

Springfield – Greene County, Mo Integrated Plan for the Environment



Environmental Priorities Task Force

Date: Tuesday, May 27, 2014
4:30 to 6:30 p.m.

Location: Greene County Archives Building
1126 N Boonville Ave
Springfield, MO 65802

*Map to meeting
site on page 2*

Meeting purpose:

- Provide an introduction and overview of integrated planning.
- Present environmental issues overview.
- Get input on random sample survey questions.

AGENDA

4:30 p.m.	Introductions and Overview	Tim Smith, Greene County
4:45 p.m.	What is Integrated Planning?	Errin Kemper, City of Springfield
5:10 p.m.	Environmental Issues Overview of Water, Air, Land	Errin Kemper, City of Springfield
5:45 p.m.	Task Force Process Details	Sheila Shockey, Facilitator
6:00 p.m.	Committee Input on First Random Sample Survey	Sheila
6:15 p.m.	Open Discussion	All
6:30 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:

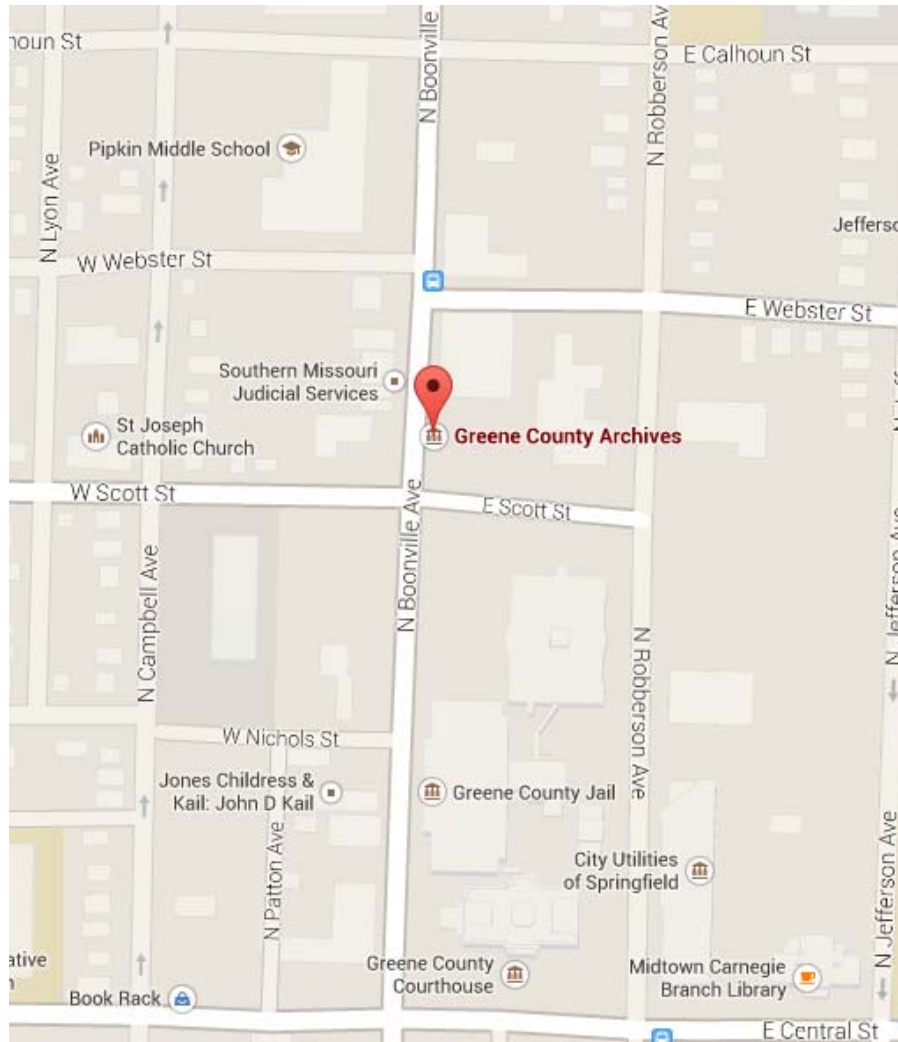
- 1. Background Information

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For assistance call 417.861.7102



Springfield – Greene County, Mo Integrated Plan for the Environment



Air-Land-Water Background Information

Introduction

What is the connection between air, land and water?

The quality of our air, land and water are all connected. Pollute the air and those pollutants can fall onto the land and be carried into the water during a rainfall. Pollute the land and it can find its way into our streams or groundwater. Pollute the water and it can have impacts both locally and as far away as the Gulf of Mexico. Sources of pollution can be natural or from a variety of human activities.

Our natural resources – water, land, plants, animals, and air – are the basis of our economies, historically and presently. Water resources and the quality of that water historically determined the location and size of communities and influenced the built environment. In particular, a good source of drinking water, and harbors, rivers, and lakes for transportation and commerce were vital resources to any community. Water resources and water quality remain vitally important today for quality of life, industry, agriculture, and a healthy economy. Good air quality plays an important role in bringing business to our region (more about that later) and land issues have a significant impact on both urban development as well as agriculture.

Everyday activities can impact our water, air and land quality and subsequently our health. Many of the things we use every day such as the cars we drive, the products we use, and what we do with our waste can have a lasting impact on our environmental resources. In the 19th and early to mid 20th centuries, waste generated in mining, manufacturing, and commercial enterprises, as well as everyday life, were dumped on the ground, into ravines and sinkholes, and into our waterways. “Dilution is the solution to pollution” and ‘dump and bury’ were the best management practice in those days. Recognition of the impacts of these practices on public health and our environment led to several major pieces of federal legislation in the 1970’s, including the Clean Water Act, Clean Air Act, Safe Drinking Water Act, Resource Conservation and Recovery Act, and the Superfund Act. These are the primary laws that still govern the protection of air, land, and water, and the disposal of waste. Since the 1970’s we have been cleaning up the consequences of decades of poor water and waste management while also working to minimize further impacts on our environment from development and present-day activities. Although today’s practices are greatly improved, many industrial, commercial, residential, and agricultural activities still pollutant and deteriorate our natural environment. Our understanding of environmental problems and solutions, and the connection between a healthy environment, public health, and quality of life continues to evolve on a national and local level. As our understanding evolves so do the federal, state, and local laws and programs to address these problems. In this summary, we hope to give a very brief overview of the issues related to air, land, and water and how they are all connected.

Air Quality

Why is air quality important?

Springfield, Greene County and City Utilities are committed to air quality protection through proactive educational efforts with businesses, non-profit alliances, and compliance with state and federal regulations. Managing air quality in the region is important to the health of citizens, the economy, and the environment.

The federal and state regulatory agencies set how much of each type of air pollutant is allowed in the air. These levels are set nationally based upon health impacts and environmental studies. Air monitors are located in each region to measure the concentration of pollutants in the air. If air quality in the Springfield-Greene County region does not meet the regulations, it is called non-attainment. If non-attainment is sustained over a certain period of time, the region has to develop a series of actions to be taken to get back into attainment of air quality standards.

There are serious economic consequences should the Springfield-Greene County region go into non-attainment of air quality standards. This could limit the types of businesses able to move into the region or place restrictions on existing businesses. Also, should the region move into non-attainment status and not make the required progress, the region could lose federal transportation funds, which would further impact economic development.

What are we trying to protect?

Air pollution can cause adverse health effects in humans and animals; damage trees, lakes, streams, crops; and influence weather patterns.

Human & Animal Health

The average adult breathes over 3,000 gallons of air each day. But that air may not be as clean as it looks because air pollution is not always visible. Air pollution is comprised of two primary components of pollutants: ground level ozone and particles suspended in the air. Ozone irritates the sensitive tissue of the eyes, nose and lungs. This can cause inflammation, chest pain and difficulty breathing. Ozone is a problem for everyone, but it can be especially dangerous for people who have respiratory illnesses or allergies. Exposure to ozone may aggravate asthma and bronchitis symptoms, and over time, it can increase susceptibility to respiratory infection and impair lung function. Healthy adults can experience problems breathing, especially those who exercise or work outdoors. Particle pollution can penetrate deep into the lungs, aggravating lung disease, triggering asthma attacks and bronchitis, and increasing susceptibility to respiratory infections.

There are immediate effects of air pollution exposure as well as long-term effects:

Immediate effects of air pollution

- Irritates your respiratory system, which can cause coughing, chest pain and difficulty breathing.
- Aggravates asthma, emphysema, chronic bronchitis and other chronic lung conditions.
- Makes your lungs more susceptible to infection.
- May make breathing uncomfortable, or more shallow or rapid than normal.

Longer-term effects of air pollution

- Inflames and damages the lining of your lungs – this is irreversible.
- Causes permanent lung damage, especially for children who are repeatedly exposed to ozone pollution.

Local Environment

In addition to the health concerns, poor air quality can damage trees and plant life. Air pollution reduces agricultural crop and commercial forest yields. Bodies of water can become contaminated as pollutants in the air are deposited on the land and in the water through dust and rain which, in turn, endangers fish and aquatic life and can make them unsafe for human consumption.

Local Economy

Air pollution increases individual and public health care costs due to increased doctor and hospital visits. It negatively impacts the economy because of work absences. It reduces student potential because it increases school absences. In addition to damaging the natural environment, air pollution's corrosive elements also damage roadways, buildings, and monuments. Air pollution can endanger fish and aquatic life which are important for recreation and the tourism economy in the Ozarks.

If the region doesn't meet air quality standards, the following costs may increase:

- Public sector staff costs to educate and enforce regulations;
- City Utilities infrastructure costs for more air quality measures;
- Automobile ownership costs for vehicle inspection requirements;
- Gas prices for cleaner fuel measures; and
- Private business compliance costs.

Most of these costs would be passed along to or directly paid by the citizens of Springfield-Greene County.

Global Environment

The "Greenhouse Effect" is a natural phenomenon that warms up the earth. Greenhouse gases are increasing leading to an overall warming of the earth's surface. The major greenhouse gases include carbon dioxide, troposphere ozone, nitrous oxide, methane, CFCs, and water vapor. This impacts weather patterns which in turn can affect crops, fresh water supply and other ecosystem impacts.

What are the sources of air pollution?

The sources of pollution can be divided into the following categories:

Natural – natural activities in the environment such as wildfires can cause air pollution.

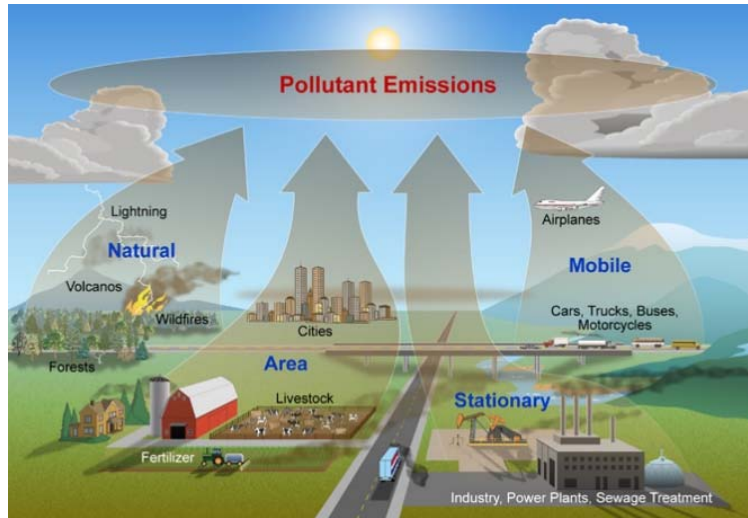
Area – Smaller-size facilities that release lesser quantities of toxic pollutants into the air. Area sources are defined as sources that emit less than 10 tons per year of a single air toxic, or less than 25 tons per year of a combination of air toxics. Though emissions from individual area sources are often relatively small, collectively their emissions can be of concern - particularly where large numbers of sources are located in heavily populated areas.

Stationary – These sources may release air toxics from equipment leaks, when materials are transferred from one location to another, or during discharge through emission stacks or vents. Examples include large industrial facilities and power plants.

Mobile – Mobile sources include on-road vehicles and non-road equipment such as airplanes, boats, and lawn mowers. Mobile sources are responsible for direct emissions of air toxics and contribute to precursor emissions which react to form secondary pollutants.

Figure 1 shows the sources of air pollution by these four categories.

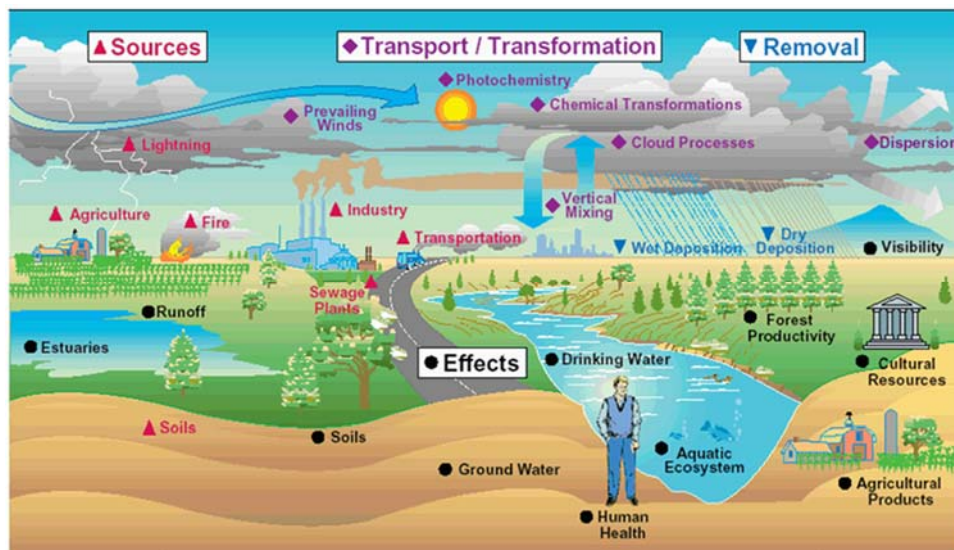
Figure 1: Pollutant Emission Sources



How is it connected?

Figure 2 shows the sources of air pollution, the mechanisms by which it is transported, transformed, and deposited on the earth, and the effects it has on the environment and human health.

Figure 2: Sources and Effects of Air Pollution



Sources of air pollution rise up through our atmosphere and are transported by prevailing winds and transformed through chemical processes. Some of the matter is deposited back on the earth in wet deposition, like rain, or by dry deposition, like dust. These pollutants can contaminate the land and water, and affect human health and agricultural productivity.

Land Pollution

Who and what is polluting our land?

We are – through the improper use or disposal of the following:

- Chemicals – industrial and household waste
- Petroleum products
- Heavy metals
- Trash and debris – business and households
- Fertilizers and pesticides
- Wastewater – failing septic tanks and poor animal waste management

Industrial and household waste includes many chemicals such as surfactants, lubricants, solvents, glues, and acids and bases. These chemicals are important in the manufacture of many products we use every day and depend on, such as cleaning solutions, pharmaceuticals, and oils and greases. Improper handling of these chemicals or their waste products can lead to contamination of the land.

Gasoline, diesel fuels, oils, lubricants, and similar petroleum products are found everywhere in our community and our daily lives. Petroleum products leak or spill into the environment through accidents and improper storage and handling at industrial facilities, commercial enterprises, and other businesses. Some leakage of oils, greases, and fuels is common from our vehicles through regular use and care. Petroleum products may also be improperly handled or disposed at residential properties.

Heavy metals are ubiquitous in our environment since many are used in products and manufacturing processes. One common source of heavy metals is brake linings. Metal fragments of the brake linings are worn off from cars and trucks every time the brakes are applied. The metal fragments land on the road surfaces where they can be blown by the wind or transported to water resources via stormwater runoff.

Lead mining from near surface geologic formations was a lucrative enterprise during the 20th century. Mining practices at the time were not as strict as today and waste piles from the mining operation, also known as chat piles, were left at the surface. Chat piles may contain levels of lead that are unsafe for the environment; therefore less vegetation grows on the waste piles. Lead contaminated soil washed away in stormwater runoff and blew dust across the area. Lead is toxic to people, plants, and animals. Some of these former lead mining areas have been remediated under the Superfund and Brownfields programs.

In addition, the use of lead in gasoline was standard practice up until the mid-1970s. Lead was emitted through tailpipes and settled onto the ground and building surfaces. Lead was also common in paint products used throughout interior surfaces of homes, schools, and buildings. Human exposure to lead occurred through breathing dust and dirt particles with lead adhered to them and through hand-to-mouth contact.

Trash and debris from businesses and households that is improperly handled litters our land, highways, cities, and country. Especially during windy weather, trash can easily blow great distances despite our best efforts to keep it in trash receptacles.

The improper application and over-use of fertilizers and pesticides on urban and agricultural lands can result in pollution of soils, streams, lakes and groundwater. This is a situation where the old adage 'if a little is good, a lot is better' does not apply.

Wastewater from failing septic tanks and poor animal waste management can result in pollution of streams, lakes, and groundwater through stormwater runoff or through the shallow surface soil and karst geology in Greene County, which allows pollutants to move into groundwater and surface in springs, waterways, and drinking water wells.

Where does land pollution come from?

Land pollution comes from people's activities in the past and today. Historical pollution sources often come under the umbrella of "old ways of doing business" since at the time, standard practices were being followed. For example, many industrial facilities buried chemical wastes on site, often in drums. Commercial enterprises using chemicals, such as dry cleaners, took their waste to the local dump or just 'threw it on the ground out back.' Standard practice for storage of fuel at service stations used single-layer metal tanks that were not lined and just buried in the ground, which over time corroded and leaked. Chemical products were stored in drums that may have leaked or spilled, often outside.

Figure 3. Sources of land pollution



A variety of materials were used in manufacturing and products that later were found to be hazardous to human health and the environment. Asbestos containing materials (fireproofing, insulation, roof and siding tiles, soundproofing) and lead based paint are two of the most common. As products were used and became worn, materials were released into the environment.

Old dump sites were often selected based on topography – a ravine or low area that was easy to unload debris. These disposal sites were used prior to regulations and local codes controlling these sites, often resulting in leaching of chemicals and land contamination. Old mining sites were often used as disposal sites or landfills once the mining operations ceased.

Illegal Activities continue as a source of land pollution. Illegal dumping of debris and chemical products, illicit discharges of waste onto land areas, and improper chemical and biological material handling are sources of land pollution.

Improper Management of Industrial & Household Waste

Historically, industrial and household waste was disposed of in the same landfill. The Fulbright and Sac River Landfills are former landfills operated by the City of Springfield. At the time of operation, they accepted domestic and industrial wastes from the region, usually mixed together. This was considered standard practice at the time. Landfills during this time period also did not have impermeable linings to prevent any waste from leaching into the subsurface soils and groundwater. These facilities became a Superfund site as will be discussed in greater detail later.

Air Pollution

Pollution of the land from air sources can be natural or from a variety of human activities– deposition of emissions from power plants, quarries and mineral extraction, industrial manufacturing facilities, windblown dust off construction sites and agricultural land, particulates and pollen, and vehicular emissions. Air pollutants are deposited on the ground surface during dry weather periods and during precipitation. The sources can be local, from across the country, or from across the world.

Fertilizers and Pesticides

Weed and insect control applied to lawns, golf courses, and agriculture lands can be sources of land pollution if these products are not applied properly – quantity, timing, and application method. Excess product can become airborne or enter water resources via runoff. Product can leach through the soil and enter groundwater resources.

Land management practices that cause erosion are another source of land pollution. Since the 1930's, the United States has worked diligently through local soil and water conservation districts to protect top soil and prevent soil erosion. Eroded soil can carry chemicals (fertilizers and pesticides) and pollutants (metals, bacteria, petroleum products) onto other property and into streams, lakes, and sinkholes.

Littering continues to be a source of land and sight pollution despite anti-litter laws passed decades ago. States and communities have utilized a variety of programs to prevent littering and cleaning up the litter deposited and blown throughout our communities. Illegal dumping of personal trash, bulky items, and lawn debris is another source of land pollution.

How is it connected?

Contaminated soils can be a human health concern and a problem for development. Pollution gets deposited on the land through human activities such as chemical use and disposal, and through deposition of pollutants in the air. Pollution sources such as underground fuel tanks and failing septic tanks are buried in the ground and can make their way into our streams, lakes, and groundwater through stormwater runoff and our karst geology.

Water as a Resource

Why protect our water resources?

Protecting our water quality is important for a number of reasons, primarily because it is vital to life. We need to protect it for drinking water, water for industrial uses, recreation (boating, fishing, hiking, wading), economic stability and growth, and quality of life. Water quality is particularly important to the environmental and economic health of Springfield and the surrounding communities because of the impact on two important lakes used for recreation and tourism: Table Rock Lake and Stockton Lake. Our region's water resources are tremendous assets for residents and a draw for tourists who desire clear, clean lakes for recreation.

Our 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. Tens of thousands of residents rely on groundwater wells for their drinking water. Droughts and reduced water supplies drive home our need for clean water every day.

What is negatively affecting our waterways?

Our waterways are affected by wastewater from cities and failing septic tanks, as well as pollutants found in stormwater runoff from commercial, residential, industrial and agricultural land uses in our community. Our waterways are also negatively affected by increases in runoff rate and volume resulting in stream bank erosion, as well as other changes such as removal of trees/vegetation along our streams. In addition, water pollution can come from buried sources such as leaking underground storage tanks and contaminated soils, as well as pollutants deposited from the air. Table 1 provides a summary of major factors that can negatively affect our waterways.

Table 1. Source and impact of various factors affecting waterways

Pollutant	Source	Impact
Bacteria	Animal & human waste: pets, wildlife, livestock, septic systems, sanitary sewer overflows.	Causes people to get sick if they ingest it – public health issue. Can impact aquatic communities.
Nutrients: Nitrogen & Phosphorus	Animal & human waste Improperly applied fertilizer from lawns, recreational fields, and agriculture carried by stormwater runoff. Detergents with phosphorus. Air pollution falling to land &	Causes algae to grow in water resulting in less clear water. These conditions are less appealing for recreation. As it dies, algae uses up the oxygen in the water which can kill fish & aquatic life.

	water.	Increases cost to treat drinking water and can cause taste and odor problems. Nitrates in drinking well water are a health hazard to infants and young children.
Toxins	Improper disposal of chemicals (household & business). Air pollution falling to land & water. Stormwater runoff from urban areas carrying toxins from land. Leaking storage tanks and contaminated soils.	Human & animal health; toxic to fish & aquatic life. Bioaccumulation of toxins in fish.
Increased sediment load	Increased volume and velocity of stormwater runoff. Erosion of stream banks. Stormwater runoff from urban and agricultural areas carrying sediment from the land.	Aesthetic issues. Changes in physical condition of the stream. Affects habitat for aquatic life. Increases drinking water treatment costs. Source of nutrients and carrier of other pollutants.
Trash	Improper disposal of trash	Aesthetic. Clogs water intake pipes, increasing treatment costs. Clogs culverts, drainages, and streams with potential to impact bridge structures. Can impact health/survival of aquatic life.
Bank erosion	Increased volume and velocity of stormwater runoff. Removal of trees/vegetation along banks by humans, livestock/geese causes erosion.	Aesthetic. Source of sediment (see above impacts). Soil and property loss. As banks erode, trees fall over. Loss of trees affects

	Mowing/agriculture to edge of waterway.	water quality and habitat for aquatic life.
Loss of riparian buffer (area with trees and vegetation along a stream)	Development/agriculture next to waterway Stream channelization and modifications	Loss of habitat for aquatic life and wildlife. Riparian buffers can filter pollutants so their loss can degrade water quality.
Changes in stream flow	Increased volume and velocity of stormwater runoff from development. Less groundwater recharge due to impervious cover.	Affects habitat and lifecycle/survival of aquatic life. Bank erosion.

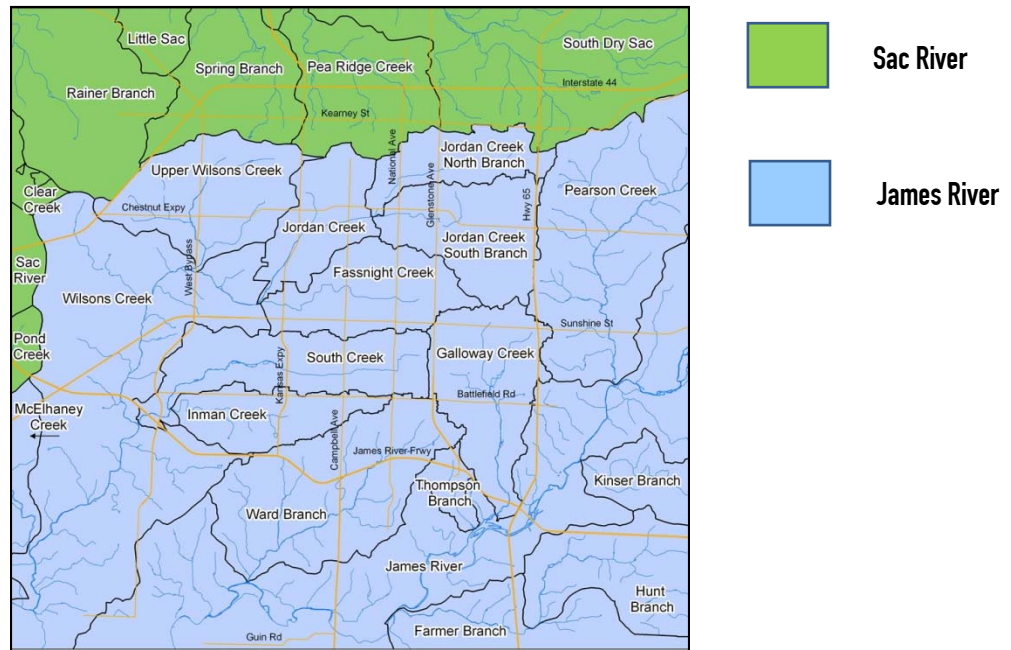
What waterways are we trying to protect?

A watershed is the land that stormwater runs across to a common body of water such as a lake, river or stream. Watershed boundaries are formed by the topography of the land. 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 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. 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. Table 2 lists the various sub-watersheds within each major watershed. Figure 4 shows the major watersheds in the urban service area of Springfield.

Table 2. Watersheds of Springfield area

Sac River Watershed	James River Watershed	
Pea Ridge Creek	Pearson Creek	Galloway Creek
Spring Branch	Fassnight Creek	Thompson Branch
South Dry Sac	Lower Jordan Creek	Inman Creek
Little Sac	N. Branch Jordan Creek	McElhaney Creek
Pond Creek	S. Branch Jordan Creek	Ward Branch
Rainer Branch	Upper Wilsons Creek	Kinser Branch
Clear Creek	Lower Wilsons Creek	Hunt Branch
	South Creek	Farmer Branch

Figure 4. Sac River and James River Watershed



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

How is it connected?

Air pollution and land pollution have environmental and human health impacts all their own, but they are also sources of water pollution. What is in the air and on the land ends up in our streams, lakes, and groundwater. Although air, land, and water are regulated under different laws, their protection often goes hand in hand. The goal of integrated planning is to address the protection of these resources together, rather than separately, recognizing that they are all connected.