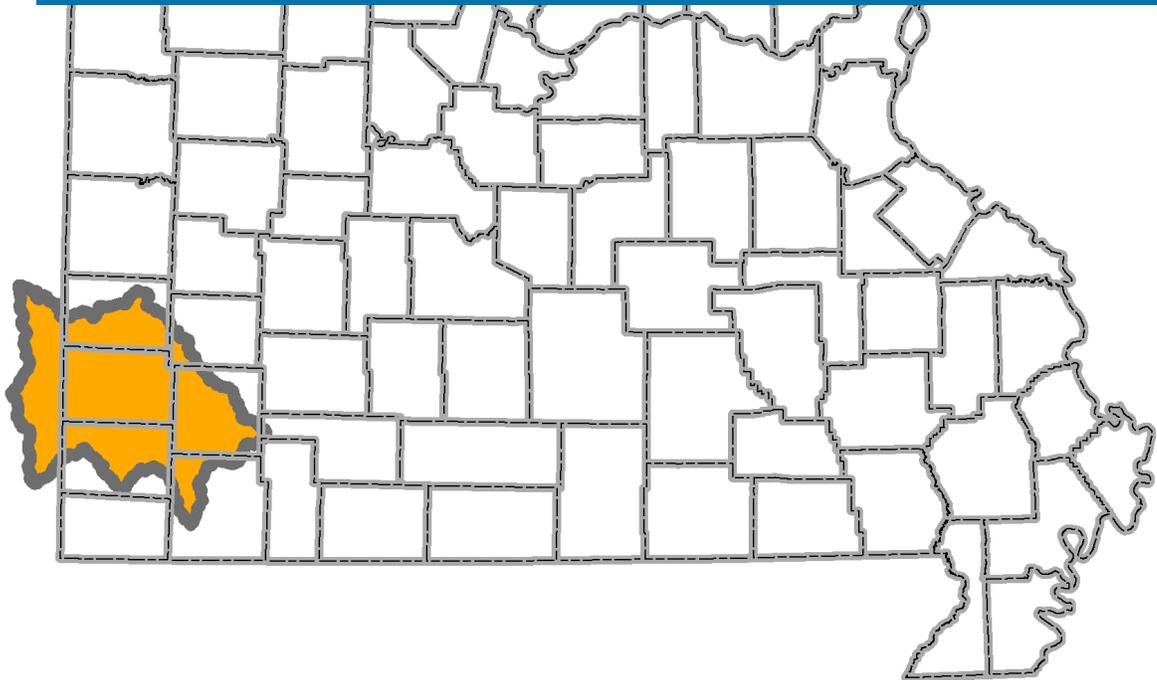


The State of *Our Missouri Waters*

Spring River Watershed



The Missouri Department of Natural Resources seeks to improve the availability of water resource information to communities where impact to these water resources is felt most.

The information presented in this summary is intended to increase awareness of how activities on land and in water have an influence on water resource quality and quantity. The department greatly values local input and engagement regarding the mission of ensuring safe and ample water resources, and will continue to seek local guidance to further focus department efforts and funding strategies for the betterment of *Our Missouri Waters*.

Spring River Watershed

The State of Our Missouri Waters

Importance of Water Quantity and Quality

Water shortages can have severe and expensive consequences. Adequate water supplies are vital not only to human health and safety, but also to the prosperity of our state. Whether it is for crop irrigation, industrial manufacturing or power generation, water is at the core of human existence and sustainability. A few decades ago, the supply of water in Missouri was considered virtually unlimited. As population and industry have increased, a need for statewide water planning has emerged.

Water quality impairments can also have severe impacts on human health and the environment and be extremely expensive. Unfortunately and more importantly, many water quality impairments are only discovered once the consequences of poor water quality have been realized. For this reason, it is important that locals are involved in the protection of their water quality and quantity so as to prevent irreversible consequences.

Key Points

High *Escherichia coli* (*E. coli*) levels are a concern in the Spring River basin. There are approximately 712 -miles of impaired streams in the watershed. Fifty-two percent of the impaired streams are due to *E. coli* from stormwater runoff from nonpoint sources. *E. coli* are a type of bacteria found in the fecal matter from warm blooded mammals. It is used as a risk indicator of waterborne disease and illness from harmful bacteria or viruses. High levels of this bacteria in streams that are frequently used by area citizens and visitors for fishing, swimming and boating can cause serious public health and recreational safety issues. Nonpoint sources of pollution, such as animal waste and contaminants carried by stormwater runoff, can have a serious cumulative impact on surface waters in a largely rural watershed. Urban stormwater and agricultural best management practices can significantly reduce nonpoint source impacts.

Opportunities

Community Involvement

- Communities, groups and individuals can be involved in and promote watershed improvement activities through education, advocacy and hands-on projects. Examples include, watershed education for schools, litter control, tree planting, water quality monitoring and storm drain stenciling.

Education and Outreach

- Assistance is available for training and assistance regarding several topics such as source water protection, municipal drinking water loss, water main leak location, asset management, water conservation planning and implementation and I/I onsite assistance.
- Training is also available to livestock operations and landowners regarding the benefits of alternate watering sources for livestock, improvements to land application practices, best management practices and associated cost-share programs.

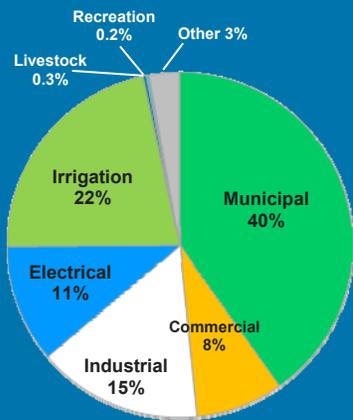
Financial Assistance

- **Clean Water and Drinking Water State Revolving Funds** are available to build or improve municipal wastewater and drinking water infrastructure and support agricultural and urban projects such as improvements to urban runoff, wet weather flow, stormwater and sewer overflow issues, water reuse and conservation and alternative treatment projects.
- **319 Nonpoint Source Funds** are available to assist organizations with implementation of on-the-ground practices that control, reduce or manage nonpoint source pollution such as riparian buffer strips, detention ponds, limitation of animal waste to stream and sinkholes.
- **Source Water Protection Grants** and **Well Plugging Grants** are available to public water systems to support safe well abandonment procedures and source water protection implementation and planning efforts.
- A full list of department funding sources is available at <http://dnr.mo.gov/financial.htm>

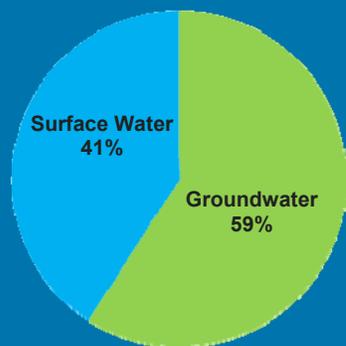
Spring River Watershed

The State of Our Missouri Waters—Current Conditions and Trends

Water Use by Category (2013)



Water Use by Source (2013)



Climate and Water Availability

Precipitation

A five-year trend line reveals several wet periods have dominated since the early 1980s. This wet pattern has also been accompanied by an increasing trend of heavy precipitation events. Severe drought occurred during 2012, but this drought was brief compared to major multi-year droughts that occurred in the 1930s and 50's. Tree ring analyses conducted in Missouri and historic observation data show periods of multi-year severe droughts, indicating that extended dry periods are likely to occur in the future.

Groundwater and Stream Monitoring

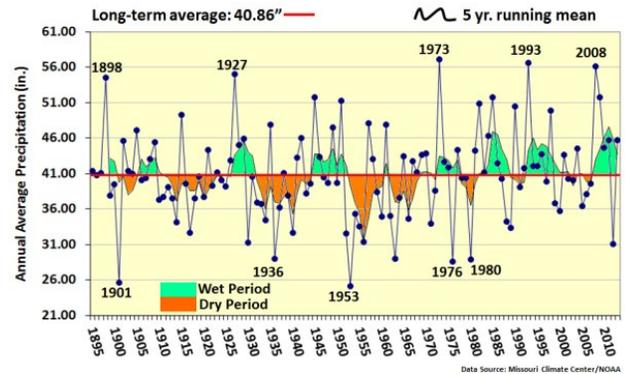
There are 19 groundwater monitoring wells within the watershed as part of the Missouri Observation Well Network. Two of these wells are open to the Ozark and St. Francois aquifers. Thirteen wells are open to the Ozark aquifer and four wells are open to the Springfield Plateau aquifer. The Atlas Powder well (see right) has been recording water level data since 1956. There are currently 10 stream gauges in the watershed that measure average stream flow. Average discharge varies from 14 (tributary) to 1,506 (mainstem Spring River) million gallons per day.

Water Use Characteristics

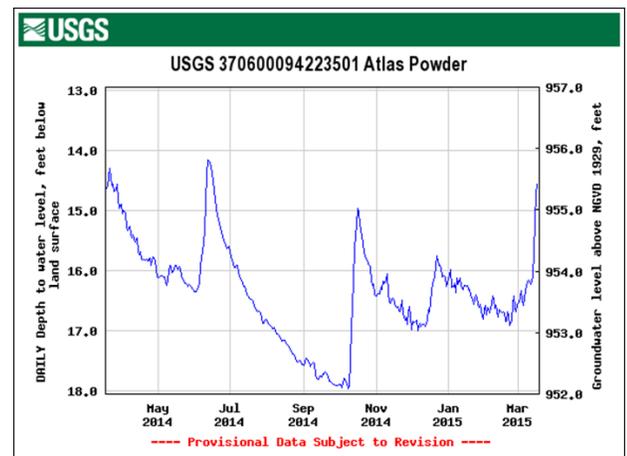
A major water user is defined as the capacity to withdraw more than 70 GPM (gallons per minute) or 100,000 GPD (gallons per day). The estimated annual water use as of 2013 is 14.2 billion gallons, of which 41 percent is diverted surface water and 59 percent is groundwater. Sixty-one major water users are registered in the basin. The majority of surface water is used for Joplin municipal water supply (70 percent), which is pumped from Shoal Creek. Only 6 percent of Joplin's municipal water supply comes from groundwater.

There are 102 public drinking water systems serving approximately 170,723 people. Water systems that are required to report show approximately 29.6 million gallons of water are consumed per day. There is 82.4 million gallons of available drinking water capacity per day for public water use.

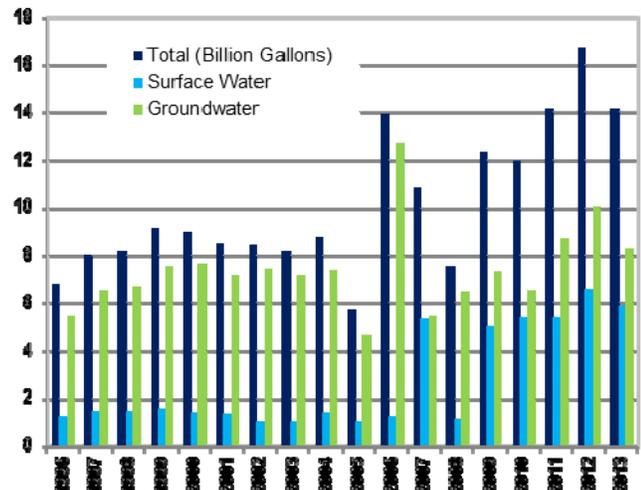
Missouri Annual Average Precipitation (1895-2013)



USGS Atlas Powder Groundwater Monitoring Point



Major Water Use Trends in Spring River Basin 1996-2013



Spring River Watershed

The State of Our Missouri Waters—Current Conditions and Trends

Protection of Our Natural Resources

The department exercises authority under Missouri's Clean Water Law to regulate point sources of pollution. When point sources are known or discovered, the department issues permits for these sources to limit the amount of certain water contaminants that may be discharged into the water body.

The department also has resources to help people proactively plan to protect water resources, such as:

- Source Water Protection Plans for drinking water sources
- Section 319 funding for watershed planning and projects
- Funding to plan for source water protection
- Soil and Water Conservation funding
- State Revolving Fund grants and loans for community drinking water and wastewater improvements

A full list of department funding sources is available at dnr.mo.gov/financial.htm

It is important to note that resources are limited and local involvement, in determining most critical and effective focus areas, is invaluable.



Watershed Protection

Water Quality Impairments

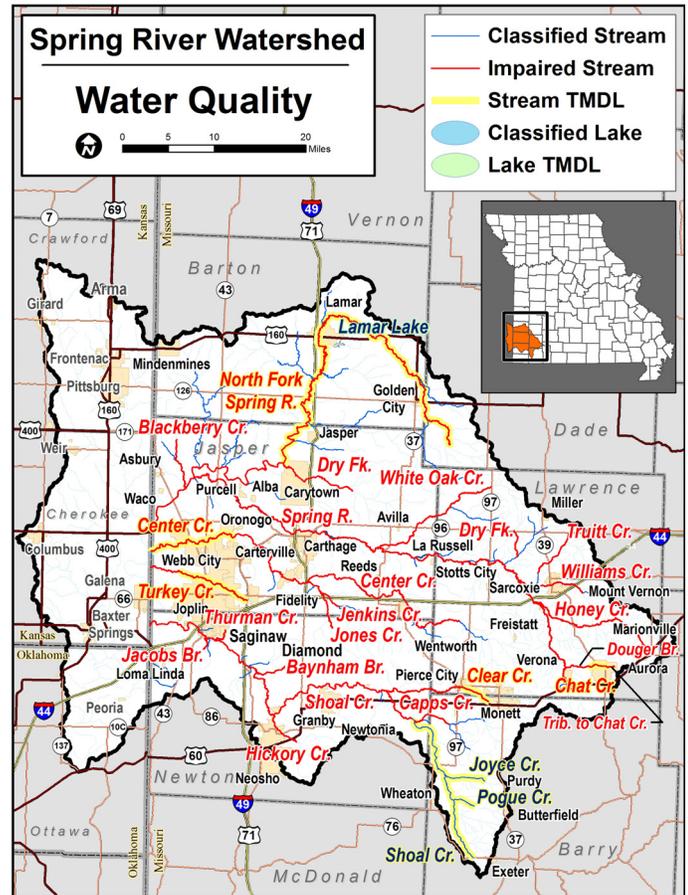
Section 303(d) of the federal Clean Water Act requires each state identify waters that do not meet water quality standards and for which adequate water pollution controls are not in place. These identified waters are considered impaired. Water quality standards protect beneficial uses of water such as whole body contact (e.g. swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife.

The following streams within the watershed are listed on the State's 2014 list of impaired waterways and are presented on the adjacent map:

Baynham Branch (bacteria), Beef Branch (cadmium, lead, and zinc), Blackberry Creek (sulfate+chloride and chloride), Capps Creek (bacteria), Center Creek (bacteria, cadmium, and lead), Clear Creek (bacteria, low dissolved oxygen, and nutrients), Douger Branch (lead and zinc), Dry Fork (bacteria), Hickory Creek (bacteria), Honey Creek (bacteria), Jacobs Branch (cadmium, lead, and zinc), Jenkins Creek (Bacteria), Jones Creek (bacteria), North Fork Spring River (ammonia, bacteria, and low dissolved oxygen), Shoal Creek (bacteria), Slater Branch (bacteria), Spring River (bacteria), Thurman Creek (bacteria), Tributary to Chat Creek (cadmium and zinc), Tributary to Shoal Creek (cadmium and zinc), Tributary to Turkey Creek (lead and zinc), Truitt Creek (bacteria), Turkey Creek (bacteria, cadmium, lead, and zinc), White Oak Creek (bacteria) and Williams Creek (bacteria). Impairments can be caused by known sources like point or nonpoint source pollution, or may be unknown; however, identifying activities near impaired water bodies can provide key information in determining the sources of contamination as well as developing solutions for impaired waters.

Examples of **point sources** of pollution include municipal wastewater treatment plants, land disturbance sites, large confined animal operations, and treated industrial wastewater discharges. Common challenges for wastewater treatment include the limited contaminant removal capacity of certain types of treatment. When facilities experiences difficulty in providing the proper level of treatment and contaminant removal, the department often works with them to improve the treatment process and quality of the discharge. In the case that point source emitters are unwilling to improve the quality of their discharge, the department has regulatory authority to ensure that inappropriate discharges are discontinued in a timely manner.

Nonpoint pollution sources refer to contaminants that do not come from specific conveyances and may come from multiple sources, such as failing septic systems and contaminants carried in stormwater runoff from rural, urban, and agriculture lands. Runoff from abandoned mine tailings is one significant source of pollution In this watershed. Other causes of water body impairments include natural causes like precipitation, climate, and drought which can alter stream flow and channel characteristics leading to changes in water quality.



Spring River Watershed

The State of Our Missouri Waters—Current Conditions and Trends

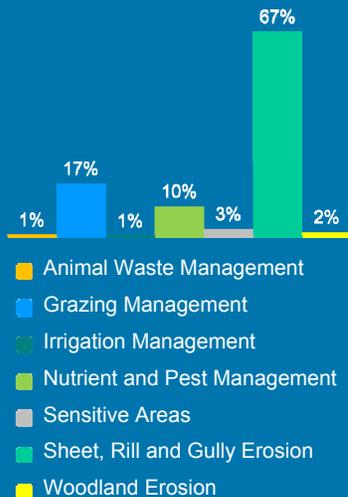
Local Watershed Improvements

Local Awareness

Is it safe to fish or swim in the nearby stream? Does the stream provide habitat suitable for fish? What does it cost to make this water potable? Will I have enough water during a drought?

Impacts to water quality and quantity are most critical to local communities; however, impacts are often not realized until a dire situation arises as a result of poor water quality or quantity. Local awareness and involvement can lead to pollution prevention and reduction, water supply sustainability, and can give communities the upper hand in protecting, preserving and enhancing local water supplies for generations to come.

2009-14 Implemented Conservation Practices



Missouri Stream Team and Volunteer Water Quality Monitoring

Missouri Stream Teams strive to gain and share knowledge regarding the state's stream systems and the problems and opportunities they face. The Missouri Stream Team Program is a partnership between the departments of Natural Resources and Conservation as well as the Conservation Federation of Missouri and the citizens of Missouri. Besides improving stream conditions, Stream Teams often provide useful data in targeting areas that should be monitored more closely for impairments. The Missouri Stream Team Watershed Coalition has compiled and reported monitoring data which demonstrates the importance of watershed protection, preservation and enhancement by local communities. (image from <http://mstwc.org/who-we-are/vision-mission-goals/>)



The Volunteer Water Quality Monitoring Program is one of the most popular activities of the Missouri Stream Team Program. Stream Teams volunteer monitors have provided the department with valuable water quality data from 129 sites throughout the watershed.

Soil and Water Conservation and Nonpoint Source Grant Program

Missouri's Nonpoint Source Grant Program is used to restore the water quality of lakes and streams impacted by nonpoint source pollution and listed on the state's impaired waters list. Funds are used to provide the public with knowledge and tools to improve common land-use practices that will benefit water quality. Over the last several years, numerous nonpoint source grants have been provided in the Spring River watershed to local organizations to improve water quality through education, outreach and land use practices. Some of the local organizations active in improving the waterways include: Spring River Watershed Partnership (pictured right), Harry S Truman Coordinating Council, Wildcat Glades Conservation and Audubon Center, Lower Shoal Creek Watershed Partnership, Jasper County Commission, Environmental Task Force of Jasper and Newton Counties, and Barton County Soil and Water Conservation District.

Source Water Protection Program

This voluntary program is designed to assist public water systems and the communities they serve with developing local voluntary source water protection plans to protect their source of drinking water from existing or additional contamination sources. Learn more about the program and grants at <http://dnr.mo.gov/env/wpp/pdwb/swpp.htm>.

Well Plugging Grants

As part of Source Water Protection, the department offers grants to plug abandoned wells. Inactive wells can act as a direct conduit for pollutants to enter our water sources. Safely closing these wells is another layer of protection for pollution prevention. The City of Diamond has participated in this program and received two grants for the purpose of safely closing an inactive wells.

Soil and Water Conservation Cost Share Program

Soil and Water Conservation Districts set annual goals to address resource concerns. Practices specific to these concerns are funded and implemented to help districts meet their resource conservation goals. These practices conserve soil, which consequently improves water quality by reducing sedimentation in our rivers, streams, and lakes. The chart below illustrates the number of practices implemented for each resource concern in the watershed from 2009 to 2014, relative to the total number of practices for this watershed.

Spring River Watershed

The State of Our Missouri Waters

Contact Information for this Watershed

Southwest Region
Watershed Coordinator -
Gwenda Bassett
2040 W. Woodland
Springfield, MO 65807
417-891-4300

Or visit the Web at
dnr.mo.gov/omw

Resources

Education and Outreach Resources include:

Missouri Department of Natural Resources' Our Missouri Waters dnr.mo.gov/omw

Missouri Department of Natural Resources Financial Assistance Opportunities
<http://dnr.mo.gov/pubs/financial-asst-brochure-2014.pdf>

Natural Resources Conservation Service (NRCS) <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/>

Missouri Rural Water Association (MRWA) <http://www.moruralwater.org/training.php>;
<http://www.moruralwater.org/tools.php>; <http://www.moruralwater.org/dlcenter/>

Missouri Public Utilities Alliance (MPUA) <http://www.mpua.org/Training.php>; http://www.mpua.org/Untitled_Page_4.php

EPA Region 7 Environmental Finance Center (EFC) http://webs.wichita.edu/?u=HUGOWALL&p=/Centers_Research/Environmental_Finance_Center/

Funding Resources include:

Natural Resources Conservation Service (NRCS) <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/>

United States Department of Agriculture Rural Development (USDA-RD) <http://www.rurdev.usda.gov/ProgramsAndOpportunities.html>

Missouri Department of Economic Development (DED) <http://www.ded.mo.gov/BCS%20Programs/BCSProgramDetails.aspx?BCSProgramID=10>; <http://www.ded.mo.gov/Community/InfrastructureAssistance.aspx>

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Center for Applied Research and Environmental Systems (<http://www.cares.missouri.edu/>)

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Department of Natural Resources' Source Water Protection Program Page (<http://dnr.mo.gov/env/wpp/pdwb/swpp.htm>)

Department of Natural Resources' Major Water Users Page (<http://dnr.mo.gov/env/wrc/mwu-forms.htm>)

Missouri Stream Team Program Website, (<http://www.mostreamteam.org/aboutTeams.asp>)

Missouri Stream Team Watershed Coalition Website, (<http://mstwc.org/>)

Multi-Resolution Land Characteristics Consortium, 2011 and 2001 National Land Cover Database, (<http://www.mrlc.gov>)

Missouri Climate Center, (<http://climate.missouri.edu/modata.php>)

U.S. Army Corps of Engineers, Southwest Missouri Water Resource Study—Phase I. Sept. 2012 (http://tristatewater.org/?page_id=12)

Guinan, Pat, State Climatologist, MU Extension, Missouri Climate Center, (<http://climate.missouri.edu/modata.php>)