partnerships with the James River Basin Partnership for 10 watershed festivals involving 2,300 fifth graders, the annual Dam Jam event with 5,000 people in attendance, and septic tank assistance to property owners. Funds were also used for rain garden programs and the incentive program for rain barrel purchases by homeowners.
- Project WET (Water Education for Teachers) receives $10,000 per year to help fund the WET coordinator who works closely with the public school system to incorporate water education into the curriculum and for classroom lessons and field trips.
- Greene County continues to support Legacy Trails, a Low Impact Development subdivision, with $14,000 per year to maintain post-construction BMPs.
- Water quality monitoring is conducted four times per year at eight monitoring stations.
- The stormwater program supports training to contractors for on-site wastewater treatment system installation. Eighty-six people attended in the past year.

How were these stormwater management investments funded?

Historical funding sources for both the City and County have relied primarily on the tax system to address stormwater issues.

City of Springfield:

In February 1994, after the 1993 flood event, the City of Springfield, through the direction of a Citizens' Stormwater Task Force, placed on the ballot both a 1/10 cent sales tax and a stormwater utility to pay for stormwater improvements. Neither ballot measure was approved by the voters. A probable contributor to the failure was a controversial crime ordinance which was also on the ballot.

In 1995, voters approved the City issuing General Obligation (G.O.) bonds in the amount of $14 million to fund stormwater improvements. In 1999, voters again approved the City issuing G.O. bonds in the same amount, with a condition that the property tax rate would remain level. The Level Property Tax (LPT) then

became the funding source to pay back future G.O. bond issues for stormwater improvements. Voters approved subsequent bond issues in the amount of $15 million and $13 million in 2001 and 2004, respectively, to fund additional stormwater improvements and programs. The total revenue generated from these bond issues is over $56 million including any earned improvements to the stormwater system including construction of conveyance improvements, buyouts of flood prone properties, construction of stormwater detention ponds, and multipurpose stormwater and recreation amenities. A part of these funds was also used for water quality programs and permit compliance through 2007.

Detention buy-out or in-lieu payments provide about $100,000 per year. This amount varies with construction activity in the community. The money stays in the same watershed in which it is collected and is used for regional detention or conveyance improvements.

A City Capital Improvements Sales Tax that began in 2010 will generate about $2 million for stormwater improvements. The Sales Tax ends in 2013. The stormwater program in Springfield also uses a small amount of funds from the General Fund, primarily spent on administrative costs.

Greene County Funding Sources:

Greene County has, historically, funded a very limited stormwater program through the general fund. Stormwater management systems located within road right-of-way are maintained by the Greene County Highway Department using Road & Bridge funds. The County does not fund maintenance of stormwater management systems outside of road right of way. Prior to passage of the Parks/Stormwater tax in 2006, the County was only able to perform capital improvement projects using state and federal grants. Following passage of this tax, the County has utilized the funding to reduce flooding in the worst areas by providing much needed channel maintenance and purchasing flood-prone properties. The sales tax revenue source ended in July 2012.

The funding sources and amounts for the City and the County are summarized below and presented in **Tables 2 and 3**, and **Figures 18 and 19**.

Table 2. City Stormwater Program Funding Breakdown (1995-2012)

Level Property Tax	$56,600,000
Payment in Lieu of Detention	$ 3,000,000
Federal/State Funds	$ 7,500,000
Parks/Stormwater Sales Tax (2007-2012)	$16,500,000
General Fund	$ 5,000,000
Capital Improvements Sales Tax (2010-2013)	$ 2,000,000
TOTAL	**$90,600,000**

Figure 18. City of Springfield Stormwater Revenues

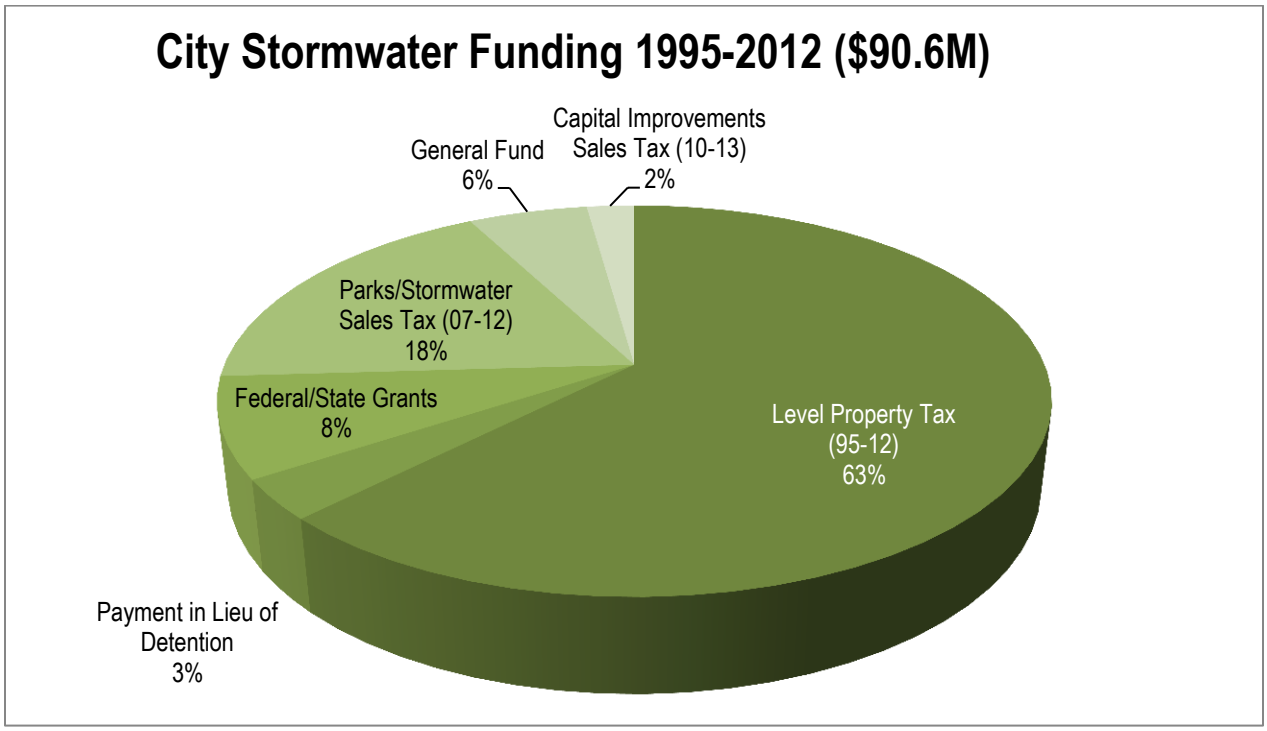
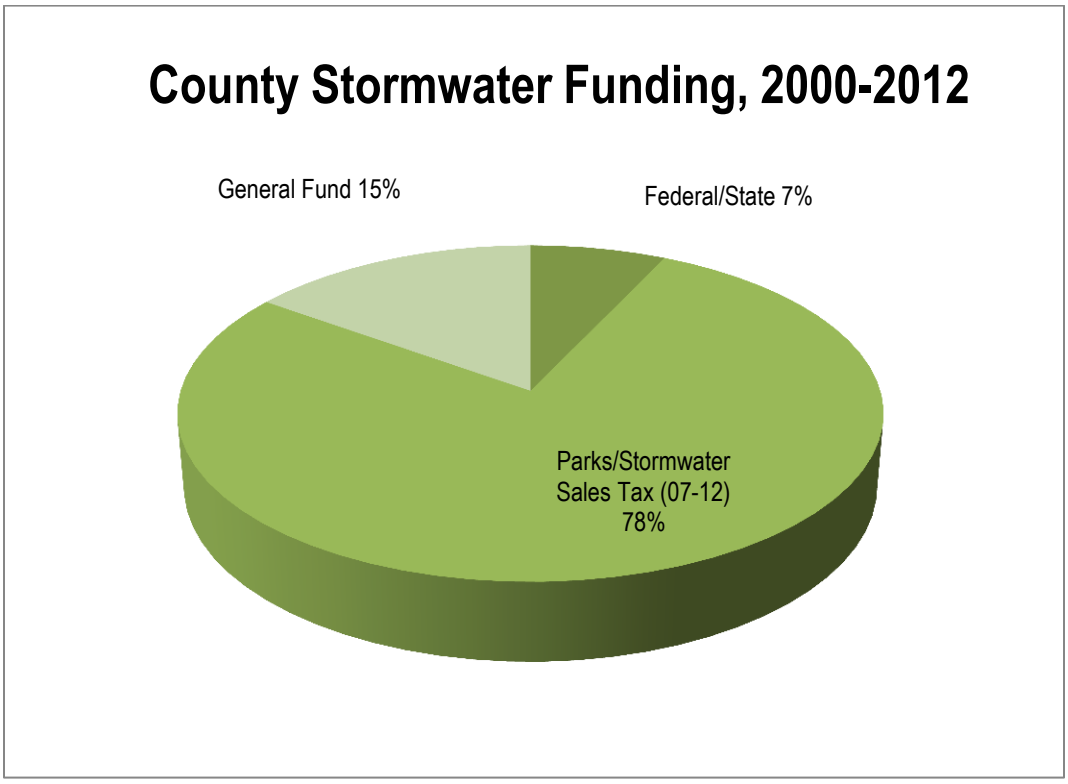


Table 3. County Stormwater Program Funding Breakdown (2000-2012)

Federal/State Funds	$ 700,000
Parks/Stormwater Sales Tax (2007-2012)	$7,700,000
General Fund (approx. $250,000/year 2007-2012)	$1,500,000
TOTAL	**$9,900,000**

Figure 19. Greene County Stormwater Revenues



City & County Funding Sources:

¼ Cent County Sales tax

A citizen committee looking at stormwater funding recommended a ¼ cent county sales tax. This tax was split with the Springfield/Greene County Parks Department - 1/8 cent to parks and 1/8 cent to stormwater projects. The county sales tax was passed in 2006. Collection of the tax began in July 2007 and ended in July 2012, generating about $16 million for the City and $8 million for the County, total over the five year period. It was used for waterways projects and programs to benefit water quality in parks and throughout the drainage system. Funds were split amongst the local governments, based on population. Several projects in parks have been completed by the City recently including Fassnight, Sequiota, Doling and Dickerson Parks. The sales tax revenue source ended in July 2012.

Big Urbie Water Quality Grant:

The City and County partnered with Watershed Committee of the Ozarks, James River Basin Partnership and others on a CWA Section 319 Grant application which was awarded in 2011. The 4-year grant, nicknamed "Big Urbie" provides $1 million for projects to address the water quality impacts of stormwater runoff, including practices like rain gardens, rainwater harvesting, and pervious pavement on public and school properties, as well as in partnership with homeowners and businesses. The City is providing $470,000 in matching funds. The City and County are providing technical assistance and project management. A stipulation of Section 319 water quality grants is that the grant can only be used for water quality projects that are above and beyond what the City and County are required to do by their MS4 permits. The Big Urbie water quality grant ends in 2015.

THE FUTURE

What are the current and future needs?

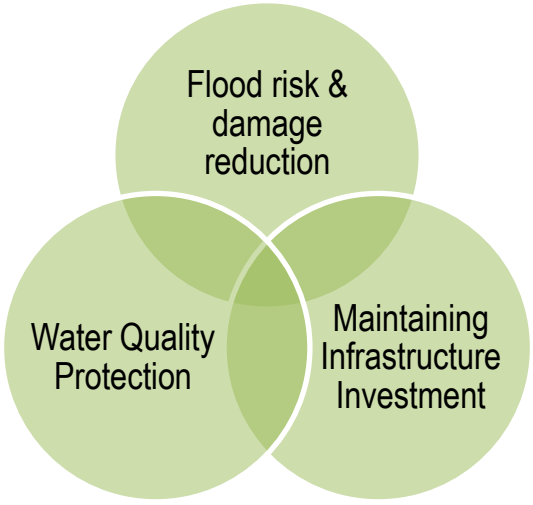
There is still a lot of work to be done to resolve stormwater management and flooding issues, as well as to meet increasing water quality permit requirements. There is not enough money to do everything. No community typically has enough resources to fix all the stormwater problems. Affordability of programs and investments in stormwater management and water quality protection will take careful balancing.

As Springfield and Greene County move forward with future investments and to meet regulatory requirements, there are three areas of focus to the work:

1. flood risk & damage reduction;
2. maintaining infrastructure investment; and
3. water quality protection.

The diagram below illustrates how the three focus areas relate to each other, with some overlapping opportunities. Projects and programs that fall within the overlapping, shaded areas will generally provide the most benefit to the community for every dollar spent.

Figure 20. Stormwater Management Issues



Identified Needs

Flood Risk & Damage Reduction – Improving motorist safety and flood damage to structures.

It is estimated that the City of Springfield would need $700 million to reduce flood damage and improve motorist safety to accepted national standards during heavy rains. Springfield has $100 - $200 million identified as high priority projects that would address the areas of most frequent and severe flooding. A study of the flood-prone areas within the City and the unfunded stormwater system needs to correct the

problems showed 664 projects totaling 293 miles of stormwater conveyance system improvements. The City's unfunded stormwater improvement needs are summarized by watershed in the following table.

Table 4. Unfunded Stormwater Improvement Needs

Watershed	Length (feet)	Estimated Cost (dollars)
Spring Branch	17,421	6,970,000
Pea Ridge Creek	62,310	22,930,000
South Dry Sac	15,300	6,550,000
Lower Jordan Creek	148,782	74,560,000
N. Branch Jordan Creek	80,836	51,540,000
S. Branch Jordan Creek	1,647,000	80,200,000
Upper Wilson Creek	196,452	76,296,000
Lower Wilson Creek	52,100	20,850,000
South Creek	145,160	58,870,000
Fassnight Creek	186,875	89,520,000
Galloway	192,615	89,620,000
Thompson	36,900	13,740,000
Inman Creek	61,902	27,200,000
Ward Branch	111,700	48,820,000
James River	75,975	44,360,000
Totals	**3,031,328**	**$712,026,000**

Greene County has an inventory of the stormwater system but no assessment on the needs for capital improvement projects. Since County regulations regarding stormwater infrastructure were not implemented until the 1990s, there are numerous subdivisions with inadequate drainage infrastructure.

Maintaining Infrastructure Investment – Protect past investments and infrastructure.

Both the County and the City provide minimal maintenance to their existing infrastructure.

The City spends about $1 million annually on maintenance which includes vegetation control and emergency repairs. Some examples of infrastructure maintenance needs facing the City of Springfield are briefly described below:

- Springfield has approximately $500 million in stormwater system assets. This includes 600 miles of pipes, culverts, and drainage ways. The City is currently assessing the condition of this infrastructure system. In very rough terms, if the system components had a life expectancy of 100 years, then Springfield would need $5 million for an infrastructure replacement program annually to

move from a reactive maintenance program to a proactive maintenance program protecting past investments.

- Collapsed box culverts (many are 50 to 100 years old) are a growing concern as the historical stormwater system reaches its life expectancy. Collapsed culverts can be a public safety hazard and can restrict the movement of stormwater and damage the transportation system. Several collapses have occurred in the past several years under the street, sidewalks, structures, in yards, and in parks. It is expected that as long as infrastructure replacement is underfunded that these occurrences will continue to increase.
- A specific infrastructure concern is the condition of corrugated metal pipe culverts. Many of these have been inspected and are deteriorating, nearing their life expectancy of 30 to 50 years.
- Springfield owns 23 regional stormwater basins to reduce downstream flooding that are maintained by the Springfield Public Works Department. The City stormwater permit requires the City to investigate opportunities to use these areas for more effective water quality protection. Conversion of basins to water quality treatment generally increases the maintenance requirements significantly.
- The City has acquired over 150 flood prone properties over the last 18 years. Most of these properties are maintained by the Department of Public Works. While there are many benefits of this program, property maintenance costs have gone up significantly due to these increases in City-owned property.

The County has an inventory of the stormwater system but no current assessment on the needs for maintenance projects. The County Highway Department maintains everything within the transportation system right-of-way. Everything outside this area is maintained by home owners or home owners associations. Most of the infrastructure is relatively new, built since the 1960s but not built to current standards. Due to lack of maintenance, many of the open channels have become clogged with sediment and yard waste reducing their capacity for stormwater conveyance.

Water Quality Program – Minimizes stormwater runoff pollution.

The City currently spends nearly $1 million annually to comply with clean water regulations that are designed to keep our lakes and streams clean and beautiful, as well as provide a safe and natural habitat for fish and wildlife. This cost is expected to continue to increase significantly with the issuance of the City's next MS4 permit in 2013. In addition to continuing to meet current permit requirements, the revised permit is expected to contain an increased level of planning, inspection, tracking, and reporting requirements to demonstrate effective implementation. Anticipated requirements include inspection to insure best management practices for controlling stormwater are utilized on new developments and redevelopments, as well as city projects and facilities. The City's illicit discharge and industrial inspection components of stormwater management are expected to increase. Best Management Practice structures built for managing stormwater quantity may require retrofitting to better address water quality issues. These increased MS4 permit elements will require additional staffing and resources.

Greene County's stormwater permit will expire in March 2013. A permit renewal application is due in May 2013 to Missouri Department of Natural Resources (MDNR). Changes to Greene County's Stormwater

Management Program from the current permit are anticipated to be more stringent monitoring, reporting, and public involvement requirements. Additionally, it is anticipated that all new construction and re-development sites will be required to reduce the total volume of runoff using post-construction infiltrative Best Management Practices.

An unknown regulatory requirement is looming in the near future. Jordan, Wilsons, and Pearson Creeks are on the state's list of impaired waterways. Total Maximum Daily Loads (TMDLs) were issued by EPA to address these impairments. The City is currently in litigation with EPA to address the City's concerns with how these documents were written. The resulting approach will likely require some level of expenditure by the City and County to study and address these impaired streams. Columbia, Missouri has a similar situation and they are estimating 70 stormwater detention basins are needed within one watershed alone.

In addition to these water quality issues, the U.S. Environmental Protection Agency is promoting an integrated planning and permitting process. The integrated planning process combines point source permits for wastewater treatment plants (WWTP's) and the MS4 stormwater permit. Springfield is contemplating trying this new approach to set environmental priorities and save monetary resources. Integrated planning is designed to save municipalities resources, although not eliminate administrative costs.

What are the potential funding sources?

Many communities across the Midwest and United States have grappled with securing long-term monetary resources to fund stormwater management programs. Below are some points the Task Force will consider and discuss in the coming months.

The types of funding sources generally available to governments include sales tax, property tax, or a stormwater utility fee. How much revenue can be generated by each potential source? Some estimates on a County-wide sales tax include:

- 1/10th of one percent generates $4 million/per year.
- 1/8th of one percent generates $5.5 million/per year.
- 1/4th of one percent generates $11 million/per year.

A utility fee could be enacted that charges property owners for the amount of hard (impervious) surface they have on their property or the amount of runoff that is generated on their property. The Level Property Tax is considered an inconsistent source due to competing needs for the funds and the scheduling on general obligation bonds. All the needs of the local government must be weighed when deciding how to use these funds.

Any new revenue source will likely need to be approved by the voters due to the Missouri Hancock Amendment. Some revenue sources have limitations on how funds can be used. Therefore, the revenue source needs to match with the program needs.

The Vision 2020 Comprehensive Plan and the 2030 Strategic Plan both identified water quality and stormwater management as critical issues for the Springfield community to continue to address. Some recommendations from the Vision 2020 plan have been implemented. In the 2030 Strategic Plan, the Natural Environment Committee addressed Stormwater Funding and Watershed Impacts. This committee recommended a sustainable, adequate funding source be in place by 2017. The committee anticipated the renewal of the Parks/Waterways Sales Tax in 2012 for another five years. Because that renewal did not occur, the need for a sustainable, adequate funding source is now more urgent. In addition, The Police Fire Pension Fund 3/4 cent Sales Tax continues for another 5 years. The City of Springfield is committed to no new taxes during this time frame, unless they are part of a County-wide tax or necessary to meet an unfunded mandate.

Stormwater Funding

"Major Goal: Ensure sustainable, adequate City and County stormwater funding for water quality protection and infrastructure management.

Provide sustainable, adequate funding for City/County stormwater management programs.

Responsible Group: Public Works Stormwater Services Division and Greene County Resource Management

Proposed Performance Measure(s):

1. Renewal of the 1/4 cent Parks/Waterways Sales Tax in 2011.
2. Convene a task force in 2014.
3. Sustainable, adequate funding in place when the 1/4 cent sunsets in 2017.

Estimated Cost to Achieve: $16.5 million annually (2005 estimate)

Proposed Funding Source(s): To be determined by task force"

Watershed Impacts

"Major Goal: Maintain or restore the pre-development hydrology of our watersheds and protect our waterways from pollution.

Assumptions: Urbanization has hydrologic, geomorphic, and biological effects on a watershed that can be minimized with a holistic, prioritized approach (National Research Council, 2008). Protection of Ozark streams with bank stabilization, riparian corridor restoration, and greenways is a cost-effective way to reduce phosphorus inputs and associated algae blooms in area lakes, and provides significant economic benefits in tourism, health care, and home values[5]. Potential impacts on karst systems and underground infrastructure need to be considered when promoting stormwater infiltration practices."

Recommendations include:

- Public use of Low Impact Development
- Coal Tar Ban
- Support State Water Pollution Control Regulations
- Riparian Corridor Restoration
- Stormwater BMP Retrofitting

More detailed information will be provided to the Task Force in future meetings. City and County staff and Shockey Consulting will provide more information in specific areas, as requested by the Task Force.

Recorded Subdivisions Southwest Greene County by Decade

Legend

- Incorporated
- County Line
- Property Parcels

By Decade

- Before 1980
- 1980 to 1989
- 1990 to 1999
- 2000 to Present

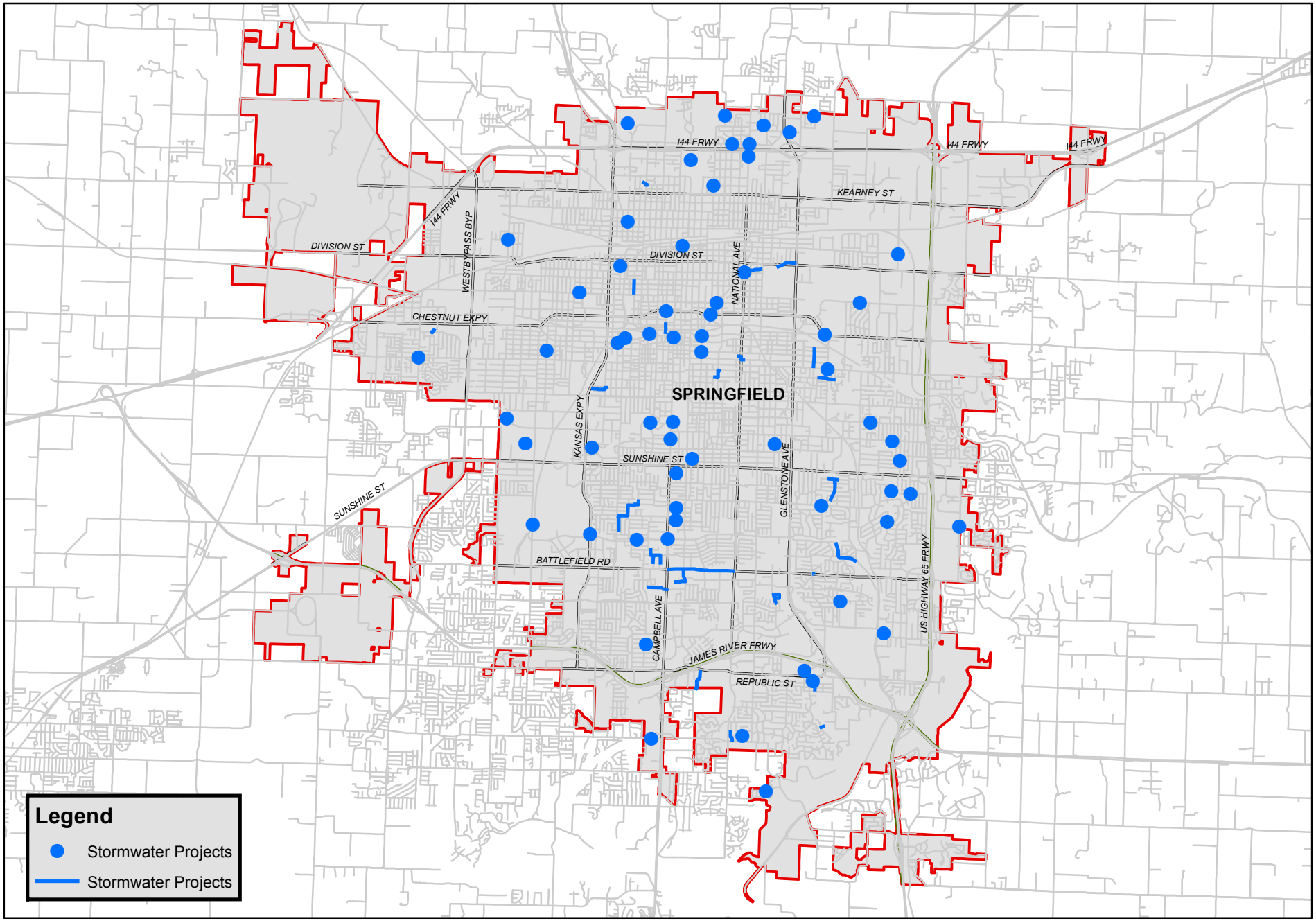
N
W E
S

Source:
Greene County Assessor's Office
Greene County Recorder's Office
Greene County Planning & Zoning

0 250 500 1,000 Feet

Stormwater Projects (1995-2012)

City of Springfield, Missouri



City of Springfield, Missouri

0 2,900 5,800 11,600 17,400 23,200 Feet

SCALE: 1:125,000

Springfield/Greene County Stormwater Management Task Force

October 25, 2012

Facilitator: Shockey Consulting

Staff Support:

City of Springfield
Department of Public Works
Stormwater Engineering

Greene County
Resource Management

Welcome and Introductions

Task Force Orientation

Purpose and Commitment

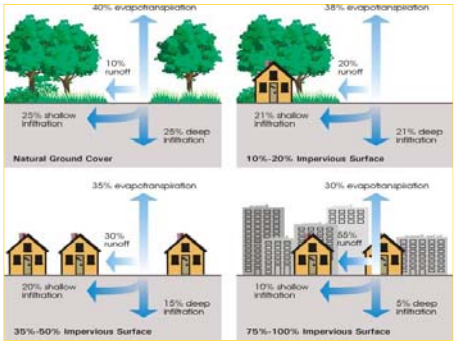
Role and Responsibilities

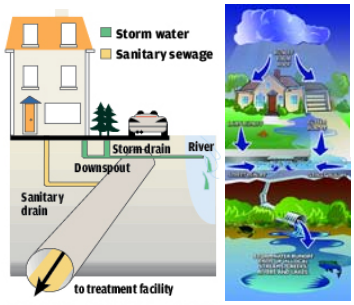
Tips for effective engagement

Task Force Support Team

- Springfield staff
- Greene County staff
- Shockey Consulting Services

Urbanization = Impervious Surfaces





The stormwater system is separate from the sanitary sewer system and does not go to a treatment plant.

Impervious Cover Influences Dry Weather Stream Flow

Many streams draw from groundwater.

Impervious surfaces prevent water from soaking into the ground.

This can result in lower stream flows during dry weather.

Impervious Cover Influences Wet Weather Stream Flow

When it rains, a large amount of water . . .



Runs off of impervious surfaces → Enters the storm drain system → Is directed straight to the stream

Increased runoff can cause…

More Frequent Flooding

Higher Flood Levels

Decrease in aquatic biodiversity

Stream bank erosion

Impervious Cover Influences Water Quality

Pollutants build up on impervious surfaces and wash off into area waterways when it rains.

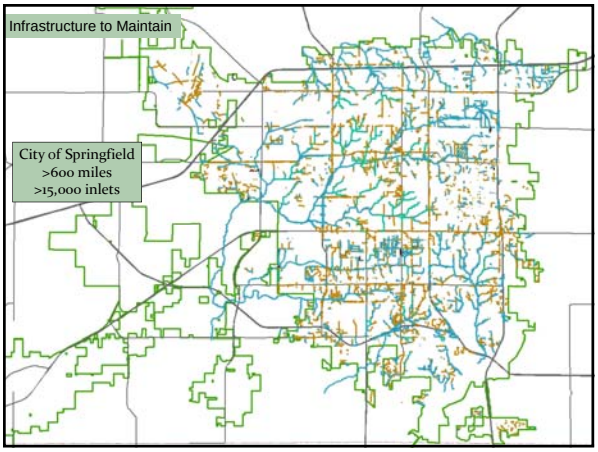
Potential Negative Impacts

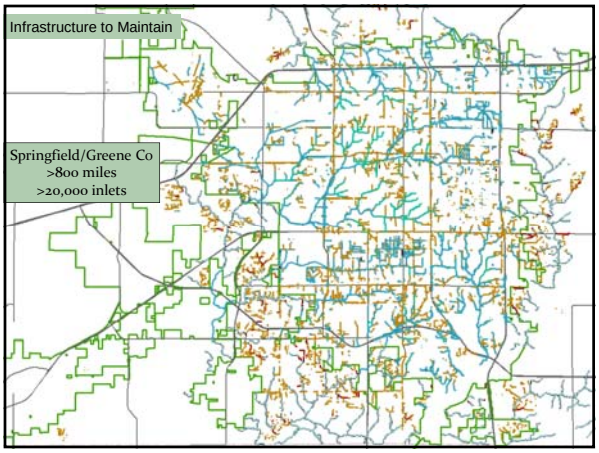
- Public health and safety
- Property damage
- Devaluation of property and neighborhoods
- Degradation of waterways
- Regional economy (fishing, recreation, tourism)

Good Stormwater Management

- Minimize flood impacts
- Maintain infrastructure
- Attractive, multi-purpose spaces
- Floodplain/riparian corridor protection
- Water quality and habitat protection
- Regulatory compliance

Improved quality of life and economic development

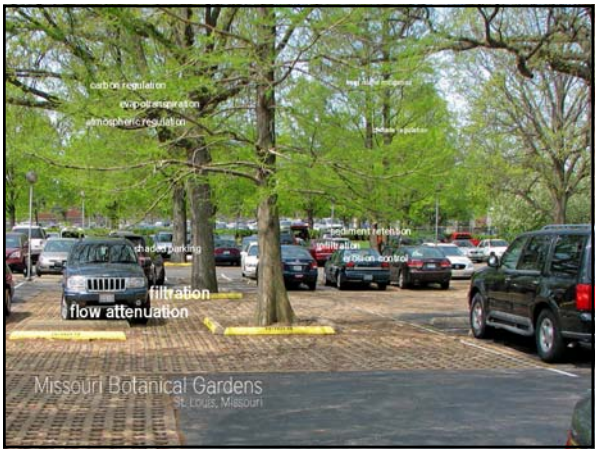




Minimizing Development Impacts

- Best Management Practices – reduce or treat runoff
- Low Impact Development
- Green Infrastructure

Pervious Pavement



Rainwater Harvesting

Green Circle Shopping Center – Republic Road & National

Rainwater Harvesting

Watershed Center

Water Quality Basins

Lenexa, KS

Green Roof

Modular Extensive Green Roof
Greene County Public Safety Center

Green Roof

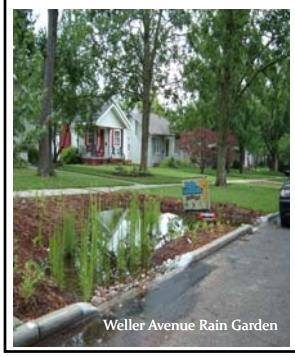
Green Circle Shopping Center

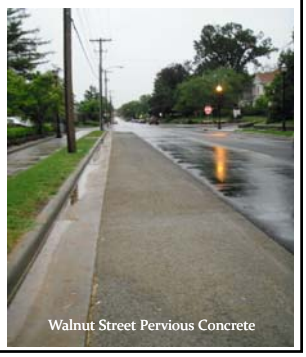
Rain Gardens

Doling Park Rain Garden

Park Central East Rain Garden

Green Streets


Weller Avenue Rain Garden


Walnut Street Pervious Concrete

Low Impact Development

Minimizing Pollution

- Individuals
- Businesses/Industries
- Construction
- Municipal

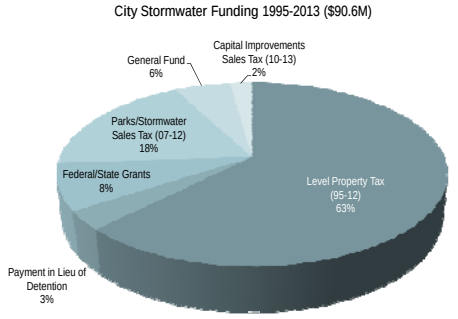
How was Stormwater Management Funded in the Past?

Level Property Tax
Parks and Stormwater Sales Tax
General Obligation Bonds
Federal and State Grants
Detention Buy-out or In-lieu payments
Capital Improvements Sales Tax
General Fund

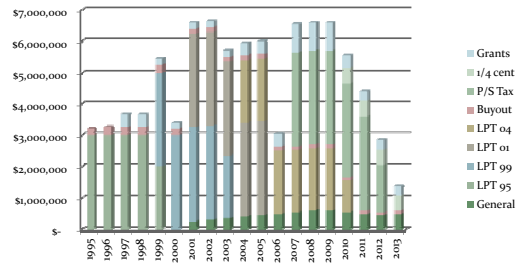
City Stormwater Program Funding Breakdown (1995-2013)

Level Property Tax	$56,600,000
Payment in Lieu of Detention	$3,000,000
Federal/State Funds	$7,500,000
Parks/Stormwater Sales Tax (2007-2012)	$16,500,000
General Fund	$5,000,000
Capital Improvements Sales Tax (2010-2013)	$2,000,000
TOTAL	**$90,600,000**

City of Springfield Stormwater Revenues



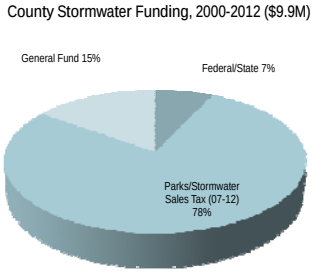
City Stormwater Program Approximate Annual Funding (1995-2013)



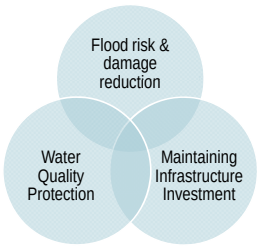
County Stormwater Program Funding Breakdown (2000-2012)

Federal/State Funds	$700,000
Parks/Stormwater Sales Tax (2007-2012)	$7,700,000
General Fund ($250,000/year 2007-2012)	$1,500,000
TOTAL	**$9,900,000**

Greene County Stormwater Revenues

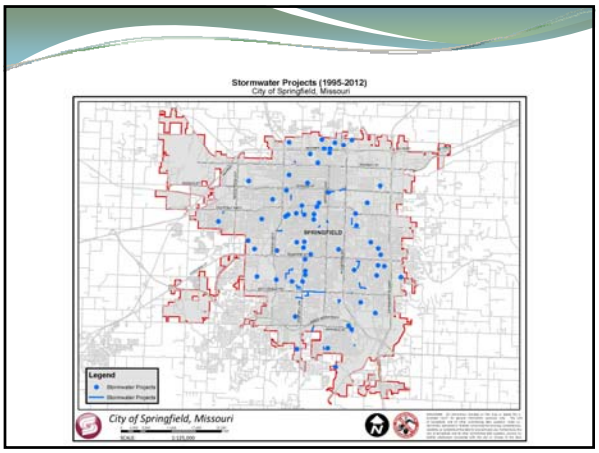


Stormwater Management Issues



What was Accomplished with the Investments Made?

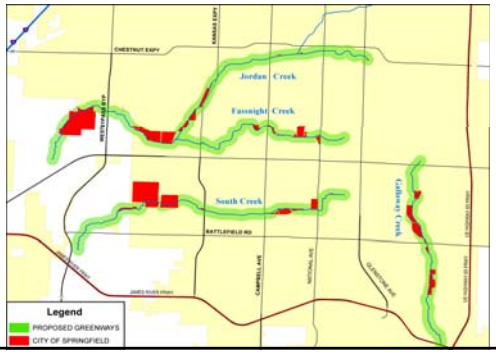
- **Voluntary flood buyout program: >$10M**
- **Flood reduction projects: $70M**
- **Stormwater Permit Compliance: >$400k annually.**
- **Water quality improvements projects - Stormwater Best Management Practices (BMPs)**
- **Infrastructure repairs: minimal, some projects replace**
- **Public Education and Outreach**



Voluntary Flood Buyout Program

- Stops the Cycle of Repeated Flooding of individual homes or entire neighborhoods – leads to lower property values, dilapidated properties
- Over $10M spent since 1994
- Over 200 acres acquired, mostly in or adjacent to floodplain
- Nearly 200 acquisitions
- Approximately 150 structures
- Matched approximately $750,000 in FEMA funds

Role of Floodplain Buyouts in Trail Development



Voluntary Flood Acquisition - Examples

Galloway (1998)	Seminole to Battlefield Road	43 ac	$ 425,000
Galloway (2003)	Southern Hills to Battlefield Road	16 ac	private
South (1998)	Close Park	52 ac	$ 90,000
South (2001)	Campbell to National	20 ac	$1,300,000
Wilsons (2001)	Scenic and Bennett Mobile Home	9 ac	$ 382,500
Wilsons (2001)	Open Space	43 ac	$ 100,045
Fassnight (2005)	Parkview Christian Church	2 ac	$ 15,200
Fassnight (2005)	Maple Park Cemetery	2 ac	$ 15,000
Jordan (2004)	Mount Vernon to Grand	20 ac	$ 119,000
Jordan (2005)	Catalpa to Bennett	10 ac	$ 53,500
TOTAL	10 properties	211 ac	$2,500,245

Voluntary Flood Acquisition - Examples

Voluntary Flood Acquisition - Examples

Erie-Ferguson Buyout and Flood Reduction

- Repetitive flooding 1977, 1993
- Approximately 17 home buyouts at Ferguson Sinkhole
- Approximately 13 home buyouts at Erie Sinkhole
- Approximately $4M in construction of flood control channel over 3 phases
- Environmental Award Winner

Erie to Ferguson Drainage Channel

Ferguson Sinkhole (Sept 1993)

Ferguson Sinkhole (July 2000)

Erie to Ferguson Drainage Channel

Ferguson Sinkhole Greenspace

Multi-purpose stormwater facilities

South Family Y Regional Detention to reduce downstream flooding

North Branch of Jordan aerial, before/after

North Branch of Jordan - Before

North Branch of Jordan - Today

Fassnight Creek – Flood Control/Park Restoration

Fassnight Creek Phases

Fassnight Creek – Flood Control/Park Restoration

Fassnight Creek – New Bridges

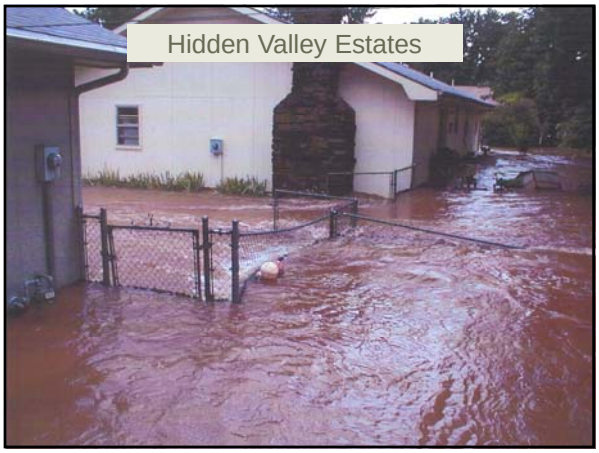
Home Grown Green Roof

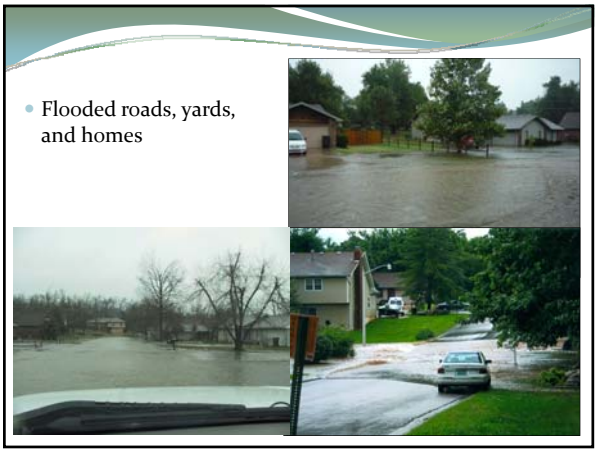
Shadowood Subdivision


Water Line

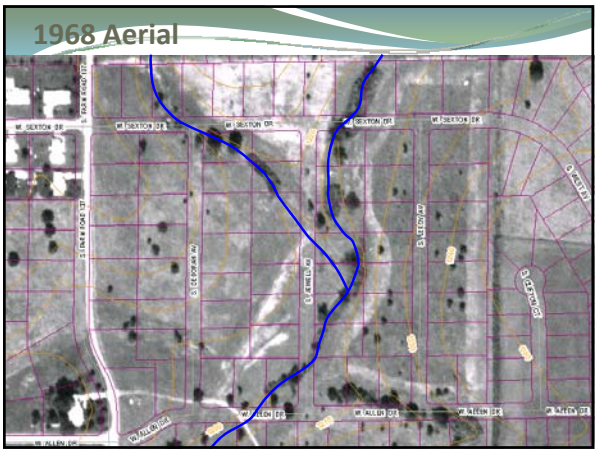

2001
2012


Ward Branch Stream Bank Stabilization
Twin Oaks Country Club
Nov. 2004
Jan. 2007
June 2007
May 2010

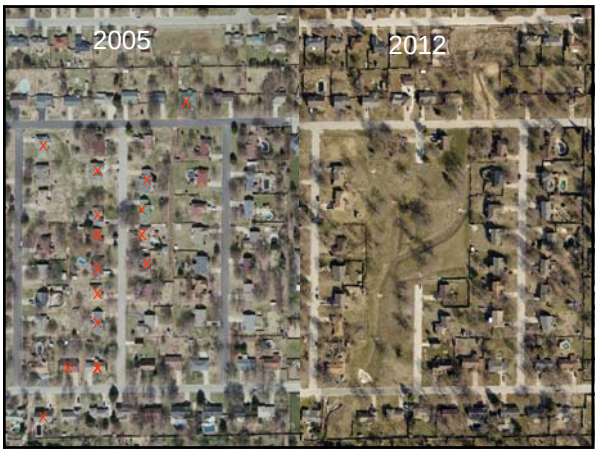

Hidden Valley Estates


Flooded roads, yards, and homes


400 acre watershed 100yr, 1 hr storm = 1,100 cfs


1968 Aerial


2005 Aerial: Homes built in 1977



2007-2012

- 15 homes purchased and demolished using Parks and Stormwater tax funds

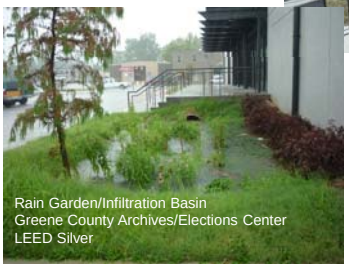
Spring 2010

- Box culvert installation under Allen Drive

Greene County Highway Dept

- Fall 2010
  - Channel Construction for flood protection

Stormwater BMPs



Rain Garden/Infiltration Basin
Greene County Archives/Elections Center
LEED Silver

Regulatory Compliance

- Federal Clean Water Act (CWA)
- Missouri Department of Natural Resources (MDNR)
- Municipal Separate Storm Sewer System (MS4) Permit

Development Review

- Infrastructure and conveyance standards
- Flood control requirements
- Water quality requirements

Land Disturbance Permit Program

- Land disturbance 1 acre or greater
- Permit
- Inspections
- Education and training

Municipal Operations

Illicit Discharges/Industrial Runoff

Public Education & Involvement

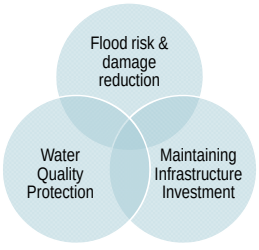
Partnership is key

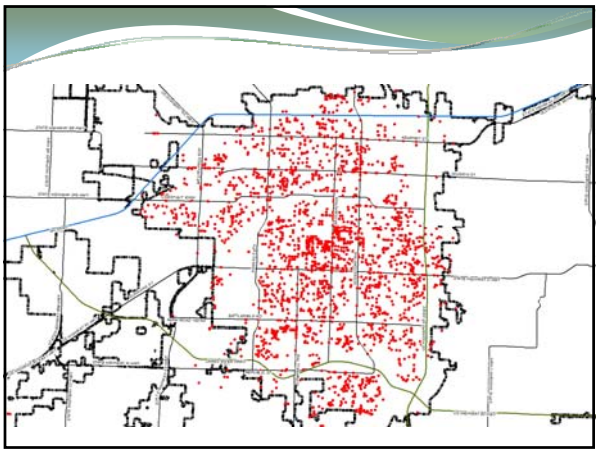
- Watershed Committee of the Ozarks
- James River Basin Partnership
- Project WET
- MDC

Water quality monitoring

- Stormwater runoff sampling
- Stream monitoring (chemical and biological)

What are the Current and Future Needs?





What are the Current and Future Needs?

Water Quality – Cleaning, Maintenance and Education/Awareness

What are the Current and Future Needs?

Infrastructure Repair and Maintenance

What are the Current and Future Needs?

Water quality protection and Federal and State compliance

What are the Current and Future Needs?

Flood Damage Reduction and Public Safety

What are the Current and Future Needs?

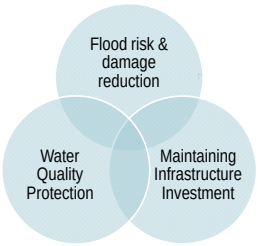
Channel Stabilization and Erosion Control/Utility Protection

What are the Current and Future Needs?

Infrastructure Repair and Maintenance

What are the categories of need?

- Flood damage reduction & public safety
- Water quality protection & federal and state regulatory compliance
- Infrastructure replacement & maintenance



City Unfunded Needs List (Flooding)

Watershed	Length (feet)	Estimated Cost (dollars)
Spring Branch	17,421	6,970,000
Pea Ridge Creek	62,310	22,930,000
South Dry Sac	15,300	6,550,000
Lower Jordan Creek	148,782	74,560,000
N. Branch Jordan Creek	80,836	51,540,000
S. Branch Jordan Creek	1,647,000	80,200,000
Upper Wilson Creek	196,452	76,296,000
Lower Wilson Creek	52,100	20,850,000
South Creek	145,160	58,870,000
Fassnight Creek	186,875	89,520,000
Galloway	192,615	89,620,000
Thompson	36,900	13,740,000
Inman Creek	61,902	27,200,000
Ward Branch	111,700	48,820,000
James River	75,975	44,360,000
Totals	**3,031,328**	**$712,026,000**

Flood damage reduction and public safety

- Needs based on
  - nearly 3,000 calls for service
  - analysis by city staff where system is non-existent or inadequate
- Priority currently given to frequency, severity and type of flooding (structural, major arterial, life safety)
- High priority needs are in the $100-$200M range

City Need for Infrastructure Replacement

A recent study found the approximate replacement value of the existing 600 mile long drainage system is $500M.

A very simplistic life cycle analysis shows that, with a projected 100-year life cycle, the annual replacement cost is $5M.

City/County Need for Water Quality/Regulatory Compliance

City Direct non-capital costs are currently about $500k annually. This cost is expected to increase to $1M or more annually with requirements of the new permit and federal stormwater rule, anticipated to be effective in 2013.

County spends $300k annually.

Other long term costs related to meeting more strict water quality standards are not known but could be significant.

What are the Next Steps?

Task Force Meeting Place and Times

Future meetings to be at new **Public Safety Center** near Chestnut Expressway and Campbell Avenue

- November 15
- December 13
- January 17
- February 7
- February 28
- March 21
- April 4

When is the best time to meet?

4:00 – 6:00 p.m. or

5:00 – 7:00 p.m.

Discussion & Closing Remarks