

GREENE COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN



PREPARED BY:
SPRINGFIELD - GREENE COUNTY
OFFICE OF EMERGENCY MANAGEMENT
330 W. SCOTT ST.
SPRINGFIELD, MO 65802

2020 - 2025

PREREQUISITES

44 CFR Requirement 201.6 (5): The local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

This plan has been reviewed by and adopted with resolutions or other documentation of adoption by all participating jurisdictions and schools/special districts. The documentation of each adoption is included in Appendix C.

A model resolution was provided to the jurisdictions, but did not have to be used. The example is provided on the next page.

The jurisdictions listed in the Executive Summary participated in the development of this plan and have adopted the multi-jurisdiction plan.

PREREQUISITES

MODEL RESOLUTION

(LOCAL GOVERNING BODY/SCHOOL DISTRICT), Missouri RESOLUTION NO. _____

A RESOLUTION OF THE (LOCAL GOVERNING BODY/SCHOOL DISTRICT) ADOPTING THE (PLAN NAME)

WHEREAS the (*local governing body/school district*) recognizes the threat that natural hazards pose to people and property within the (*local governing body/school district*); and

WHEREAS the (*local governing body/school district*) has participated in the preparation of a multi-jurisdictional local hazard mitigation plan, hereby known as the (*plan name*), hereafter referred to as the *Plan*, in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the *Plan* identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the (*local governing body/school district*) from the impacts of future hazards and disasters; and

WHEREAS the (*local governing body*) recognizes that land use policies have a major impact on whether people and property are exposed to natural hazards, the (*local governing body/school district*) will endeavor to integrate the *Plan* into the comprehensive planning process; and

WHEREAS adoption by the (*local governing body/school district*) demonstrates their commitment to hazard mitigation and achieving the goals outlined in the *Plan*.

NOW THEREFORE, BE IT RESOLVED BY THE (LOCAL GOVERNMENT/SCHOOL DISTRICT), in the State of Missouri, THAT:

In accordance with (*local rule for adopting resolutions*), the (*local governing body/school district*) adopts the final FEMA-approved *Plan*.

ADOPTED by a vote of ___ in favor and ___ against, and ___ abstaining, this ___ day of _____, _____.

By (Sig): _____

Print name: _____

ATTEST:

By (Sig.): _____

Print name: _____

APPROVED AS TO FORM:

By (Sig.): _____

Print name: _____

CONTRIBUTORS

Greene County Hazard Mitigation Planning Committee

NAME	TITLE	DEPARTMENT	JURISDICTION/AGENCY/ORGANIZATION
Jacob Marler	EMD	Ash Grove Police Department	City of Ash Grove and Ash Grove Fire Protection District
Frank Schoneboom	City Administrator/EMD	Battlefield City Hall	City of Battlefield
Greg Porter	EMD	Emergency Management	City of Fair Grove and Fair Grove Schools
Lynn Hollandworth	EMD	Republic Fire	City of Republic
Steve Bodenhammer	City Administrator/EMD	Strafford City Hall	City of Strafford
Eric Sutton	City Clerk/EMD	Walnut Grove City Hall	City of Walnut Grove
Jennifer Rowe	City Clerk/EMD	Willard City Hall	City of Willard
Aaron Gerla	Superintendent	Ash Grove Schools	Ash Grove School District
Chance Wistorm	Superintendent	Republic Schools	Republic School District
Jim Farrell	Director of School Police	Springfield Schools	Springfield School District
Brett Soden	Superintendent	Strafford Schools	Strafford School District
Adam Willard	Superintendent	Walnut Grove Schools	Walnut Grove School District
Derrick Huttzell	Superintendent	Willard Schools	Willard School District
Scott Moore	Deputy Fire Chief	Battlefield Fire	Battlefield Fire Protection District
Ashlee Parker	EMS Captain	Ebenezer Fire	Ebenezer Fire Protection District
Erich Higgins	Chief	Fair Grove Fire	Fair Grove Fire Protection District
Tim Clarkson	Asst. Chief	Logan-Rogersville Fire	Logan-Rogersville Fire Protection District
Dwayne Bourke	Chief	Walnut Grove Fire	Walnut Grove Fire Protection District
Ken Scott	Chief	Willard Fire	Willard Fire Protection District
Tyler Goodwyn	Stormwater Engineer	Floodplain Management	Greene County
Kent Morris	Planning Director	Planning and Zoning	Greene County
Kevin Barnes	Director	Resource Management	Greene County
David Johnson	Captain	Sheriff's Office	Greene County
Jeff Cumley	Superintendent	Parks	City of Springfield
Travis Fisher	Health Planner	Health	City of Springfield
Collin Quigley	City Administrator	City	City of Springfield
David Hall	EMD	Missouri State	Missouri State University
J.D Landon	Security Officer	Safety and Security	Ozark Technical Community College
Hannah James	Mitigation Planner	OEM	Springfield-Greene County
Tyrel Floyd	Planning Specialist	OEM	Springfield-Greene County
Lindsey Mericle	Planning Specialist	OEM	Springfield-Greene County
Samantha Foster	Deputy Director	OEM	Springfield-Greene County
Larry Woods	Director	OEM	Springfield-Greene County

CONTRIBUTORS

Stakeholder Representatives

NAME	TITLE	DEPARTMENT	AGENCY/ORGANIZATION
Jamie Kilbourn	Chief	Fire	Bois D'Arc Fire Protection District
Chris Jones	N/A	Campus Safety	Drury University
Jason Goodman	Previous Assistant Director of Safety	Campus Safety	Drury University
Jason O'Neal	Superintendent	Logan-Rogersville School District	Logan-Rogersville School District
Todd Revell	Public Safety Director	Campus Safety	Evangel University
Zim Schwartz	Director	9-11 Communications	City of Springfield
Chuck Collins	Assistant Director	9-11 Communications	City of Springfield
Bryan Newberry	Assistant Director of Operations	Springfield Fire Department	City of Springfield
Mike Crocker	Director	Zoo	Springfield Parks
Paul Laughlin	Chief	Police	City of Rogersville
Jennifer Story	Lead Planner	Mitigation	SEMA
Ryan Hunt	Planner	GIS	City of Springfield

Stake holders are individuals or groups that are affected by a mitigation action or policy and include businesses, private organizations, and citizens. Unlike planning team members, stakeholders may not be involved in all stages of the planning process, but they inform the planning team on a specific topic or profile input from different points of view in the community.

EXECUTIVE SUMMARY

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Greene County and participating jurisdictions developed this multi-jurisdictional local hazard mitigation plan update to reduce future losses from hazard events to the County and its communities and school/special districts. The plan is an update of a plan that was approved in July of 2015. The plan and the update were prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 to result in eligibility for the Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance Grant Programs. The plan was revised to reflect changes in development in the County. It was also revised to reflect changes in the priorities and mitigation efforts in Greene County.

The Greene County Multi-Hazard Mitigation Plan is a multi-jurisdiction plan that covers the following jurisdictions that participated in the planning process:

- Greene County
- City of Ash Grove
- City of Battlefield
- City of Fair Grove
- City of Republic
- City of Springfield
- City of Strafford
- City of Walnut Grove
- City of Willard
- Ash Grove School District
- Fair Grove School District
- Republic School District
- Springfield School District
- Strafford School District
- Walnut Grove School District
- Willard School District
- Missouri State University
- Ozark Technical Community College
- Ash Grove Fire Protection District
- Battlefield Fire Protection District
- Ebenezer Fire Protection District
- Fair Grove Fire Protection District
- Logan-Rogersville Fire Protection District
- Walnut Grove Fire Protection District
- Willard Fire Protection District

The Logan-Rogersville School District was invited to participate but did not meet all requirements for official participation. Representatives from the school district attended the Kick-Off Meeting, but did not meet again. An individual meeting was held with Bois D'Arc Fire Protection District, but the district did not participate any further. Strafford Fire Protection District also failed to meet all requirements for the plan participation and was removed from the plan. West Republic Fire Protection District and Brookline Fire Protection District were also invited to participate, but did not meet any requirements. When the future five-year plan update is developed for this plan, the school district and fire districts will be invited again to participate.

Greene County and the entities listed above developed a Multi-Jurisdictional Hazard Mitigation Plan that was approved by FEMA on August 27th, 2020. This current planning effort serves to update the previously approved plan.

The plan update process following a methodology in accordance with FEMA guidance, which began with the formation of a Mitigation Planning Committee (MPC) comprised of representative's from Greene County and participating jurisdictions. The MPC updated the risk assessment that identified and profiled hazards that pose a risk to Greene County and analyzed jurisdictional Vulnerability to these hazards. The MPC also examined the capabilities in place to mitigate the hazard damaged, with emphasis on changes that have occurred since the previously approved plan was adopted. The MCP determined that the planning area is vulnerable to several hazards that are identified, profiled and analyzed in this plan. Some example of hazards include tornados, flooding, extreme temperatures, dam failure, etc.

EXECUTIVE SUMMARY

Mitigation Action Matrix

#	Action	Jurisdiction	Priority	Goals Addressed	Hazards Addressed	Address Current Development	Address Future Development	Continued Compliance with NFIP
Greene County								
1.1	Continue to purchase properties located within Unincorporated Greene County. See page below for already purchased properties.	Greene County	High	1	Flooding	Yes	Yes	Yes
2.1	Add two 1,000 Mega Watt Generators to the Greene County Jail that is being built.	Greene County	High	1	Severe Storms, Severe Winter Weather, Non-Weather Related Incidents	Yes	Yes	Yes
3.1	Purchase and place sirens in the areas for the county that are not in the current coverage and update all sirens with support systems.	Greene County	High	1	Tornados	Yes	Yes	Yes
4.1	Build shelters across the county to provide appropriate shelter for the citizens and staff of Greene County during tornadoes.	Greene County	Medium	1	Tornados, Severe Storms	Yes	Yes	Yes
5.1	Create flood warning systems for flood prone roads using various methods including railroad crossing signs.	Greene County	High	1	Flooding	Yes	Yes	Yes
6.1	Update the Springfield-Greene County Office of Emergency Management's Website to include the newest version of the Hazard Mitigation Plan.	Greene County	Medium	1	All Hazards	Yes	Yes	Yes
6.2	Create brochures to pass out during OEM events regarding Mitigation information.	Greene County	Medium	1	All Hazards	Yes	Yes	Yes
6.3	Update and rollout Hometown Ready	Greene County	Medium	1	All Hazards	Yes	Yes	Yes
6.4	Update Storm Spotter Classes	Greene County	Medium	1	All Hazards	Yes	Yes	Yes

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7.1	Provide programs to protect the county against cyber-crimes using some of the following: Two Factor Authentication, Encryption, any other protection programs.	Greene County	High	1	Cyber	Yes	Yes	Yes
8.1	Purchase generators for all critical facilities in Greene County including: EOC, 9-11, County Server Room and many other facilities.	Greene County	Medium	1	Severe Storms, Power-Outages	Yes	Yes	Yes
9.1	Purchase generators and transfer switches for the E-Plex, located at the Ozark Empire Fair	Greene County	High	1	Severe Storms, Tornadoes, Severe Winter Weather, Power Outage	Yes	Yes	Yes
City of Ash Grove								
1.1	Develop a plan to replace existing 30+ year old outdoor warning sirens with all hazard devices.	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
1.2	Add units for larger coverage area and maintain standard of warning in areas of new development. Reach and implement alternative notification systems.	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
1.3	Install generators at siren sites to provide reliable warning systems in power outage situations.	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
1.4	Monitor annexations process to stay informed as to upcoming and potential annexations to ensure warning siren coverage remains consistent with current standard	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
1.5	Equip new sirens with radio technology to enable Greene County the ability to activate and monitor sirens	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes

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1.6	Develop the ability to broadcast emergency and public education material to the public	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
1.7	Promote NOAA weather radios with annual city sponsored purchase campaign	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
1.8	Develop a plan to install cameras at sites that routinely host large special events and that also have good vantage points to monitor incoming weather. Install cameras at chosen sites and link them to the EOC.	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
1.9	Work with the Springfield-Greene County Office of Emergency Management on proper placement of warning sirens and cameras.	City of Ash Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
2.1	Secure funding and build a community safe room and hardened structure for Emergency Management and Public Safety Operations.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
2.2	Research grants and other funding sources to build emergency community safe rooms, large enough to temporarily house citizens.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
2.3	Build FEMA approved emergency safe rooms for citizens to take protective cover in, and provide temporary sheltering during any emergency.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
2.4	Incorporate local public safety department and emergency operations center into hardened facilities	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes

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	connected of the community safe room.							
2.5	Ensure adequate water, equipment and supplies are stored in facilities that will sustain first responders and citizens during and immediately after a disaster.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
2.6	Develop backup systems for utilities and communications, ensuring facilities capability during a disaster and public safety responders can continue to offer life assisting/saving services to the citizens of the city.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
3.1	Develop and implement public education and awareness programs and activities that focus on the prevention and mitigation of natural and manmade hazards their consequences, and the steps that can be taken to reduce risk.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
3.2	Distribute brochures and related materials to inform property owners about projects they can accomplish to make their residential and commercial properties disaster resistant.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
3.3	Promote hazard mitigation awareness and education.	City of Ash Grove	High	1	All hazards	Yes	Yes	Yes
3.4	Promote an awareness campaign regarding safety measures and preparation actions for specific hazards to target populations; severe winter storms, heat, tornadoes.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes

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3.5	Develop comprehensive workshops to be conducted for elected officials, business owners, and other community leaders on hazard mitigation programs and activities.	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
3.6	Increase local business ability to expedite business resumption following a disaster	City of Ash Grove	High	1	All Hazards	Yes	Yes	Yes
3.7	Develop incentive programs for citizens, business and industry to pursue hazards mitigation projects.	City of Ash Grove	High	1	All hazards	Yes	Yes	Yes
4.1	Reduce the City of Ash Grove's Vulnerability of Human-Caused Hazards and disasters by 50% over the next 5 years.	City of Ash Grove	High	1	Human Caused Hazards	Yes	Yes	Yes
4.2	Develop and implement policies and training programs regarding infrastructure security and safety.	City of Ash Grove	High	1	Human Caused Hazards	Yes	Yes	Yes
4.3	Install locking, alarm, and security devices to improve physical security of municipal facilities and structures.	City of Ash Grove	High	1	Human Caused Hazards	Yes	Yes	Yes
4.4	Retrofit municipal buildings with structural components to prevent unapproved entry.	City of Ash Grove	High	1	Human Caused Hazards	Yes	Yes	Yes
4.5	Continue to develop procedural systems to reduce risk of targeted violence, cyber, and other human caused hazards to municipal facilities.	City of Ash Grove	High	1	Human Caused Hazards	Yes	Yes	Yes

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5.1	Reduce the vulnerability of flooding damage to existing private and public structures.	City of Ash Grove	Medium	1	Flooding	Yes	Yes	Yes
5.2	Conduct a citywide analysis of the sewer system, assessing for causes of sanitary sewer overflows and caused during flooding events.	City of Ash Grove	Medium	1	Flooding	Yes	Yes	Yes
5.3	Create a financial and intervention plan for reducing risk for sanitary sewers overflowing during flooding vents as recognized by sewer system analysis.	City of Ash Grove	Medium	1	Flooding	Yes	Yes	Yes
5.4	Promote environmentally sound watershed and stormwater practices to decrease flash flooding.	City of Ash Grove	Medium	1	Flooding	Yes	Yes	Yes
6.1	Reduce vulnerability of population with increased risk to medical complications secondary to extreme heat.	City of Ash Grove	High	1	Extreme Temperatures (Heat)	Yes	Yes	Yes
6.2	Search and identify all local citizens that have an increased risk factor for medical complications.	City of Ash Grove	High	1	Extreme Temperatures (Heat)	Yes	Yes	Yes
6.3	Identify adequate locations to develop Community Shelters to be used during extreme heat, and similar emergencies.	City of Ash Grove	High	1	Extreme Temperatures (Heat)	Yes	Yes	Yes
6.4	Create a volunteer program that can assist in monitoring the vulnerable population identified, provide assistance with opening and monitoring shelters.	City of Ash Grove	High	1	Extreme Temperatures (Heat)	Yes	Yes	Yes
6.5	Consult with local office of the American Red Cross and other organizations to help	City of Ash Grove	High	1	Extreme Temperatures (Heat)	Yes	Yes	Yes

EXECUTIVE SUMMARY

	research and organize shelter needs, and operational guidelines.							
6.6	Support annual campaign advertisement for Extreme Heat Awareness	City of Ash Grove	High	1	Extreme Temperatures (Heat)	Yes	Yes	Yes
7.1	Identify primary and secondary emergency snow routes to be maintained during severe weather conditions. Establish policy and procedures for maintaining these routes.	City of Ash Grove	Medium	1	All Hazards	Yes	Yes	Yes
7.2	Establish an interdepartmental communications system for Ash Grove Emergency Management, Ash Grove Police Department, Ash Grove Fire Protection District, Ash Grove Public Works, and Ash Grove City Hall.	City of Ash Grove	Medium	1	All Hazards	Yes	Yes	Yes
7.3	Enhance strategies for post-disaster debris management.	City of Ash Grove	Medium	1	All Hazards	Yes	Yes	Yes
7.4	Increase the ability of city staff to maintain operative during emergencies.	City of Ash Grove	Medium	1	All Hazards	Yes	Yes	Yes
8.1	Develop a plan for the replacement of flood-damaged bridge on Brookside, which is currently unsafe for use by emergency and utility vehicles.	City of Ash Grove	High	1	Flooding	Yes	Yes	Yes
8.2	Work in conjunction with Greene County Highway Department for bridge replacement.	City of Ash Grove	High	1	Flooding	Yes	Yes	Yes
8.3	Replace damaged bridges across the City of Ash Grove.	City of Ash Grove	High	1	Flooding	Yes	Yes	Yes

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City of Battlefield								
1.1	Purchase 800 MHz radios for city officials.	City of Battlefield	High	1	All Hazards	Yes	Yes	Yes
2.1	Expansion and improvement of Storm Siren coverage area.	City of Battlefield	High	1	Severe Thunderstorms, Tornadoes	Yes	Yes	Yes
3.1	Construct emergency safe rooms	City of Battlefield	High	1	Severe Thunderstorms, Tornadoes	Yes	Yes	Yes
4.1	Enhance and create stormwater control programs	City of Battlefield	High	1	All hazards	Yes	Yes	Yes
City of Fair Grove								
1.1	Replace, add and update storm sirens as needed across the city to protect and warn the citizens when severe weather is in the area.	City of Fair Grove	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
City of Republic								
1.1	To address and fix the traffic flow at major intersection and collector streets to MO ZZ	City of Republic	Medium	1	All Hazards	Yes	Yes	Yes
2.1	Construct a pedestrian bridge across E. US 60 connecting sidewalks a long Hines St and removing existing crosswalk and lights.	City of Republic	High	1	Public Safety	Yes	Yes	Yes
3.1	Study of relocation of stormwater from 1740 US 60 E to 1000 block of US 60 E.	City of Republic	Medium	1	Flooding	Yes	Yes	Yes
4.1	Retrofit the piping for stromwater management from 500 Block of St. Highway 174 to 400 block of Hines Street.	City of Republic	Medium	1	Flooding	Yes	Yes	Yes
5.1	Add a permanent generator at Lift Station 2, which moves wastewater from southwestern portion of City	City of Republic	Medium	1	Power Outage; Severe Storms; Severe Winter Weather	Yes	Yes	Yes

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	including the new OTC Campus.							
6.1	Replace aging peripheral devices to reduce susceptibility to takeover or invasion of City's Network and development of additional offsite storage and server management.	City of Republic	High	1	Cyber	Yes	Yes	Yes
City of Springfield								
1.1	To retrofit areas identified in the action description section of the chart below.	City of Springfield	High	1	Flooding	Yes	Yes	Yes
2.1	To purchase the properties listed in the action description.	City of Springfield	Medium	1	Flooding	Yes	Yes	Yes
3.1	To relocate the current animal shelter that is in a designated floodplain area to an area that is safe for staff to travel to and work during severe weather and flooding.	City of Springfield	High	1	Flooding, Communicable Disease	Yes	Yes	Yes
4.1	Purchase a large generator to supply power to the Jordan Valley Ice Park.	City of Springfield	High	1	All Hazards	Yes	Yes	Yes
5.1	Build a FEMA Safe Room on property owned by the Parks Department.	City of Springfield	Medium	1	Severe Storms	Yes	Yes	Yes
City of Strafford								
1.1	Replace, update and add storm sirens throughout the city to better serve the community during severe weather	City of Strafford	High	1	Tornados, Severe Storms	Yes	Yes	Yes
City of Walnut Grove								
1.1	Promote hazard mitigation awareness and education by providing a quarterly	City of Walnut Grove	High	1	All Hazards	Yes	Yes	Yes

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	newsletters with information on hazards.							
1.2	Host yearly emergency awareness meeting for citizens to gain information and ask questions.	City of Walnut Grove	High	1	All Hazards	Yes	Yes	Yes
2.1	Add measures and structural modifications to increase municipal complex's ability to withstand disaster events and serve as both an EOC and warming/post event shelter for displaced.	City of Walnut Grove	Medium	1	All Hazards	Yes	Yes	Yes
3.1	To provide proper equipment to the Public Works Department including a backhoes and hauling trailers.	City of Walnut Grove	Medium	1	All Hazards	Yes	Yes	Yes
City of Willard								
1.1	Develop a new standard operation procedure for maintaining the inspection of sirens. Research funding opportunities for updating sirens in the future.	City of Willard	High	1	All Hazards	Yes	Yes	Yes
2.1	To develop and implement mitigation measures that focus on building, modifying, or retrofitting buildings and other structures to minimize the effect of natural hazards on them and their occupants.	City of Willard	Medium	1	Flooding	Yes	Yes	Yes
3.1	Reduce vulnerability of population with increased risk to medical complications secondary to extreme heat by purchasing equipment and implementing shelters.	City of Willard	Medium	1	Extreme Temperatures (Heat)	Yes	Yes	Yes
4.1	To reduce the vulnerability of flooding damage to existing private and public structures.	City of Willard	High	1	Flooding	Yes	Yes	Yes

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5.1	Maintain and improve sufficient warning system as growth and development occur.	City of Willard	High	1	Severe Thunderstorms, Tornadoes	Yes	Yes	Yes
6.1	Increase public education of specific tornado mitigation activities that can be done. Increase amount of homes with a weather alert radio.	City of Willard	High	1	Severe Thunderstorms, Tornadoes	Yes	Yes	Yes
7.1	Improve City Wide fire hydrant capabilities	City of Willard	Medium	1	Wildfire, Urban Fire	Yes	Yes	Yes
Ash Grove Fire Protection District								
1.1	Acquire new apparatus and equipment capable of mitigating wildland fires.	Ash Grove Fire Protection District	High	1	Wildland Fire	Yes	Yes	Yes
1.2	Actively seek grants and other funding sources to assist with goals.	Ash Grove Fire Protection District	High	1	Wildland Fire	Yes	Yes	Yes
1.3	Property train personnel on use of purchased apparatus and equipment.	Ash Grove Fire Protection District	High	1	Wildland Fire	Yes	Yes	Yes
2.1	Acquire new apparatus capable of multi-type rapid response.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	YES
2.2	Actively seek grants and other funding courses to assist with goals.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
2.3	Properly train personnel on use of purchased apparatus and equipment.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
3.1	Research grants and other funding sources to build a new station.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
3.2	Coordinate with local Public Safety departments to explore opportunities of constructing a joint Public Safety Facility and Emergency	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes

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	Operation Center with hardened structure for services, potentially connected to a Community Safe Room.							
3.3	Construct a new Station, ensure adequate water, equipment, and supplies, are stored in facilities that will sustain First Responders during and immediately after a disaster.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
3.4	Develop backup systems for utilities and communications, ensuring facilities capability during a disaster, and public safety responders can continue to offer life assisting/ saving series to the citizens of the district.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
3.5	Increase the ability of departmental personnel to maintain in departmental operations during emergencies.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	YES	Yes
4.1	Acquire new or used fire engine.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
4.2	Actively seek grants and other funding sources to assist with goals.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
4.3	Properly train personnel on use of purchases apparatus and equipment.	Ash Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
Battlefield Fire Protection District								
1.1	Build new fire apparatus and create a replacement plan for existing apparatus.	Battlefield Fire Protection District	Medium	1	All Hazards	Yes	Yes	Yes

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2.1	Acquire more full time staffing for the district.	Battlefield Fire Protection District	Medium	1	All Hazards	Yes	Yes	Yes
Ebenezer Fire Protection District								
1.1	Purchase and place a 14K Generac at Station 2 and a 20k at Station 6 for use during natural disaster and Emergency Operations Centers.	Ebenezer Fire Protection District	High	1	Severe Storms, Severe Winter Weather, Non-Weather Related Incidents	Yes	Yes	Yes
2.1	Certify all fire fighters to at least the operations level, Certify 8 to the Tech level and purchase 1 Zodiac boats. Also purchase more ropes and other water rescue equipment.	Ebenezer Fire Protection District	High	1	Swiftwater/Flooding	Yes	Yes	Yes
3.1	Strategically place storm sirens located in Ebenezer Fire Protection District that are currently lacking warning systems.	Ebenezer Fire Protection District	Medium	1	Severe Storms, Tornadoes	Yes	Yes	Yes
4.1	Incorporate a storm shelter in the new station 6.	Ebenezer Fire Protection District	Medium	1	Severe Storms, Tornadoes	Yes	Yes	Yes
5.1	To enhance all hazards response by being better located, having more room for trucks/boats/ other equipment, having storm shelters for firefighters and residents, and having an EOC room.	Ebenezer Fire Protection District	Medium-High	1	All Hazards	Yes	Yes	Yes
6.1	Creating an area for equipment housing in the district to help enhance all hazards response.	Ebenezer Fire Protection District	High	1	All Hazards	Yes	Yes	Yes
Fair Grove Fire Protection District								
1.1	Purchase a new tender for more efficient fire suppression.	Fair Grove Fire Protection District	High	1	All Hazards	Yes	Yes	Yes

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Logan-Rogersville Fire Protection District								
1.1	Provide all stations within the district with generators to provide back-up power.	Logan-Rogersville Fire Protection District	High	1	Severe Storms, Severe Winter Weather, Power Outages.	Yes	Yes	Yes
2.1	Provide proper storm sirens in locations that don't have coverage within the Logan-Rogersville Fire District	Logan-Rogersville Fire Protection District	Medium	1	Severe Storms, Tornadoes	Yes	Yes	Yes
3.1	Provide a tornado shelter for the fire fighters and staff during times of severe weather and/or tornadoes	Logan-Rogersville Fire Protection District	Medium	1	Severe Storms, Tornadoes	Yes	Yes	Yes
4.1	Build a training facility that includes a training tower and other vital training resources.	Logan-Rogersville Fire Protection District	Medium	1	All hazards	Yes	Yes	Yes
Walnut Grove Fire Protection District								
1.1	Purchase generators large enough to power fire stations in the Walnut Grove Fire Protection District when severe weather is in the area.	Walnut Grove Fire Protection District	Medium	1	Severe Thunderstorms, Severe Winter Weather	Yes	Yes	Yes
Willard Fire Protection District								
1.1	Design a new engine to replace the 2016 model, moving the 2016 to another station and retiring a 2001 model.	Willard Fire Protection District	Medium	1	All Hazards	Yes	Yes	Yes
Ash Grove Public School District								
1.1	Build a FEMA Shelter that would also serve as a gym at one of the Ash Grove Schools.	Ash Grove Public School District	High	1	Severe Storms, Tornadoes	Yes	Yes	Yes
Fair Grove Public School District								

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1.1	Continue inserting access control throughout the campus to obtain single point of entrances of the buildings.	Fair Grove Public School District	High	1	Civil Unrest	Yes	Yes	Yes
Republic Public School District								
1.1	Build a high wind structure that will be attached to Schofield Elementary School.	Republic Public School District	High	1	Tornados	Yes	Yes	Yes
2.1	Build a high wind structure that will be attached to the Early Childhood building.	Republic Public School District	High	1	Tornado	Yes	Yes	Yes
Springfield Public School District								
1.1	Build FEMA Safe Rooms across the district to protect all students and staff from tornado and severe weather events.	Springfield Public School District	High	1	Tornado, Severe Weather	Yes	Yes	Yes
2.1	Purchase generators that can support the different critical facilities in the district.	Springfield Public School District	Medium	1	All Hazards	Yes	Yes	Yes
3.1	Purchase weather radios for all schools and essential personnel.	Springfield Public School District	Medium	1	All Weather Related Issues	Yes	Yes	Yes
4.1	Continue Safety Audits with Springfield-Greene County Office of Emergency Management.	Springfield Public School District	High	1	All hazards	Yes	Yes	Yes
4.2	Provide new education and training programs for students and staff members that provide information on all hazards.	Springfield Public School District	High	1	All Hazards	Yes	Yes	Yes
5.1	Rebuild and relocate Jaret Middle Schools in an area that does not have flooding issues.	Springfield Public School District	High	1	Flooding	Yes	Yes	Yes

EXECUTIVE SUMMARY

6.1	Prepare all staff and equipment by using different cyber security methods.	Springfield Public School District	High	1	Cyber	Yes	Yes	Yes
Strafford Public School District								
1.1	Build storms shelters in all of the district's schools for students and faculty to use during tornados and severe storm incidents.	Strafford Public School District	High	1	Severe Storms, Tornados	Yes	Yes	Yes
Walnut Grove Public School District								
1.1	Provide funds for the implementation of safety and security measure district-wide.	Walnut Grove Public School District	High	1	Civil Unrest	Yes	Yes	Yes
1.2	Site development, construction, renovation, equipping and furnishing of a new elementary school classrooms and administration offices.	Walnut Grove Public School District	High	1	Civil Unrest	Yes	Yes	Yes
1.3	Development of a new drop-off/pick-up lane.	Walnut Grove Public School District	High	1	Civil Unrest	Yes	Yes	Yes
1.4	The replacement of mechanical systems.	Walnut Grove Public School District	High	1	Civil Unrest	Yes	Yes	Yes
1.5	The completion of other remodeling and repair improvements to existing facilities.	Walnut Grove Public School District	High	1	Civil Unrest	Yes	Yes	Yes
2.1	Construct a FEMA Safe Room at one of the schools that would protect the students and staff member during severe weather.	Walnut Grove Public School District	High	1	Severe Thunderstorms, Tornados	Yes	Yes	Yes
Willard Public School District								

EXECUTIVE SUMMARY

1.1	Build a FEMA Shelter for the High School Population and other locations as desired.	Willard Public School District	High	1	Severe Thunderstorms, Tornados	Yes	Yes	Yes
Missouri State University								
1.1	Integrate existing fire alarm panels into Mass Notification Systems.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
1.2	Provide Interconnectivity to Public Address Systems.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
1.3	Provide dispatch access to mass notification via voice phones in buildings.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
1.4	Provide dispatch access to mass notifications via video monitors in buildings.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
1.5	Add desk top pop up notifications to Mass Notification System.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
1.6	Create design standards for all new and renovated facilities.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
2.1	Upgrade/replace outdoor emergency notifications systems.	Missouri State University	Medium	1	All Hazards	Yes	Yes	Yes
2.2	Provide dispatch access to mass notifications via video board systems.	Missouri State University	Medium	1	All Hazards	Yes	Yes	Yes
3.1	Continuous updates of MSU Emergency Operations Plans.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
3.2	Develop Continuity of Operations Plan and Business Continuity Plan.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
3.3	Develop hazard specific response plans.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
4.1	Provide emergency training to campus community.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
4.2	Develop and revise training curriculum.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes

EXECUTIVE SUMMARY

4.3	Incorporate safety training for all new staff/faculty/students.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
4.4	Develop and fill training position in Office of University Safety	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
4.5	Identify mid-campus location for Office of University Safety.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
4.6	Office of University Safety facility to include many different departments.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
5.1	Annually participate in one county-wide full scale exercise	Missouri State University	Medium	1	All Hazards	Yes	Yes	Yes
5.2	Annually develop and conduct two campus table-top exercises for Policy Group at MSU.	Missouri State University	Medium	1	All Hazards	Yes	Yes	Yes
5.3	Annually conduct one full-scale exercise including community first responders.	Missouri State University	Medium	1	All Hazards	Yes	Yes	Yes
5.4	Annually conduct at least one exercise at the department level.	Missouri State University	Medium	1	All Hazards	Yes	Yes	Yes
5.5	Create/improve specific facility response plans.	Missouri State University	Medium	1	All Hazards	Yes	Yes	Yes
6.1	Identify needs of an operational EOC.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
6.2	Identify space options on MSU Campus.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
6.3	Identify funding sources for EOC.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
6.4	Implement operation of new EOC.	Missouri State University	Medium-High	1	All Hazards	Yes	Yes	Yes
7.1	Build and establish large safe rooms across the MSU campus for students and staff.	Missouri State University	Medium	1	Severe Weather, Tornadoes	Yes	Yes	Yes

Ozarks Technical Community College

EXECUTIVE SUMMARY

1.1	To purchase generator(s) that would be large enough to power the entire republic campus.	Ozark Technical Community College	High	1	Severe Storms, Tornados, Power Outage	Yes	Yes	Yes
2.1	Construct a new Center for Advancement Manufacturing building for the OTC community	Ozark Technical Community College	Medium	1	All Hazards	Yes	Yes	Yes

*Note Unincorporated, Greene County and all cities have an actions regarding NFIP participation. They are not included in this chart.

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1.1 PURPOSE

Hazard Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. This five-year blue print for the future is aimed at making Greene County, and all of the jurisdictions within, disaster resistant by reducing or eliminating long-term risk of loss of life and property from the full-range of natural disasters.

The communities and school/special districts that participate and adopt the Multi-Jurisdictional Hazard Mitigation Plan are eligible for mitigation grants to help with their goals and projects. Communities that do not adopt the plan are not eligible for the mitigation grants.

This plan meets all requirements from the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288) as amended by the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulation set forth by the Interim Final Rule published in the Federal Register on February 26,2002, (44 CFR 201.6) and finalized on October 31,2007.

FEMA’s Local Mitigation Planning Handbook, March 2013 and FEMA’s Local Mitigation Plan Review Guide, October 1, 2011 were used a resources creating this Multi-Jurisdictional All Hazard Mitigation Plan.

The main mitigation program is in the areas of floodplain management (regulations updated 2002) and participation in the administration of the National Flood Insurance Program (NFIP). Floodplain Management programs are based on policies to protect the general welfare and health of county residents. The programs are designed to safeguard health, safety and property in times of flood; restrict avoidable increases in flood size; mitigate losses at the time of construction of public facilities; and protect the public from buying land unsuited for the intended use due to flood hazards.

1.2 BACKGROUND AND SCOPE

The 2020-2025 Greene County Multi-Jurisdictional All Hazard Mitigation Plan is an update on the current plan that was approved on July 6th, 2015. The hazard mitigation plans are valid for a period of five years. The current plan will expire July 6th 2020 and the new plan will be valid from August 27, 2020- August 27, 2025.

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In the previous 2015-2020 Hazard Mitigation Plan, the following jurisdictions and municipalities participated:

Communities

City of Ash Grove	City of Battlefield	City of Fair Grove	City of Republic	City of Springfield
City of Strafford	City of Walnut Grove	City of Willard	Greene County	

Fire Protection Districts:

Ash Grove Fire Protection District	Battlefield Fire Protection District	Bois D’Arc Fire Protection District
Ebenezer Fire Protection District	Fair Grove Fire Protection District	Logan-Rogersville Fire Protection District
Pleasant View Fire Protection District	Strafford Fire Protection District	Willard Fire Protection District

Public School Districts

Ash Grove School District	Fair Grove School District	Logan-Rogersville School District	Republic School District
Springfield School District	Strafford School District	Walnut Grove School District	Willard School District

Higher Education Institutions

Missouri State University	Ozarks Technical Community College
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Many of Greene County’s jurisdictions have multiple different counties that they cover. For example, most of the fire protection districts cover multiple different counties. The City of Rogersville participated in the Webster County Mitigation Plan. All other jurisdictions that participate in the plan have assets located within Greene County limits.

1.3 PLAN ORGANIZATION

The format for the 2020-2025 plan is much different than the previously approved plan. Springfield-Greene County used the Missouri State Emergency Management Agency’s Mitigation Plan template to help construct the new plan. The new plan is organized as follows:

- Chapter 1: Introduction and Planning Process
- Chapter 2: Planning Area Profile and Capabilities
- Chapter 3: Risk Assessment

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- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Implementation and Maintenance
- Appendices

The table below shows each chapter and summarizes the changes made in the update.

PLAN SECTION	SUMMARY OF UPDATES
Chapter 1- Introduction and Planning Process	<ul style="list-style-type: none"> • Updated member of the Mitigation Planning Committee (MPC) and participating jurisdictions formally adopted the MPC
Chapter 2- Planning Area Profiles	<ul style="list-style-type: none"> • Updated all jurisdictions community profiles and capabilities
Chapter 3- Risk Assessment	<ul style="list-style-type: none"> • Combined Extreme Heat and Extreme Cold into one hazard profile- Extreme Temperatures. • Combined Hail, Damaging Wind and lightning into one hazard profile- Severe Thunderstorms • Ice and Snow is now referred to as- Severe Winter Weather • Sabotage was merged into Targeted Violence • Previous occurrences and probability was updated
Chapter 4- Mitigation Strategy	<ul style="list-style-type: none"> • Project and Goals now include the following information: Estimated Cost, Benefits, Hazards being address, problem being mitigated, and mitigation category
Chapter 5- Plan Implementation and Maintenance	<ul style="list-style-type: none"> • Jurisdictions will update their own projects quarterly • MPC will meet as needed

1.4 PLANNING PROCESS

44 CFR Requirement 201.6 (1): The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

A contractor was hired under a Federal Grant created the 2020-2025 Greene County Multi-Jurisdictional Hazard Mitigation Plan. The contractor had the following responsibilities:

- Assist in establishing a Mitigation Planning Committee (MPC)
- Ensure the updated plan meets the DMA requirements as established by federal regulations and follows the most current planning guidance of the Federal Emergency Management Agency (FEMA)
- Facilitate the entire plan development process.
- Meet and coordinate with all participating MPC members.

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- Identify the data that MPC participant could provide and conduct the research and documentation necessary to augment that data.
- Produce the draft and final plan update in a FEMA approval document and coordinate the Missouri State Emergency Management Agency (SEMA) and (FEMA) plan reviews.

Jurisdictional Representative of Greene County Mitigation Planning Committee

NAME	TITLE	DEPARTMENT	JURISDICTION/AGENCY/ORGANIZATION
Jacob Marler	EMD	Ash Grove Police Department	City of Ash Grove and Ash Grove Fire Protection District
Frank Schoneboom	City Administrator/EMD	Battlefield City Hall	City of Battlefield
Greg Porter	EMD	Emergency Management	City of Fair Grove and Fair Grove Schools
Lynn Hollandworth	EMD	Republic Fire	City of Republic
Steve Bodenhammer	City Administrator/EMD	Strafford City Hall	City of Strafford
Eric Sutton	City Clerk/EMD	Walnut Grove City Hall	City of Walnut Grove
Jennifer Rowe	City Clerk/EMD	Willard City Hall	City of Willard
Aaron Gerla	Superintendent	Ash Grove Schools	Ash Grove School District
Chance Wistorm	Superintendent	Republic Schools	Republic School District
Jim Farrell	Director of School Police	Springfield Schools	Springfield School District
Brett Soden	Superintendent	Strafford Schools	Strafford School District
Adam Willard	Superintendent	Walnut Grove Schools	Walnut Grove School District
Derrick Huttzell	Superintendent	Willard Schools	Willard School District
Scott Moore	Deputy Fire Chief	Battlefield Fire	Battlefield Fire Protection District
Ashlee Parker	EMS Captain	Ebenezer Fire	Ebenezer Fire Protection District
Erich Higgins	Chief	Fair Grove Fire	Fair Grove Fire Protection District
Tim Clarkson	Asst. Chief	Logan-Rogersville Fire	Logan-Rogersville Fire Protection District
Dwayne Bourke	Chief	Walnut Grove Fire	Walnut Grove Fire Protection District
Ken Scott	Chief	Willard Fire	Willard Fire Protection District
Tyler Goodwyn	Stormwater Engineer	Floodplain Management	Greene County
Kent Morris	Planning Director	Planning and Zoning	Greene County
Kevin Barnes	Director	Resource Management	Greene County
David Johnson	Captain	Sheriff's Office	Greene County
Ryan Hunt		GIS	City of Springfield/Greene County
Jeff Cumley	Superintendent	Parks	City of Springfield
Travis Fisher	Health Planner	Health	City of Springfield
Collin Quigley	City Administrator	City	City of Springfield
David Hall	EMD	Missouri State	Missouri State University
J.D Landon	Security Officer	Safety and Security	Ozark Technical Community College
Hannah James	Mitigation Planner	OEM	Springfield-Greene County
Tyrel Floyd	Planning Specialist	OEM	Springfield-Greene County
Lindsey Mericle	Planning Specialist	OEM	Springfield-Greene County

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Samantha Foster	Deputy Director	OEM	Springfield-Greene County
Larry Woods	Director	OEM	Springfield-Greene County

1.4.1 Multi-Jurisdictional Participation

The 2020-2025 Greene County Multi-Jurisdictional Hazard Mitigation Plan was prepared by the Local Mitigation Planning Taskforce. This task force included representatives from fire protection districts, public school districts, higher education institutions, municipalities, and various representative from the department in both the City of Springfield and Greene County government. The Local Mitigation Planning Task Force met under the terms set for under a grant received from the Missouri State Emergency Management Agency (SEMA).

The Hazard Mitigation Plan is the result of a collaborative effort between citizens, businesses, industry, institution and voluntary agencies throughout Greene County.

Incorporated communities, public school districts, fire protection districts and other various stakeholders were invited to participate in the plan update. The DMA requires each jurisdiction to participate in the planning process and officially adopt the plan. The following were requirements for each participating jurisdiction:

- Designation of at least one representative from each participating jurisdiction to serve on the MPC
- Participating in Kick-off meeting (or re-scheduled initial meeting)
- Information about jurisdiction including Data Collection Questionnaire worksheet
- Updated project and goals
- Continued updates for project and goals (quarterly)
- Review and comment on plan drafts
- Record time worked on plan
- Plan adoption

All of the participating jurisdictions met all requirements for the plan. Lack of staffing in our jurisdictions made it more difficult to hold larger meetings. Many of our meetings took place one-on-one. Several of the Mitigation Planning Committee members have Emergency Management duties either as a volunteer or as an added job onto their normal full-time daily work. The following tables list the meetings that took place.

Jurisdiction	Kick-Off Meeting	Meeting #2	Meeting #3 (Phone meeting)	Data Collection Questionnaire	Update/Develop Mitigation Actions
Greene County	Yes	Yes	Yes	Yes	Yes
City of Ash Grove	Yes	Yes	Yes	Yes	Yes
City of Battlefield	Yes	Yes	Yes	Yes	Yes
City of Fair Grove	Yes	Yes	Yes	Yes	Yes
City of Republic	Yes	Yes	Yes	Yes	Yes
City of Springfield	Yes	Yes	Yes	Yes	Yes
City of Strafford	Yes	Yes	Yes	Yes	Yes
City of Walnut Grove	Yes	Yes	Yes	Yes	Yes
City of Willard	Yes	Yes	Yes	Yes	Yes

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Ash Grove Fire Protection District	Yes	Yes	Yes	Yes	Yes
Battlefield Fire Protection District	Yes	Yes	Yes	Yes	Yes
Ebenezer Fire Protection District	Yes	Yes	Yes	Yes	Yes
Fair Grove Fire Protection District	Yes	Yes	Yes	Yes	Yes
Logan-Rogersville Fire Protection District	Yes	Yes	Yes	Yes	Yes
Walnut Grove Fire Protection District	No	Yes	Yes	Yes	Yes
Willard Fire Protection District	Yes	Yes	Yes	Yes	Yes
Ash Grove Public School District	Yes	Yes	Yes	Yes	Yes
Fair Grove Public School District	Yes	Yes	Yes	Yes	Yes
Republic Public School District	Yes	Yes	Yes	Yes	Yes
Strafford Public School District	Yes	Yes	Yes	Yes	Yes
Walnut Grove Public School District	Yes	Yes	Yes	Yes	Yes
Willard Public School District	Yes	Yes	Yes	Yes	Yes
Missouri State University	Yes	Yes	Yes	Yes	Yes
Ozark Technical Community College	Yes	Yes	Yes	Yes	

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1.4.2 The Planning Steps

The 2020-2025 Greene County Multi-Jurisdiction Hazard Mitigation Plan used many resources to conduct research and updates to the plan. Some of the resources includes:

- FEMA’s Local Mitigation Planning Handbook
- Local Mitigation Plan Review Guide
- 2015-2020 Greene County Multi-Jurisdictional Hazard Mitigation Plan
- Emergency Management Standards from the Emergency Management Accreditation Program
- Stafford Act

The development of the plan followed the 10-step planning process adapted from FEMA’s Community Rating System (CRS) and Flood Mitigation Assistance programs. The 10-Step process allows the plan to meet funding eligibility requirements of the Hazard Mitigation Grant Programs (HMGP), Pre-Disaster Mitigation Program (PDM), and Flood Mitigation Assistance Program (FMA) as well as qualify for points under Activity 510 for Mitigation Plans, under the Community Rating System. The following table shows how the CRS process aligns with the Nine Task Process outline in the 2013 Local Mitigation Planning Handbook. The ten-step planning steps are outlined below:

COMMUNITY RATING SYSTEM (CRS) PLANNING STEPS (ACTIVITY 510)	LOCAL MITIGATION PLANNING HANDBOOK TASKS (44 CFR PART 201)
Step 1. Organize	Task 1. Determine the Planning Area and Resources
	Task 2. Build the Planning Team 44 CFR 201.6 (1)
Step 2. Involve the Public	Task 3. Create an Outreach Strategy 44 CFR 201.6(b)(1)
Step 3. Coordinate	Task 4. Review Community Capabilities 44 CR 201.6(b)(2)&(3)
Step 4. Assess the hazard	Task 5. Conduct a risk Assessment 44 CFR 201.6 (2)(i) 44 CFR 201.6 (2)(ii) & (iii)
Step 5. Assess the problem	
Step 6. Set Goals	Task 6. Develop a Mitigation Strategy 44 CFR 201.6 (3)(i); 44 CFR 201.6 (3)(ii); and 44 CFR 201.6 (3)(iii)
Step 7. Review possible activities	
Step 8. Draft an action plan	
Step 9. Adopt the Plan	Task 7. Review and Adopt the Plan
Step 10. Implement, evaluate, revise	Task 8. Keep the plan current
	Task 9. Create a Safe and Resilient Community 44 CFR 2201.6 (4)

The ten step planning steps are outlined below:

Step 1: Organize the Planning Team

The Mitigation Planning Committee (MPC) was updated by phone and email. The Mitigation Planner reached out to each jurisdiction to update contact information for all committee members. Multiple interoffice meetings took place before the kick-off meeting discussing tentative schedules, hazard identification, etc. A kick-off meeting was planned for April 1st 2019. All MPC members were invited via email with an online registration. A planning workbook was created and passed out to all attendees. The workbook included the process of mitigation planning, plan requirements, hazards, etc. The kick-off meeting had a decent turnout with 40 attendees from different

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jurisdictions. After the kick-off meeting was completed, individual emails went out to jurisdictions that could not attend the meeting. The mitigation contractor set up one-on-one meetings, phone meetings and email conversations to get planning information passed to everyone. Data Collection Questionnaires were passed out via email so the MPC could have electronic copies to edit.

The table below demonstrates larger meetings held.

MEETING	TOPIC	DATE
Informational Meeting	Planning Overview, Planning Team Contacts, Mitigation Resources, Outreach Strategy	2/11/2019
Kick-Off Meeting	Guidebook, Planning Progress, Timeline, Due Dates	4/1/2019
Individual Meetings	Mitigation Overview, Data Collection Questionnaires, Project and Goals, Jurisdictional Information	April 2019-October 2019
Final Meeting	Plan Review	11/14/2019

Step 2: Plan for Public Involvement

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

At a minimum, the planning process must include 2 opportunities for public comment: 1) during the drafting stage and 2) prior to plan approval. The MPC decided that using an online survey, like the previous plans, would provide the public with a quick and easy way to participate. The Hazard Experience Feedback form on the following pages was posted on all of Springfield-Greene County Office of Emergency Management's social media pages including, Facebook, Instagram, Twitter and Next-Door. The form was originally posted on May 31st, 2019. The survey was open until July 1st, 2019. There were over 235 responses from the public, over twice the responses from the previous plan. KY3 News also conducted a news story promoting the survey. Deputy Director, Samantha Foster, spoke about the importance of mitigation and the plan re-write. The story was posted on its website and aired on television June 5th, 2019. The MPC was encouraged to reach out to their communities and jurisdictions to push the survey on other community websites.

Many of the public responses included damages from flooding, damaging winds and tornados. This information was used in the Risk Assessment section where a CPRI formula was used to include occurrences or frequencies of hazards that occur in Greene County. These are three hazards the MPC agrees are serious issues in Greene County. Many of the responses did not relate to the hazards that are discussed in the plan. Examples: Texting and driving, drugs, stolen items, etc.

Final public input happened after the plan was written. The Springfield-Greene County Office of Emergency Management Office hosted an open house where the public and surrounding counties were invited to come look at the Mitigation Plan and meet with the Mitigation Planner, Director, Municipality Planner and Senior Planner to ask questions about the final plan. The meeting was hosted at the Public Safety Center on November 14th from 8 am- 12:00 p.m. The event was advertised on the Office of Emergency Management's social media pages. Personal invitations for the surrounding counties took place via phone call or email. Attendance was lower than expected.

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Below is the invitation sent out to the public regarding the Mitigation Open House:



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Hazard Experience Feedback

The Springfield-Greene County Office of Emergency Management values your input regarding various hazards that have affected you. This input may assist with future mitigation projects and strategies for the City of Springfield and Greene County.

WHICH OF THE FOLLOWING HAZARDS HAVE PERSONALLY AFFECTED YOU? PLEASE SELECT ALL THAT APPLY.

	Damaging Wind	Drought	Extreme Cold	Extreme Heat	Flood	Ice and Snow	Lightning	Tornado
Weather-Related Hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Animal Disease Outbreak	Communicable Disease	Earthquake	Land Subsidence (sinkholes)	Wildfire			
Other Natural Hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	Airplane Crash	Cave/Mine Collapse	Dam Failure	Hazardous Materials	Power Failure	Train Derailment	Urban Fire	
Technological Hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Biological	Chemical	Civil Unrest	Cyber	Explosives	Nuclear	Radiological	Sabotage
Human-Caused Hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

◀ ▶

Other hazards you have experienced:

Your answer

Do you live in Greene County?

Yes

No

Other feedback:

Your answer

SUBMIT

The Hazard Experience Feedback online survey was disseminated across social media platforms to the citizens of Greene County

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Step 3: Coordinate with Other Departments and Agencies and Incorporate Existing Information

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effect plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as wells as businesses, academia and other private and non-profit interests to be involved in the planning process. (3) review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

During the planning process, stakeholders must be given the opportunity to be involved. Stakeholders include the following:

- Neighboring communities
- Academia
- Local and regional agencies involved in hazard mitigation activities

Stakeholders were invited via email and phone calls to the departments and/or agencies.

Two separate meetings were held with The City of Springfield and Greene County department heads. The meetings discussed mitigation importance, project and goal ideas, planning process and procedures. Departments invited were Building Development, Fire, Geographic Information System (GIS), Parks, Planning and Development, Police, Public Works, Resource Management, Sheriff’s Office, Highway Department, Flood Plain Management, 9-1-1 Emergency Communications, Public Information, Commissioners and City and County Administrators. Participants were encouraged to ask questions and share opinions of mitigation planning.

The Mitigation Planner met with many colleges including Missouri State University, Ozark Technical Community College, Drury University and Evangel University. Throughout the planning process, all universities were included. Missouri State University and Ozark Technical Community College are the only public universities eligible for mitigation funds and have detailed profiles and information throughout the plan.

After the plan was completed, a public meeting was set up where all surrounding communities, departments, schools and businesses were encouraged to come to the Public Safety Center to talk about mitigation, look at the plan and ask questions.

Name of Person Invited	Agency	Title	Participation
Bryan Newberry	Springfield Fire	Assistant Chief	Kick-Off Meeting
Chris Jones	Drury University	Safety	Individual Meeting
Chuck Collins	City of Springfield	Assistant Director of 9-11	Springfield Meeting
Jamie Kilburn	Bois D’Arc Fire	Chief	Individual Meeting
Jason Goodman	Drury University	Assistant Director of Safety	Individual Meeting
Jason O’Neal	Logan-Rogersville School District	Superintendent	Kick-Off Meeting
Mike Crocker	City of Springifeld	Zoo Director	Individual Meeting
Paul Laughlin	Rogersville Police	Chief	Kick-Off Meeting
Paul Williams	Springfield Police	Chief	Kick-Off Meeting
Phil Amtower	Christian County OEM	Director	No
Stefanie Shell	Willard Fire Protection District	N/A	Kick-Off Meeting
Todd Revell	Evangel University	Public Safety Director	Kick-Off Meeting
Zim Schwartze	City of Springfield	Director of 9-11	Springfield Meeting

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Coordination with FEMA RISK MAP Project

Risk MAP provides high quality flood maps and information, tools to better assess the risk from flooding and planning outreach support to communities to help them take action to reduce or mitigate flood risk. Each Risk MAP flood risk project is tailored to the needs of each community and may involve different products and services.

The following pages shows the FEMA Risk Map for each municipality in Greene County.

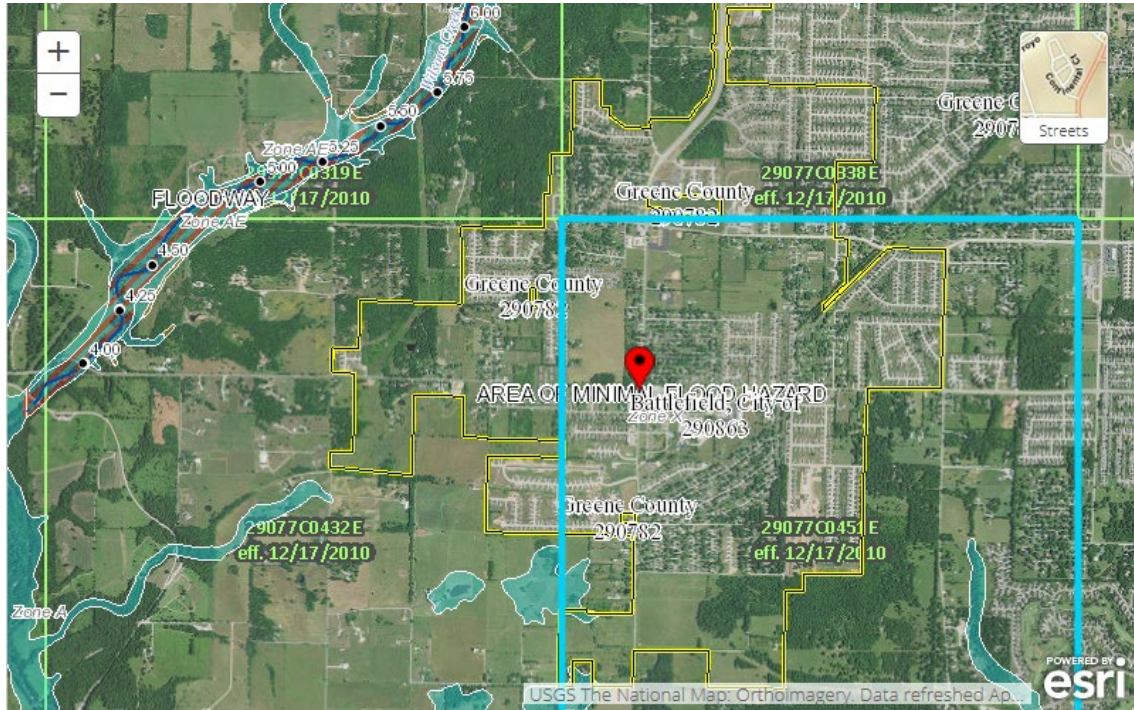
Coordination with FEMA Risk MAP Project

City of Ash Grove-FIRM Map

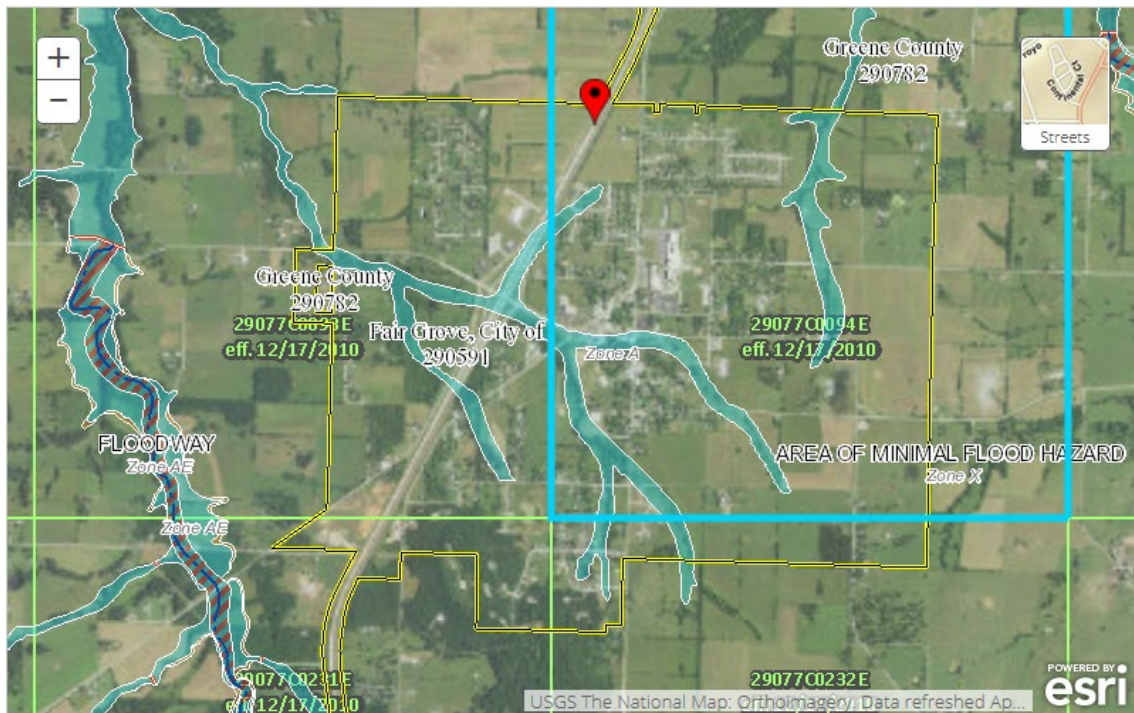


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City of Battlefield-FIRM Map

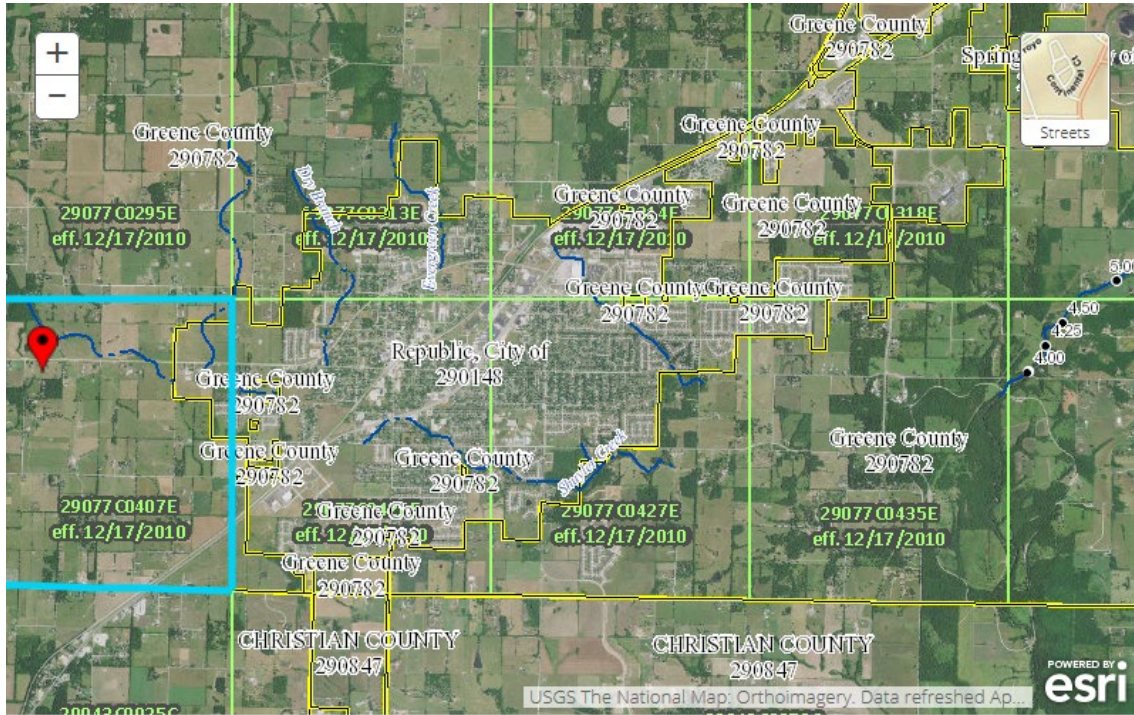


City of Fair Grove-FIRM Map

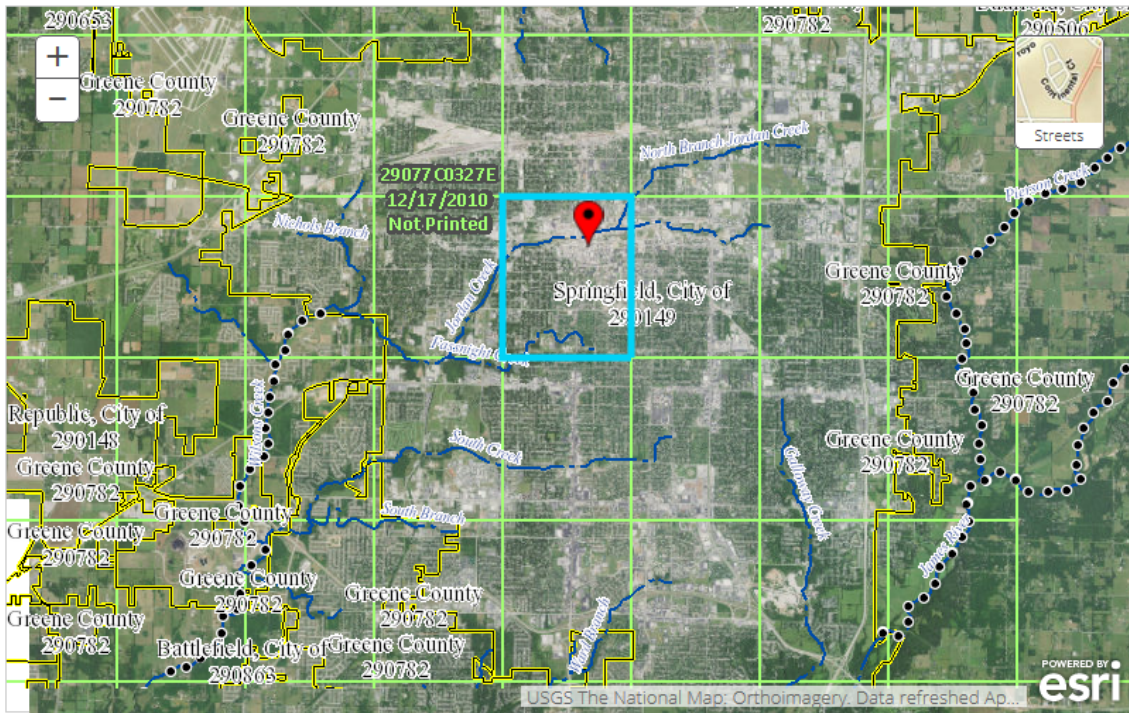


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City of Republic-FIRM Map

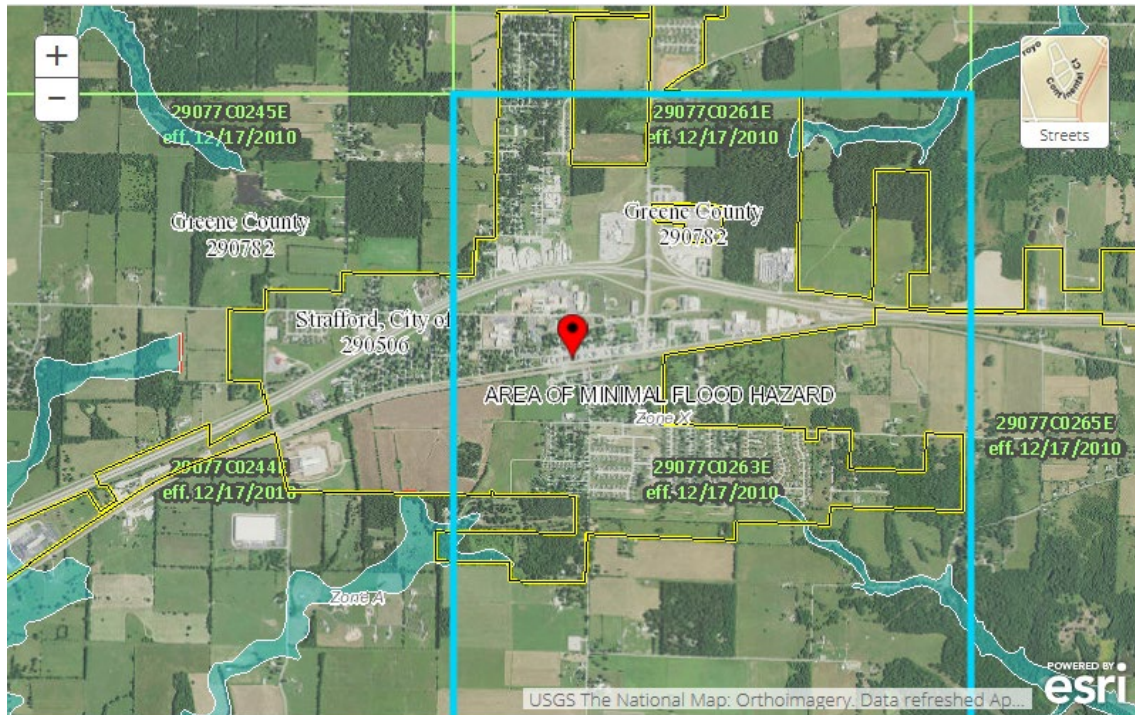


City of Springfield-FIRM Map

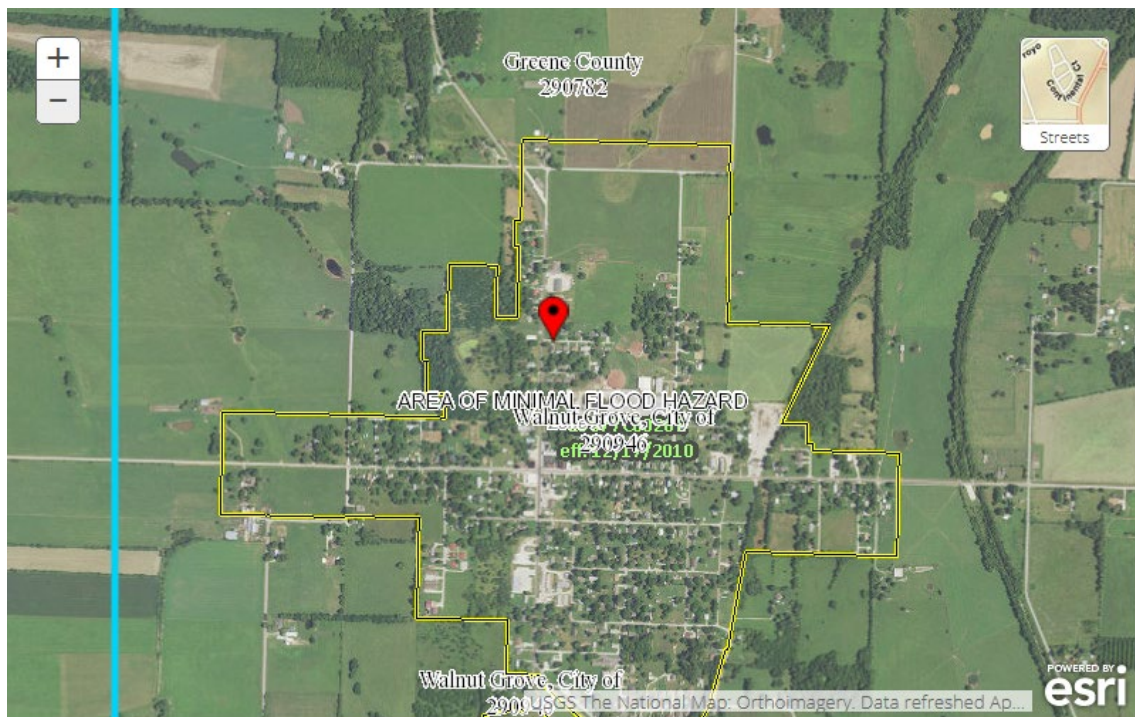


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City of Strafford-FIRM Map



City of Walnut Grove-FIRM MAP



City of Willard-FIRM MAP

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Integration of Other Data, Reports, Studies, and Plans

Additional input that was obtained from resources like the Missouri Department of Natural Resources and Missouri Health and Senior Services. Information provided by them helped the MPC rank our current hazards. Information requested from Missouri Department of Natural Resources included dam information and induction maps. The Department of Agriculture website was used for insurance statistics, local budgets, farms, inventory, etc. Other resources that were used included the MO State Hazard Mitigation Plan and the Mitigation Map Viewer located on the SEMA website. These resources were used in the Risk Assessment Section.

Step 4: Assess the Hazard: Identify and Profile Hazards

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During the kick-off meeting, identified hazards from the 2015-2020 Mitigation Plan were reviewed. It was decided that none of the hazards were to be removed. The county is still at risk for all 31 hazards previously identified. The main concern for Greene County continues to be flooding. There were no new hazards that were mentioned. Compared to the Missouri State Hazard Mitigation Plan, all hazards were included except for Levy Failure. Greene County does not currently have any levies. The following are the hazards that could affect Greene County:

NATURAL	TECHNOLOGICAL	HUMAN-CAUSED
Weather: <ul style="list-style-type: none"> ● Damaging Wind ● Drought ● Extreme Cold ● Extreme Heat ● Flood ● Hail ● Ice and Snow ● Lightning ● Tornado Other: <ul style="list-style-type: none"> ● Animal Disease ● Communicable Disease ● Earthquake ● Land Subsidence (Sinkholes) ● Wildfire 	<ul style="list-style-type: none"> ● Airplane Crash ● Cave/Mine Collapse ● Dam Failure ● Hazardous Materials ● Power Failure ● Train Derailment ● Urban Fire 	<ul style="list-style-type: none"> ● Biological ● Chemical ● Civil Unrest ● Cyber ● Explosives ● Nuclear ● Radiological ● Sabotage ● Targeted Violence ● Waste

Detailed hazard profiles for each hazard identified in the chart above will be discussed in the Risk Assessment Chapter.

Step 5: Assess the Problem: Identify Assets and Estimate Losses

Estimated losses for each jurisdiction was created by looking at census data, previous occurrences, Data Collection Questionnaires and GIS data. Loss estimates were also taken from the 2018 Missouri State Hazard Mitigation Plan. The Mitigation Contractor, along with participating jurisdictions, collected data for mitigation initiatives and capabilities which are further discussed in the Planning Area Profiles and Capabilities Section of this plan.

Step 6: Set Goals

The MPC was given their current goals at the kick-off meeting. They were instructed to review their current goals and decide which goals should be removed and which goals should be carried on to the next plan. Individual meetings were held with each jurisdiction to help guide them with project and goal selection. The jurisdictions had a deadline of turning in project and goals to the Mitigation Contractor by September 30th, 2019. Project and Goals for all jurisdictions are listed in the Mitigation Strategy section of this plan.

Step 7: Review Possible Mitigation Actions and Activities

Mitigation actions and activities were talked about during the kick-off meeting. Further discussion took place in individual meetings which were scheduled throughout the entire planning process. Assistance with planning also took place over the phone and via email with the MPC. The FEMA Mitigation Ideas document was passed on to the MPC to be used for action and activity ideas. During the meeting, the Mitigation Planner helped jurisdictions think about long term projects and goals that could be beneficial for each jurisdiction. Because Greene County covers

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such a large variety of jurisdictions, the Mitigation Planner found it easier to meet individually with representatives rather than holding many large meetings.

Step 8: Draft and Action Plan

Action worksheets were submitted by each jurisdiction for the updated Mitigation Plan. These can be found in Chapter 4: Mitigation Strategy.

Step 9: Adopt the Plan

When the final plan was complete, the participating jurisdictions took the plan to their governments and the plan was formally adopted. These adoptions have been included in Appendix D.

Step 10: Implement, Evaluate, and Revise the Plan

The MPC will be responsible for updating their own project and goal status annually through a live Google Document. The Springfield-Greene County Office of Emergency Management will review the Mitigation Plan yearly and update the plan as needed. Please see Chapter 5 for more information.

Meeting Participation

During the planning process, many meetings were held to discuss different aspects of the plan and mitigation strategies. The meeting participation charts give details on the name, jurisdiction and title of everyone involved in the planning process.

Mitigation Planning Meeting - February 11th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Samantha Foster	Springfield-Greene County OEM	Deputy Director
Branden Surgnier	Springfield-Greene County OEM	Public Information Officer

Kick-Off Meeting - April 1st, 2019

NAME	AGENCY/JURISDICTION	TITLE
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Derrick Hutsell	Willard Schools	Superintendent
David Hall	Missouri State University	Emergency Management Director
Jason O'Neal	Logan-Rogersville Schools	Assistant Superintendent
JD Landon	Ozarks Technical Community College	Security Officer
Stefanie Shell	Willard Fire Protection District	Administrative Assistant
Ken Scott	Willard Fire Protection District	Chief
Bryan Newberry	Springfield Fire Department	Chief
Steve Bodenhammer	City of Strafford	City Clerk/Emergency Manager
Karen McKinnis	Missouri State University	Emergency Preparedness Manager
Travis Fisher	Springfield Health Department	Health Planner
Paul Williams	Springfield Police Department	Chief
Paul Laughlin	Republic Police Department	Chief
Heath Dalton	Ebenezer Fire Protection District	Chief
Jennifer Rowe	City of Willard	City Clerk/Emergency Manager
Jacob Marler	Ash Grove Police Department	Sergeant/Emergency Manager
Aaron Gerla	Ash Grove School District	Superintendent
Jim Norgren	Greene County Highway Department	Supervisor
Lynn Hollandworth	City of Republic/Republic Fire	Emergency Manager
Tim Clarkson	Logan-Rogersville Fire	Shift Supervisor
Jeff Cumley	Parks Department	Superintendent
Eric Sutton	City of Walnut Grove	City Clerk/Emergency Manager
Garen McElroy	Greene County Highway Department	Project Manager
Scott Moore	Battlefield Fire Department	Chief
Vanessa Brandon	Resource Management	Environmental Planner
Todd Revell	Evangel	Director of Public Safety
Chris Dunnaway	City of Springfield	Principal Engineer
Colby Powe		
Jon Carney	Parks Department	Administration
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Tyrel Floyd	Springfield-Greene County OEM	Municipality Planner
Samantha Foster	Springfield-Greene County OEM	Deputy Director
Larry Woods	Springfield-Greene County OEM	Director
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Branden Surgnier	Springfield-Greene County OEM	Public Information Officer

Mitigation for Strafford Schools- May 7th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Samantha Foster	Springfield-Greene County OEM	Deputy Director
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Brett Soden	Strafford Schools	Superintendent
Justhan Webster	Strafford Schools	Resource Officer

Mitigation for Fair Grove Fire Protection District - May 9th, 2019

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NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Samantha Foster	Springfield-Greene County OEM	Deputy Director
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Erich Higgins	Fair Grove Fire	Chief

Mitigation for Willard School District and Fire Protection District - May 13th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Ken Scott	Willard Fire	Chief
Derrick Hutsell	Willard Schools	Superintendent

Mitigation for Bois D'Arc Fire Protection District - May 13th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Jamie Kilburn	Bois D'Arc Fire	Chief

Mitigation for City of Fair Grove and Fair Grove School District - May 14th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Greg Porter	Fair Grove Schools	Resource Officer
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner

Mitigation for Walnut Grove School District - May 16th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Adam Willard	Walnut Grove Schools	Superintendent

Mitigation for City of Willard - June 10th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Jennifer Rowe	City of Willard	City Clerk/Emergency Manager

Mitigation for Drury University - June 12th, 2019

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NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Jason Goodman	Drury University	Deputy Security Director

Mitigation for City of Battlefield - June 13th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Frank Schoneboom	City of Battlefield	City Administrator/Emergency Manager

Mitigation for Ash Grove - June 19th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Jacob Marler	City of Ash Grove	Sergeant/Emergency Manager

Mitigation for Missouri State University - June 20th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Karen McKinnis	Missouri State University	Emergency Preparedness Manager

Mitigation for City of Strafford - July 2nd, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Steve Bodenhammer	City of Strafford	City Administrator/Emergency Manager
Martha Smartt	City of Strafford	City Administrator/Emergency Manager (In-training)

Mitigation for City of Springfield - July 8th, 2019

NAME	AGENCY/JURISDICTION	TITLE
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Clay Goddard	Health Department	Director
Ryan Hunt	GIS	GIS Planner
Travis Fisher	Health Department	Planner
Collin Quigley	City of Springfield	Deputy City Manager
Chris Dunnaway	Stormwater	Engineer
Jeff Cumley	Parks	Superintendent
Chuck Collins	9-1-1	Systems Administrator
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Zim Schwartze	9-1-1	Director
Larry Woods	Springfield-Greene County OEM	Director

Mitigation for Greene County - July 9th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Vanessa Brandon	Resource Management	Environmental Planner
Franz Williams	Building Operations	Assistant Superintendent
Tyler Goodwyn	Resource Management	Stormwater Engineer
Ken Shaw	Sheriff's Office	Lieutenant
David Johnson	Sheriff's Office	Captain
Tina Phillips	Building Operations	Deputy Budget Officer
Michael Allen	IS	
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Samantha Foster	Springfield-Greene County OEM	Deputy Director
Rob Rigdon	Resource Management	

Mitigation for Ozarks Technical Community College - July 10th, 2019

Name	Agency/Jurisdiction	Title
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Scott Leven	Ozark Technical Community College	Safety Director
JD Landon	Ozark Technical Community College	Safety Officer

Mitigation for City of Republic, Republic Schools and Fire District - July 11th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Chance Winstorm	Republic Schools	Superintendent
Lynn Hollandworth	Republic Fire and City	Chief/Emergency Manager
Scott Umbarger	Republic Schools	Resource Officer

Mitigation for Battlefield Fire Protection District - July 12th, 2019

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NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Scott Moore	Battlefield Fire	Deputy Chief

Mitigation for City of Walnut Grove - July 17th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Eric Sutton	City of Walnut Grove	City Clerk/Emergency Manager
Tyrel Floyd	Springfield-Greene County OEM	Municipality Planner

Mitigation for Logan-Rogersville Fire Protection District - July 17th , 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Tim Clarkson	Logan-Rogersville Fire	Shift Supervisor

Mitigation for Ebenezer Fire Protection District - July 18th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Heath Dalton	Ebenezer Fire	Chief
Ashlee Parker	Ebenezer Fire	EMS Supervisor

Mitigation for Walnut Grove Fire Protection District - August 5th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Darrel Kerr	Walnut Grove Fire	Assistant Chief
Dwayne Bourke	Walnut Grove Fire	Chief

Mitigation for Greene County - August 6th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
David Johnson	Greene County Sheriff's Office	Captain
Jennifer Dodson	Greene County Sheriff's Office	Corporal

Mitigation for City of Springfield - August 6th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Chris Dunnaway	City of Springfield	Engineer
Travis Fisher	City of Springfield	Health Planner

Mitigation for Ash Grove (City and Fire) - August 7th, 2019

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NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Tyrel Floyd	Springfield-Greene County OEM	Municipality Planner
Jacob Marler	City of Ash Grove	Sergeant/Emergency Manager

Mitigation for Springfield-Greene County - August 13th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Jeff Cumley	Springfield-Greene County Parks	Superintendent

Mitigation for City of Springfield - August 14th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Casey Owen	Ozark Empire Fair Grounds	Operations
Aaron Owen	Ozark Empire Fair Grounds	Director

Mitigation for City of Springfield - August 15th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Carrie Lamb	City of Springfield	Water Quality Specialist

Mitigation for City of Springfield Public Works - August 22nd, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Dan Smith	Springfield Public Works	Director
Martin Gugel	Springfield Public Works	Assistant Director

Mitigation for Springfield-Greene County - August 30th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Mike Crocker	Springfield-Greene County Parks	Assistant Director
Jeff Cumley	Springfield-Greene County Parks	Superintendent

Mitigation for City Utilities - August 30th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner

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Sandy Meyers	City Utilities	Risk Management
Heath Silvey	City Utilities	Risk Management

Mitigation for Springfield-Greene County Office of Emergency Management - September 4th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Larry Woods	Springfield-Greene County OEM	Director
Lindsey Mericle	Springfield-Greene County OEM	Senior Planner
Aubrey Hardy	Springfield-Greene County OEM	Administrative Assistant
Tyrel Floyd	Springfield-Greene County OEM	Municipality Planner
Robbin Sawyer	Springfield-Greene County OEM	Administrative Manager
Courtney Wharton	Springfield-Greene County OEM	Network Engineer
Samantha Foster	Springfield-Greene County OEM	Deputy Director

Mitigation for Springfield Public Schools - September 6th, 2019

NAME	AGENCY/JURISDICTION	TITLE
Hannah James	Springfield-Greene County OEM	Mitigation Planner
Tyrel Floyd	Springfield-Greene County OEM	Municipality Planner
Jim Farrell	Springfield Public Schools	Safety Director

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2 - PLANNING AREA PROFILES AND CAPABILITIES

2.1 GREENE COUNTY PLANNING AREA PROFILE

Greene County is located in southwest Missouri. The county is bounded on the north by Polk and Dallas Counties, on the south by Christian County, on the west by Lawrence and Dade Counties and on the east by Webster County. The county consists of nine different municipalities including: Ash Grove, Battlefield, Fair Grove, Republic, Rogersville, Springfield, Strafford, Walnut Grove and Willard. The county is nearly square in shape and consists on about 678 square mileage.

Figure 2.1. Map of Greene County State



2 - PLANNING AREA PROFILES AND CAPABILITIES

Figure 2.1. Map of Greene County



As one of the fastest growing areas in Missouri, Greene County has witnessed rapid population growth for over a decade. Driving this growth is the area’s quality of life and its consistent growth as a tourist mecca. This growth will affect every facet of the lives of its citizens. The growth in population will result in exposing more people and property to hazards.

Population Growth

	POPULATION 2000	POPULATION 2017	PERCENTAGE OF GROWTH
Greene County	240,391	289,805	20.56%
Missouri	5,595,210	6,113,532	9.26%
Nation	281,421,906	325,719,718	15.74%

Source: Factfinder.census.gov

Median Household Income

	MEDIAN INCOME 2000	MEDIAN INCOME 2017	PERCENTAGE OF GROWTH
Greene County	\$34,157	\$43,175	26.40%
Missouri	\$46,044	\$51,542	11.94%
Nation	\$41,994	\$57,652	37.29%

Source: Factfinder.census.gov

Median House Value (Owner Occupied)

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	MEDIAN HOUSE VALUE 2010	MEDIAN HOUSE VALUE 2017	PERCENTAGE OF GROWTH
Greene County	\$125,000	\$136,600	8.84%
Missouri	\$137,700	\$145,400	5.59%
Nation	\$188,400	\$193,500	2.70%

Source: Factfinder.census.gov

*2000 Median House Value was not available

2.1.1 Geography, Geology and Topography

GEOGRAPHY

Greene County, Missouri has a total of 678 square miles. Of the 678 square miles, 675 square miles are land and the remaining 2.6 square miles is water. Greene County does have both urban and rural areas. The county does have a Land Use Plan and in the plan the county and its municipalities have designated desired area for future urban growth.

GEOLOGY

The surface features of Greene County are due almost entirely to the erosion of streams, modified to some extent, by fold or flexures. The rocks are mostly limestone with intercalated beds of chert and impure flint, and some sandstone and shale, all of which vary greatly in hardness, crystalline structure, texture and chemical composition. They are variously acted upon by agencies as flexures, which produce shattering, and thus render the breaking down of the formations more easily; by frost, which facilitates this process; by the chemical and erosive action of percolating waters, and by the weathering out of soft layers, with the consequent undermining of superincumbent beds. These physical agencies help to modify the topographical features of the county, and each formation, according to its peculiar structure, exhibits special characteristics, due to the action of one or more of these agencies, as will be seen in the particular description of each horizon.

The main great divide, or water shed, of the Ozark uplift, divides Greene County into two slopes. The waters on the north flow into the Missouri river; water on the Southside of the slope gets to the Mississippi River by flowing through the White river. This divide is narrow in the eastern end of the county, falling away rapidly on both sides, forming the broken area around the headwaters of the Pomme de Terre and James Rivers. To the west, it rapidly broadens into a wide, rolling plateau. The narrow eastern portion of this plateau is rough and rugged, where it falls abruptly in the headwaters of the Pomme de Terre and Sac rivers on the north and to the tributaries of the James River on the south. In general, the rock strata of the county dip southwesterly, a condition modified, locally, by slight flexures.

TOPOGRAPHY

The topographical form of Greene County is extremely karst in nature. The definition of karst is landscape underlain by limestone which has been eroded by dissolution, producing ridges, towers, fissures, sinkholes and other characteristic landforms. These karst features allow for water runoff to readily permeate into the groundwater through faults or sinkholes and then into aquifers, rivers or creeks from which drinking water is drawn. Major concerns focus around hazardous chemical and other compounds such as agricultural waters polluting groundwater sources. Greene County has adopted regulations that deal with environmental issues, especially those dealing with the watershed.

2.1.2 Climate

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Temperature Summary for Springfield Regional: National Centers for Environmental Information (NCEI) Normal 2010

ELEMENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Max °F	42.9	48.2	57.5	67.2	75.3	83.8	88.8	89.0	80.3	69.0	56.7	44.9	67.1
Min °F	22.4	26.1	35.2	44.3	54.4	63.1	67.6	66.6	57.7	46.5	35.4	25.0	45.5
Mean °F	32.6	37.2	46.3	55.8	64.8	73.4	78.2	77.8	69.0	57.8	46.1	35.0	56.3

Source: <https://mrcc.illinois.edu>

Temperature Extremes Period of Record: 1940 to 2019

Month	High Mean °F	Year	Low Mean °F	Year	1-Day Max °F	Date	1-Day Min °F	Date
JAN	43.9	2006	16.1	1940	76.0	1950-01-24	-13.0	1985-01-20
FEB	46.3	1976	22.8	1978	84.0	2017-02-23	-17.0	1979-02-09
MAR	58.1	2012	32.4	1960	87.0	1974-03-31	-8.0	1943-03-07
APR	63.0	1954	50.3	1953	93.0	1963-04-21	18.0	1957-04-13
MAY	72.3	1962	59.6	1945	93.0	2018-05-27	29.0	1944-05-06
JUN	81.1	1952	68.3	1974	101.0	2012-06-28	42.0	1966-06-01
JUL	84.8	1954	71.7	1950	113.0	1954-07-14	44.0	1972-07-06
AUG	83.4	1983	70.5	1950	108.0	2011-08-02	44.0	1967-08-12
SEP	74.9	1998	61.4	1974	104.0	1947-09-07	30.0	1942-09-27
OCT	68.3	1963	52.0	2009	93.0	1981-10-05	18.0	1993-10-31
NOV	53.4	1999	38.0	1951	83.0	2006-11-09	4.0	1959-11-17
DEC	43.9	2015	21.5	1983	77.0	1991-12-08	-16.0	1989-12-23
Annual	71.0	2012	42.3	1979	113.0	1954-07-14	-17.0	1979-02-09
Winter	50.7	2016	15.9	1979	84.0	2017-02-23	-17.0	1979-02-09
Spring	73.9	2012	40.2	1960	93.0	2018-05-27	-8.0	1943-03-07
Summer	93.7	1954	61.0	1967	113.0	1954-07-14	42.0	1966-06-01
Fall	75.2	1963	39.9	1976	104.0	1947-09-07	4.0	1959-11-17

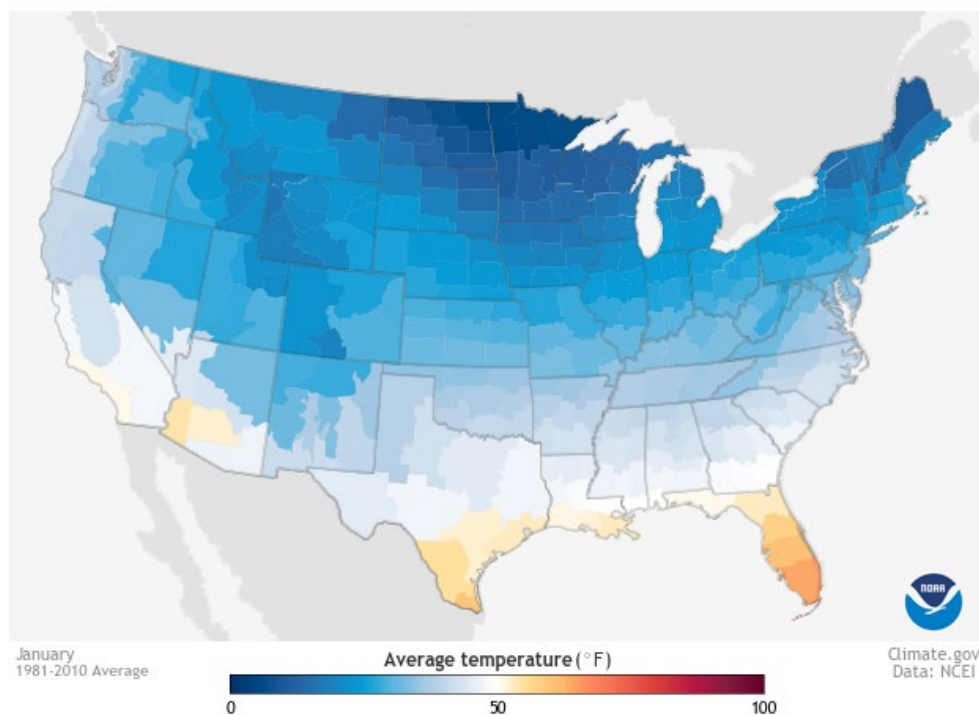
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MIDWEST CLIMATE

According to the United States Environmental Protection Agency, the Midwest has gotten warmer with average annual temperatures increasing over the last several decades. Precipitation is greatest in the eastern part of the Midwest and less towards the West. Heavy downpours are common, but climate change is expected to intensify storms and lead to greater precipitation across the entire region during this century. Annual precipitation has already risen by as much as 20% in some areas.

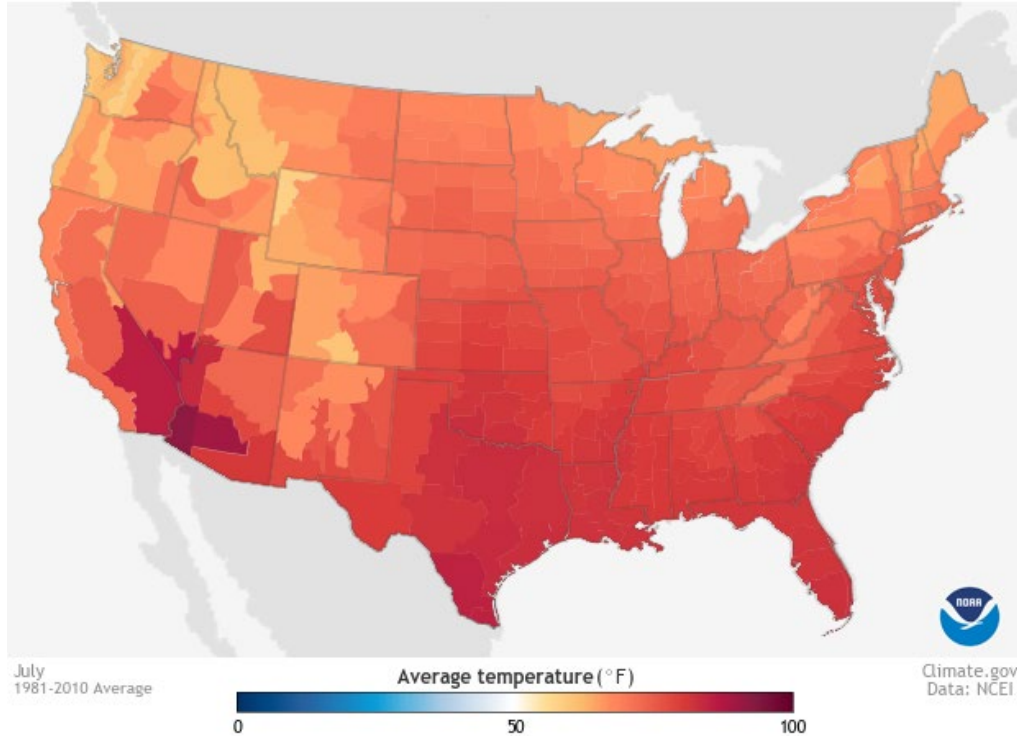
Tornadoes are a frightening part of life in the Midwest. Tornado Alley, a swath of land known for its high incidence of tornadoes, is concentrated in the center of the United States. Droughts are also common in spring and summer and can be devastating for area farmers. On the other side, heavy rain can lead to major flooding in low lying areas of the region.

30 Year Average Temperature by Month



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30 Year Average Temperature by Month July 2018



2.1.3 Population and Demographics

Greene County Population by Jurisdiction

JURISDICTION	2000 POPULATION	2010 POPULATION	2017 ANNUAL POPULATION ESTIMATE	NUMBER OF CHANGE (2010-2017)	PERCENT OF CHANGE (2010-2017)
Ash Grove	1,430	1,680	1,607	-73	-4.35%
Battlefield	2,385	5,044	5,986	942	18.68%
Fair Grove	1,107	1,343	1,623	280	20.85%
Republic	8,438	13,772	15,890	2,168	15.38%
Rogersville	1,508	2,935	3,665	**	24.84%
Springfield	151,580	158,945	165,785	6,840	4.30%
Strafford	1,845	1,879	2,152	772	14.53%
Walnut Grove	630	767	612	-155	-20.21%
Willard	3,193	4,960	5,426	466	9.40%
Unincorporated County Area	68,275	78,915	84,013	5,098	6.46%

Source: U.S. Census 2013-2017 American Community Survey, 5-year Estimates

*Population includes the portions of these cities in adjacent counties

**The Unincorporated County Area in the chart above will not be completely accurate because Rogersville overlaps into adjacent Webster County.

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Population by Age

	POPULATION NUMBER	POPULATION PERCENT	STATE OF MISSOURI PERCENTAGE	NATION PERCENTAGE
Under the Age of 5	17,513	6.1%	6.1%	6.2%
Over the Age of 65	44,397	15.4%	15.8%	14.96%

Source: U.S. Census 2013-2017 American Community Survey, 5-year Estimates

Population by Sex

GENDER	COUNT	PERCENTAGE
Male	139,733	48.73%
Female	147,026	51.27%

Source: U.S. Census 2013-2017 American Community Survey, 5-year Estimates

Population by Race

RACE	GREENE COUNTY POPULATION	GREENE COUNTY PERCENTAGE	STATE OF MISSOURI PERCENTAGE
White	252,812	88.2%	82.4%
American Indian	1,271	0.4%	0.4%
Asian	5,416	1.9%	1.9%
Black or African American	9,268	3.2%	11.6%
Hispanic or Latino	10,061	3.5%	4.0%
Native Hawaiian	186	0.1%	0.1%
Two or more Races	7,519	2.6%	2.5%
Some other race	226	0.1%	1.2%

Source: U.S. Census 2013-2017 American Community Survey, 5-Year Estimates

Households and Size

	GREENE COUNTY	STATE OF MISSOURI	NATION
Total Number of Households	119,989	2,386,203	118,825,921
1-Person Household	37,677	696,905	32,863,560
2- Person Household	43,955	845,311	40,171,259
3-Person Household	17,303	358,350	18,689,250
4+-Person Household	21,054	458,637	27,101,852

Source: U.S. Census 2013-2017 American Community Survey, 5-year Estimates

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Income Families

AMOUNT	ESTIMATE NUMBER OF FAMILIES
Less than 10,000	3,339
\$10,000 to \$14,999	2,395
\$15,000 to \$24,999	5,993
\$25,000 to \$34,999	7,679
\$35,000 to \$49,000	10,425
\$50,000 to \$74,999	15,176
\$75,000 to \$99,999	10,364
\$100,000-\$149,999	9,563
\$150,000-\$199,999	2,838
\$200,000 or more	2,741
Median Family Income (Dollars)	\$58,210
Mean Family Income (Dollars)	\$73,459

Source: U.S. Census 2013-2017 American Community Survey, 5-year Estimates

Unemployment, Poverty, Education, and Language Percentage Demographics, Greene County Missouri

JURISDICTION	TOTAL IN LABOR FORCE	PERCENT OF POPULATION UNEMPLOYED	PERCENT OF FAMILIES BELOW POVERTY LEVEL	PERCENT OF POPULATION (HIGH SCHOOL GRADUATE)	PERCENT OF POPULATION (BACHELOR'S DEGREE OR HIGHER)	PERCENT OF POPULATION WITH SPOKEN LANGUAGE OTHER THAN ENGLISH
Greene County	232,676	5%	18.5%	80.17%	40.62%	5%
Ash Grove	1,261	6.6%	21.8%	81.46%	5.51%	0.3%
Battlefield	4,453	2.7%	6.2%	79.64%	48.91%	6.3%
Fair Grove	1,125	0.4%	9.7%	98.46%	21.75%	0.3%
Republic	11,325	4.5%	16.0%	76.11%	26.43%	1.7%
Rogersville	2,479	4.1%	9.5%	73.83%	25.68%	2.7%
Springfield	139,108	6.3%	25.7%	78.20%	36.92%	5.8%
Strafford	1,610	3.8%	12.0%	88.94%	21.19%	0.9%
Walnut Grove	489	9.9%	27.9%	88.40%	15.67%	1.9%
Willard	4,044	3.0%	6.2%	81.28%	39.03%	2.5%

Source: U.S. Census 2013-2017 American Community Survey, 5-year Estimates

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2.1.4 History

MUNICIPALITIES HISTORY

Greene County

Greene County was named from the War of Independence hero, Nathanael Greene, who was a General in the Colonial Army and led patriots in the south. The county is on the Great Ozark Plateau, in the southwestern part of the State of Missouri. Greene County was originally founded in 1833 by an act of the Legislature in session in St. Louis. Its eastern boundary was roughly the Gasconade River and it extended north to the Osage Fork. Greene County now is about 40 miles from the Arkansas line and about sixty miles from the western boundary of the state.

Ash Grove

Ash Grove became an official part of Greene County in May 1871 as “The Town of Ash Grove”. The first settler in the present Ash Grove was Joseph Kimbrough. He established a town store in 1853. He also built the first dwelling. The town grew as a blacksmith shop was established but development hit a plateau until after the Civil War. Today, Ash Grove, is the epitome of small town living. The rural town is growing into a small city and has about 1,450 residents living approximately 17 miles northwest of Springfield (2017 US Census Bureau estimate).

Battlefield

Battlefield is named for its proximity to the 1861 Battle of Wilson’s Creek, the second major battle of the American Civil War. Wilson’s Creek was the first major Civil War battle fought west of the Mississippi River, and the scene of the death of Nathaniel Lyon, the first Union General killed in combat. The City of Battlefield was incorporated as a 4th class city in 1971. Battlefield has experienced rapid residential growth. The approximate population is 6,267 residents living one mile southwest of Springfield and seven miles east of Republic (2017 US Census Bureau estimate).

Fair Grove

The City of Fair Grove came into existence after a group of both Methodist and Presbyterian people gathered at a small house to have fellowship and church service. Uncle Willis Spence spoke at the meeting, naming Fair Grove after a Methodist Church that Mr. Spence once belonged to in North Carolina. Fair Grove takes great pride in its historical Womack Mill which was constructed in 1883 and is in full operation today. The Annual Heritage Festival, which takes place in September, draws nearly 80,000 people to the Womack Mill every year. Fair Grove is located in the northwest portion of the county, approximately 18 miles north of Springfield where approximately 1,505 residents live (2017 US Census Bureau estimate).

Republic

Republic residents trace the origins of their community back to the early 1840s when the area was first populated by settlers moving from the southeastern United States. The development of the Republic area during the mid-1800s was marked by events of the Civil War. Republic is located in close proximity to the site of the Battle of Wilson’s Creek. Residents of the Republic area were affect by the war effort, many of the first families fled the areas while other stayed and fought in the war. The early growth of the town, leading to eventual incorporation, was stimulated by the construction of a railroad spur in 1872 for the St. Louis and San Francisco Railroad (now the Burlington Northern Santa Fe). Republic was officially incorporated in 1871 and the first plat of the community was filed on January 8th, 1879 by William O’Neal. Republic is located in the southwestern portion of Greene County approximately 13 miles from Springfield. Since 1950, Republic’s population has been rapidly growing where over 16,510 residents live (2018 US Census Bureau estimate).

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Springfield

Springfield is the county seat of Greene County and is the third largest city in the State of Missouri. Springfield was settled in 1829 by John Polk Campbell. The town was named for its proximity to natural springs. Springfield was incorporated as a town in 1838 and then as a city in 1847. Springfield gained national attention in 1858 when the city became a stop on the Butterfield Overland Mail, a stagecoach line from Tipton, Missouri to San Francisco, California. The Springfield area was bitterly divided between Northern and Southern sympathizers during the Civil War. The Battle of Wilson's Creek took place 12 miles from Springfield in August of 1861. In 1870, the first train of the Atlantic-Pacific railway arrived in Springfield. Over the years, it added much to the economic growth of the entire area. Springfield is now known as the "Queen City" of the Ozarks. Springfield occupies a total land area of approximately 73 miles in Greene County and has approximately 167,736 residents living in the city (2017 Census Bureau estimate).

Strafford

The native inhabitants of Strafford were the Osage Indians, which used the area mainly as a hunting ground. The area was part of Louisiana, which in the 1600's and 1700's was alternately controlled by Spain and France. The United States purchased Louisiana from France in 1803, which set the stage for settlement in Strafford. The first explorer to record travels in Strafford was Henry Schoolcraft. He explored the area around 1818-1819. Missouri became a state in 1821; as a result, the United States began a systematic survey of southwest Missouri. Delaware Tribes moved into the area in 1822, along with the first settler of European descent, Mr. Davis. Settling approximately five miles southeast of present day Strafford near Davis Creek and James River; Mr. Davis was reported killed by an indigenous tribe a short time after moving to the area. Strafford is located in the eastern portion of Greene County, approximately 10 northeast from Springfield. Strafford has approximately 2,462 residents living in the city (2017 US Census Bureau estimate).

Walnut Grove

Walnut Grove was platted in 1859. It was named for the groves of wild black walnut trees growing near the original town site. The original name of the town was Possum Trot, referring to the multitude of possums in the area. In 1885, Kansas City, Clinton and Springfield Railroad opened a station in Walnut Grove. Between Walnut Grove and Ash Grove a high grade limestone was discovered during the railroad construction and, in 1913, the Phenix Marble Company was born, producing large quantities of Phenix Napoleon Gray Marble. A company town of about 500 grew up around it. Today the town is gone and the quarry under a different ownership still operates at a much smaller scale. Walnut Grove is located in the northwest portion of Greene County approximately 23 miles from Springfield. The small town has approximately 787 residents (2017 US Census Bureau estimate).

Willard

The City of Willard was founded in 1884 and incorporated in 1949. The city's early settlers were primarily of Scottish, Irish, Welsh and English descent. The Town of Willard began to flourish in 1884 when the St. Louis and San Francisco Railroad laid the first track of line running from Springfield through Willard and then eventually onto Kansas City. The city was going to be named Robberson after Dr. E.T. Robberson who had platted the town. It was discovered that other municipality already had that name and they named the city Willard after Mr. William Willard who was the surveyor working for the railroad. Willard's main east-west road, U.S. 160 is known as Olympian Boulevard because two graduates of Willard High School have participated in the Olympics. The City of Willard is located in the northwest section of Greene County approximately 6 miles from Springfield. The City has approximately 5,578 residents living within the city (2018 US Census Bureau estimate).

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FIRE DISTRICT HISTORIES

Ash Grove Fire Protection District

The Ash Grove Fire Protection District was formed in 1927 and operated as a volunteer department until 1996. The district currently has one fire station located at 112. N. Piper Road in the City of Ash Grove. The district covers approximately 34 square miles and answers about 365 calls for service a year. The Ash Grove Fire Protection District is building another station in the future.

Battlefield Fire Protection District

The Battlefield Fire Protection District was organized in the early 1950's covering an area from south Farm Road 115 on the west side to old Highway 65, between the City of Springfield city limits and the Greene County line. In 1946 the department became a dues supported organization. In 1985 the Battlefield Fire Protection District was formed and became a tax-supported entity operation gout of one station in the City of Battlefield. Station 2 was built in 1986 and Station 3 was built 1991. In 1995, the fire district got their first full-time employee which was a fire chief. In 2002, the district hired their first full-time firefighters. The district covers approximately 32 square miles and answers about 2800 calls for service a year.

Ebenezer Fire Protection District

The Ebenezer Fire Protection District was a membership district until 1990. The district became a fire protection district in 1991 and is currently acting in that same capacity. In 2011 voters agreed to grow the district again and allow for full time fire protection in the form of 13 full time firefighters. In 2015 voter agreed to merge Pleasant View and Ebenezer Fire Districts. Currently the District operates 6 fire stations; 2 full-time, 1 part-time and 3 volunteer. The district has boundaries ranging from Springfield City limits running north to the Polk County Line. The department responds to over 1,000 calls for service annually.

Fair Grove Fire Protection District

The Fair Grove Fire Protection District has three separate fire stations and is a combination fire department. The department currently has 9 full time personnel and 10 volunteers. In December 2014, the first district got an ISO (Insurance Service Organization) Class 4 for both the city limits and county areas of the district. The fire district currently has Automatic Mutual Aid agreement for all structure fires with surrounding jurisdictions. The Fair Grove Fire Protection District covers 92 square miles in 4 counties including Greene, Dallas, Webster and Polk.

Logan-Rogersville Fire Protection District

The Logan-Rogersville Fire Protection District provides fire protection, emergency medical services, rescue, hazardous material response, fire prevention and fire education programs to an estimated 20,000 individuals. The response area includes three counties: Greene, Christian and Webster. The district is governed by a board of director with five members serving six year terms. The staff consists of 22 full-time employees and 35 volunteers operating out of six stations places throughout the district. The district cover approximately 160 square miles and the district answers about 1800 calls for service a year.

Strafford Fire Protection District

The Strafford Fire Protection District was formed in 1957 as an all-volunteer department. It remained a fee-for-service department until 1987 when Strafford Fire Protection District was established by a vote of the people through Revised Missouri State Statue Chapter 321, to provide emergency services to protect the quality of life and property within the district boundaries as a tax-based organization. In November 2008, Strafford received a SAFER grant and the voters agreed to an increase in the tax levy. This increase allowed full time firefighters to be

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hired. Currently Strafford employs 15 firefighters, 1 chief and 1 office manager. Strafford Fire District is governed by a five person Board of Directors. The district covers approximately 67 square miles and answers about 1000 calls for service a year.

Walnut Grove Fire Protection District

The Walnut Grove Fire Protection District is an all-volunteer fire house covering a rural area in Greene County. The district contains one fire house located in Walnut Grove. The district helps out the community on a routine basis with both the City of Walnut Grove and Walnut Grove Public School District as their main focus.

Willard Fire Protection District

The Willard Fire Protection District is a combination fire district consisting of both paid and volunteer firefighters. The district was formed in 1954 as a community volunteer fire department. After a tax levy had been passed in 1988, the Willard Community Fire Department became the Willard Fire Protection District. The district continued to grow. In 2012, a second tax passed to hire the districts fire paid personnel. In 2015, the district moved into a new multimillion dollar headquarters and station and purchased their first custom engine. The district has 10 paid personnel and around 25 volunteers. The district covers about 72 square miles and responds to about 1400 calls for service per year.

PUBLIC SCHOOL DISTRICT HISTORIES

Ash Grove Public School District

The Ash Grove School District was the fourth school district to be organized in Greene County. The district consists of about 119 square miles, 16 square miles in Dade County, 19 square miles in Lawrence County and 84 square miles in Greene County. The district has three schools including an elementary school located in Bois D' Arc. For the 2018-19 year, Ash Grove had 562 students enrolled. The district employees around 100 people and is the largest employer in the Ash Grove community.

Fair Grove Public School District

The Fair Grove School District is located within the municipality of Fair Grove in Greene County. The district consists of three schools: Fair Grove Elementary, Middle and High School. In 2007, voters approved a tax bond for new construction projects and for renovation of current space. In the summer of 2008, the construction was completed on the new middle school that was built in 2007 as a result of the tax bond. The middle school was opened for the 2008-09 school year. The high school was built in 1980 and has had several upgrades and addition since. One addition included a FEMA Safe Room which was added to the campus during the 2010-2011 school year.

Republic School District

The Republic School R-III School District is one of the city's largest employers. The School District is located within the City of Republic. The school district consists of 5 elementary schools, 1 middle school, 1 high school and an Early Childhood Center. In January 2010 the district opened up a new high school on the corner of Highway ZZ and Republic Road. The previous high school is now used as the Republic Middle School. The school district serves over 4,700 students.

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Springfield Public School District

Springfield Public Schools is Missouri's largest fully accredited school district. Springfield Public Schools has a reputation of academic excellence based on the outstanding performance of the students. The school district has 35 Elementary schools, 9 Middle Schools and 5 high schools. The Springfield Public Schools also has many alternative schools/programs, gifted programs and special education programs. In Nov of 2009 voter approved a no-tax increase bond issue that leveraged federal stimulus money to fund air conditioning, constructions and improvements and technology. Without increasing the current tax rate, Springfield residents invested \$50 million in our schools to create quality learning environments for all students. In April of 2013, Springfield voters approved a \$71.65 million bond issue to fund technology upgrades including a new elementary school and renovations to other schools in the district. The district serves approximately 26,000 students and has about 4,500 employees.

Strafford Public School District

The earliest record of public funded schools in the Strafford area was the formation of township districts as early as 1853. These township schools were for primary education, held in primitive facilities or someone's home. In the early 1900s state law provided for the consolidation of "one room" school districts for the purpose of providing High School. In April of 1913, as a result of a citizen petition of the County Superintendent of Schools, local residents voted to create Strafford Consolidated School District. In 1956, a new six classroom elementary school with a cafeteria and offices was constructed following voter approval of a bond issue. A new industrial arts building was constructed in 1960. In 1965 four classrooms and a library were constructed to the existing elementary building. A new high school was completed in 1974 following an ice storm that destroyed the previous one. In 2006 a fine arts auditorium was constructed and an addition to the middle school was completed to accommodate 5th grade. Strafford R-VI schools has been rates as "Accredited with Distinction" by the Missouri Department of Elementary and Secondary Education since 1999. The District serves over 1,100 students in an early education center, elementary, middle and high school.

Walnut Grove Public School District

Walnut Grove schools hosted graduation for the first time in the mid 1800's and has held a graduation every year since. The school facilities have been renovated or built on an average of every 40 years. The High School was built in the late 1930's followed by renovation and updates in the late 1960's. A new High School was erected in the mid 1990's and is still being utilized today. The Elementary School was built in 1951 with an upgrade in 1978. Walnut Grove School District serves approximately 265 students.

Willard Public Schools

The Willard School District is a large school district located within the Northwest corner of Greene County. The school district is one of the largest employers within the city. The district has 9 schools spread throughout the city and unincorporated Greene County. The school district serves over 4,500 students and has high accreditation from the State. The school district has grown to have many programs and services to help provide different activities for all students.

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UNIVERSITY HISTORIES

Missouri State University

Missouri State University was founded in 1905 as the Fourth District Normal School. During its early years, the institution's primary purpose was preparing teachers for the public schools systems in the southwest region of Missouri. In June of 1906, the first class of 543 students started. In January 1909, Academic Hall, now Carrington Hall, was built. In 1919, the name changed to Southwest Missouri State Teachers College. In 1945, the name changed again to Southwest Missouri State College. In 1972, the college changed its name to Southwest Missouri State University in recognition of diversity of programs at the undergraduate level and development of graduate programs. In 1990, enrollment of the college exceeded 20,000 for the first time. In 2005, the institution became Missouri State University. Missouri State is supervised by the Board of Governors. The university has over 23,000 students in both undergraduate and graduate programs. The University is spread across 209 acres on the core campus. The main campus comprises of over 50 structures both administrative and academic.

Ozarks Technical Community College

Educational opportunities in the Ozarks took an important step forward on April 3, 1990, when residents of Springfield and 13 surrounding public schools districts voted to establish a "community college". Ozarks Technical Community College (OTC) provided an open admission, two year college with a focus on technical education. In 1991, the college opened its door at Cox Medical Center North and at 815 N. Sherman in Lincoln and Graff Hall. In 1996, OTC, on its first attempt, received accreditation from the Higher Learning Commission of the North Central Association of College and Schools. The Technical Education Center opened in the summer of 1997, the Information Commons in the summer of 1998, the Information Commons East in the summer of 1999 and the Industry and Transportation Technology Center in 2000. In August 2005, ground was broken for the first classroom building on what is now the Richwood Valley Campus. The first classes were held at this campus in spring of 2007. The Springfield Campus consists of 40 acres located at the corner of Chestnut Expressway and National Avenue. The college serves almost 13,000 students across the Ozarks.

Drury University

Drury began in 1873. It was organized by Congregational home missionaries who felt the need for an academically strong liberal arts college in the area. After much debate, Springfield was chosen over Neosho, Missouri for the college's location. Samuel Drury gave the college a gift of \$25,000, and the college was renamed for his recently deceased son. Nathan Morrison was chosen as the first president; he rang the bell to begin classes on September 25, 1873. Drury started small, in a single building. When classes began in 1873, the campus occupied less than 1.5 acres. Today, there is a 90 acre campus including facilities not originally envisioned by the founders. Drury College became Drury University on January 1st, 2000, reflecting its growing role in higher education. Drury was one of the first universities in the state to offer continuing education and evening classes to meet the needs of non-traditional students. Drury is committed to providing a quality of academic experience and preparing students for working and living in today's world. Drury serves over 4,500 students in both undergraduate and graduate programs.

*Though Drury doesn't qualify for funding. We included their information in the plan because they were heavily involved in the planning process during previous plans and this plan.

2 - PLANNING AREA PROFILES AND CAPABILITIES

2.1.5 Occupations

The economy in Greene County is diverse, though more heavily dependent on the services and trade sectors than the state as a whole. As of January 2019 the unemployment rate for Greene County was 3%. This is an improvement from January 2015 when the unemployment rate was 5% and is a significant improvement from 2009 when the rate was 8.2%

Occupation Statistics, Greene County, Missouri

PLACE	MANAGEMENT, BUSINESS, SCIENCE AND ARTS OCCUPATIONS	SERVICE OCCUPATIONS	SALES AND OFFICE OCCUPATIONS	NATURAL RESOURCES, CONSTRUCTION AND MAINTENANCE OCCUPATIONS	PRODUCTION, TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS
Greene County	35.9%	18.8%	26.9%	7.1%	11.3%
Ash Grove	24.4%	22.3%	21.7%	10.8%	20.9%
Battlefield	45.7%	13.6%	23.4%	6.8%	10.5%
Fair Grove	32.2%	14.5%	24.6%	8.4%	20.2%
Republic	30.6%	19.0%	28.6%	7.3%	14.5%
Springfield	32.2%	21.7%	28.2%	6.9%	11.0%
Strafford	22.4%	10.9%	32.7%	11.1%	22.9%
Walnut Grove	19.2%	29.2%	23.3%	9.6%	18.7%
Willard	42.4%	14.4%	19.3%	11.7%	12.2%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

2 - PLANNING AREA PROFILES AND CAPABILITIES

Top Employers for Springfield Region (Greene, Christian, Webster, Polk and Dallas Counties)

RANK	COMPANY NAME	INDUSTRY	NUMBER OF EMPLOYEES
1	CoxHealth	Healthcare	11,669
2	Mercy Hospital Springfield	Healthcare	10,950
3	Walmart Inc.	Retail	5,372
4	Springfield Public Schools	Education	4,100
5	State of Missouri	Government	4,018
6	Bass Pro Shops	Retail/Manufacturing	3,341
7	United States Government	Government	3,005
8	Missouri State University	Education	2,874
9	Jack Henry & Associates, Inc.	Software Development	2,174
10	O'Reilly Auto Parts (HQ)	Retail/Manufacturing	2,042
11	Citizens Memorial Healthcare	Healthcare	1,900
12	City of Springfield	Government	1,655
13	Ozarks Technical Community College	Education	1,554
14	EFCO (HQ)	Manufacturing	1,550
15	SRC Holdings (HQ)	Manufacturing	1,435
16	Chase Care Services	Financial	1,350
17	Prime, Inc. (HQ)	Transportation	1,263
18	The Arc of the Ozarks	Social Assistance	1,035
19	Lowe's (7 Locations)	Retail	1,010
20	Kraft Heinz Company	Manufacturing	996
21	TTEC Holding Inc.	Telecommunications	963
22	Expedia, Inc.	Telecommunications	950
23	City Utilities of Springfield	Utility	946
24	Burrell Behavioral Health	Healthcare	943
25	Ozark R-VI School District	Education	925
26	American National Property & Casualty Co.	Insurance	910
27	T-Mobile USA	Communications	825
28	Willard R-II School District	Education	804
29	Greene County	Government	800

2 - PLANNING AREA PROFILES AND CAPABILITIES

30	Nixa R-II School District	Education	785
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Source: Springfield Chamber of Commerce

*Data from 2018

2.1.6 Agriculture

Agriculture is very important to the Greene County area. Greene County has over 1,800 farms consisting of about 223,000 acres of land in the county. In 2012, Greene County had 1,752 farms across 210,600 acres of land in the county. Previously, the county saw a decrease in acreage and farms in Greene County.

Number of Farms

	GREENE COUNTY	CHRISTIAN COUNTY	POLK COUNTY	WEBSTER COUNTY
Total Number of Farms	1,857	1,169	1,592	1,837
Total Number of Acres	223,205	153,936	359,464	265,224
Average Size of Farm (Acres)	120	132	230	144

Source: USDA, National Agricultural Statistics Service-2017

Top Crops

	GREENE COUNTY	CHRISTIAN COUNTY	POLK COUNTY	WEBSTER COUNTY
Corn for Grain (Acres)	1,705	114	4,224	2,418
Wheat for Grain (Acres)	1,613	0	1,400	110

Source: USDA, National Agricultural Statistics Service-2017

Livestock and Poultry

	GREENE COUNTY	CHRISTIAN COUNTY	POLK COUNTY	WEBSTER COUNTY
Cattle and Calves Inventory (Number)	68,606	41,914	107,026	81,045
Hogs and Pigs Inventory (Number)	382	53	4,893	7,840
Sheep and Lamb Inventory (Number)	1,873	1,664	1,856	2,732
Poultry	4,307	8,448	518,738	92,045

Source: USDA, National Agricultural Statistics Service-2017

2 - PLANNING AREA PROFILES AND CAPABILITIES

Farm Labor

	GREENE COUNTY	CHRISTIAN COUNTY	POLK COUNTY	WEBSTER COUNTY
Hired Farm Labor (Number)	802	347	771	525
Percentage of Workforce	0.58%	0.88%	5.55%	3.48%

Source: USDA, National Agricultural Statistics Service-2017

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Average Sales

	GREENE COUNTY	CHRISTIAN COUNTY	POLK COUNTY	WEBSTER COUNTY
Average Sales per Farm	\$20,854	\$24,687	\$63,609	29,625

Source: USDA, National Agricultural Statistics Service-2017

2.1.7 FEMA Hazard Mitigation Assistance (HMA) Grants in Planning Area

FEMA HMA Grants in Greene County 1990-2017

DISASTER DECLARATION	PROJECT TYPE	PROJECT TITLE	SUB-GRANTEE	DATE APPROVED	PROJECT TOTAL
N/A	200.1 Acquisition of Private Real Property-Riverine	Greene County Property Acquisition	Greene County	N/A	\$175,000
DR-1328	200.1 Acquisition of Private Real Property-Riverine	Greene County Residential Buyout	Greene County	2000-12-19	\$302,874
DR-1253	200.1 Acquisition of Private real Property-Riverine	Greene County-Shadowood Subdivision Floodplain Buy-out	Greene County	2000-12-19	\$233,031
DR-1256	200.1 Acquisition of Private Real Property-Riverine	Greene County Acquisition	Greene County	2000-12-19	\$38,224

2 - PLANNING AREA PROFILES AND CAPABILITIES

DR-1412	200.1 Acquisition of Private Real Property-Riverine	Property Acquisition and Demolition-Greene County	Greene County	2007-05-03	\$298,794
DR-1635	601.1 Generators	Missouri State University JQH Arena Initiative Generator Project	Missouri State University	2010-05-03	\$257,437
DR-1631	403.1: Storm Water Management-Culverts	Kansas Expressway Culvert Project	Springfield	2012-03-13	\$402,001
DR-1822	206.2 Safe Room-Public Structures	Republic R-III Community Safe Room	Republic School District	2012-08-17	\$1,561,770
DR-1676	206.2 Safe Room-Public Structures	Greene County/Drury University Safe Room	Greene County Emergency Management	2013-06-12	\$300,000
DR-1822	206.2 Safe Room-Public Structures	Springfield R-XII community Safe Room at Hillcrest High School	Springfield School District	2014-04-03	\$1,666,665
DR-1822	206.2 Safe Room-Public Structures	Springfield R-XII community Safe Room at Jeffries Elementary	Springfield School District	2014-04-03	\$1,673,325
DR-1822	206.2 Safe Room-Public Structures	Springfield R-XII Community Safe Room at West Port Elementary	Springfield School District	2014-04-17	\$1,673,325
DR-1822	206.2 Safe Room-Public Structures	City of Fair Grove Community Safe Room	Fair Grove	2014-06-19	\$1,981,445
DR-1760	200.1 Acquisition of Private Real Property-Riverine	City of Springfield Voluntary Acquisition of Flood prone Structures Upper Wilson	Springfield	2014-06-26	\$255,957
DR-1708	91.1 Local Multi-Hazard Mitigation Plan	Greene County Hazard Mitigation Plan Update	Greene County Emergency Management	2014-12-23	\$47,217
DR-1980	206.2 Safe room-Public Structures	Springfield R-XII Kickapoo High School Safe Room	Springfield School District	2015-08-17	\$5,087,448
DR-1980	206.2 Safe Room-Public Structures	Logan Rogersville High School Safe Room	Logan-Rogersville School District	2016-06-28	\$1,969,872
DR-4238	206.2 Safe Room-Public Structures	Logan-Rogersville R-VII School District Community Safe Room at Upper Elementary	Logan-Rogersville School District	2016-09-26	\$1,845,000

2 - PLANNING AREA PROFILES AND CAPABILITIES

DR-1980	206.2 Safe Room-Public Structures	Logan-Rogersville Jr. High School Safe Room	Logan Rogersville School District	2017-03-13	\$1,007,726
DR- 1980	206.2 Safe Room-Public Structures	Missouri State University Safe Room	Missouri State University	2017-05-02	\$1,575,000
DR-4250	600.1 Warning Systems	City of Walnut Grove Siren Project	Walnut Grove	2017-08-01	\$21,915
				TOTAL	\$22,374,026

Source: Federal Emergency Management Agency, 2018

*N/A was used for information that wasn't provided

2.1.8 FEMA Public Assistance (PA) Grants in Planning Area

FEMA PA Grants in County From 2011/1993

DISASTER DECLARATION	PROJECT TYPE	PROJECT SIZE	APPLICANT	PROJECT TOTAL
DR-1463	Debris Removal	Small	City of Battlefield	\$13,200.00
DR-1463	Debris Removal	Small	City of Battlefield	\$29,897.74
DR-1463	Roads and Bridges	Small	City of Battlefield	\$11,350.79
DR-1463	Protective Measures	Small	City of Battlefield	\$19,348.24
DR-1463	Debris Removal	Small	Greene County	\$15,568.45
DR-1463	Protective Measures	Small	City of Battlefield	\$31,063.58
DR-1463	Protective Measures	Small	Greene County	\$48,804.37
DR-1463	Public Buildings	Small	Public Water District-1	\$3,000.00
DR-1463	Public Utilities	Small	City of Springfield	\$42,869.18
DR-1463	Debris Removal	Small	City of Battlefield	\$27,477.85
DR-1463	Public Utilities	Large	City of Springfield	\$213,011.80
DR-1463	Public Buildings	Small	City of Battlefield	\$35,847.03
DR-1463	Debris Removal	Small	City of Battlefield	\$3,266.99
DR-1631	Public Utilities	Large	City of Springfield	\$737,884.16
DR-1631	Recreational or Other	Small	City of Springfield	\$24,835.35
DR-1631	Public Buildings	Small	City of Springfield	\$6,991.21
DR-1673	Protective Measures	Small	City of Battlefield	\$1,386.29
DR-1673	Debris Removal	Small	City of Republic	\$5,671.70
DR-1673	Public Utilities	Large	City Utilities of Springfield	\$481,755.69
DR-1673	Protective Measures	Small	City of Willard	\$5,304.35
DR-1673	Protective Measures	Small	City of Republic	\$5,616.54
DR-1673	Protective Measures	Small	City Utilities Of Springfield	\$5,694.00
DR-1673	Protective Measures	Small	City of Strafford	\$4,584.18
DR-1673	Protective Measures	Small	City of Fair Grove	\$3,513.58

2 - PLANNING AREA PROFILES AND CAPABILITIES

DR-1673	Public Buildings	Small	City of Republic	\$2,500.00
DR-1673	Protective Measures	Large	Greene County	\$171,964.70
DR-1673	Protective Measures	Large	City of Springfield	\$171,948.76
DR-1673	Protective Measures	Small	St. Johns Hospital	\$23,879.60
DR-1676	Protective Measures	Small	Greene County	\$38,638.85
DR-1676	Public Buildings	Small	Logan-Rogersville School District	\$1,000.00
DR-1676	Debris Removal	Large	City of Springfield	\$9,923,148.14
DR-1676	Protective Measures	Small	City of Ash Grove	\$1,922.67
DR-1676	Protective Measures	Large	Greene County	\$153,533.40
DR-1676	Debris Removal	Large	Greene County	\$2,280,826.77
DR-1676	Protective Measures	Small	City of Battlefield	\$42,900.42
DR-1676	Protective Measures	Small	City of Ash Grove	\$7,642.84
DR-1676	Debris Removal	Small	City of Willard	\$15,884.00
DR-1676	Debris Removal	Small	City of Ash Grove	\$2669.56
DR-1676	Debris Removal	Large	Greene County	\$6,234,691.03
DR-1676	Protective Measures	Small	City of Ash Grove	\$2,494.30
DR-1676	Debris Removal	Small	St. Johns Hospital	\$9,900.00
DR-1676	Debris Removal	Large	City of Republic	\$539,403.60
DR-1676	Protective Measures	Large	City of Springfield	\$1,257,808.98
DR-1676	Protective Measures	Small	City of Ash Grove	\$4,979.57
DR-1676	Protective Measures	Small	Willard Fire District	\$7,917.84
DR-1676	Protective Measures	Small	Ebenezer Fire District	\$6,188.99
DR-1676	Debris Removal	Small	St. Johns Hospital	\$5,241.02
DR-1676	Protective Measures	Small	Strafford Fire District	\$4,002.17
DR-1676	Protective Measures	Small	City of Walnut Grove	\$5,943.68
DR-1676	Protective Measures	Small	Fair Haven Children's Home	\$6,948.00
DR-1676	Protective Measures	Small	City of Fair Grove	\$12,285.88
DR-1676	Debris Removal	Small	Fair Haven Children's Home	\$4,512.60
DR-1676	Public Utilities	Small	Fair Haven Children's Home	\$1,172.91
DR-1676	Protective Measures	Small	Fair Haven Children's Home	\$339.60
DR-1676	Protective Measures	Small	St. Johns' Hospital	\$27,703.28
DR-1676	Protective Measures	Small	Greene County	\$8,080.28
DR-1676	Protective Measures	Small	City of Walnut Grove	\$2,313.60
DR-1676	Debris Removal	Large	City of Springfield	\$4,044,625.60
DR-1676	Debris Removal	Small	Springfield School District	\$22,375.23
DR-1676	Debris Removal	Large	Springfield School District	\$223,354.00

2 - PLANNING AREA PROFILES AND CAPABILITIES

DR-1676	Public Buildings	Small	Springfield School District	\$19,959.00
DR-1676	Debris Removal	Small	City of Willard	\$21,031.22
DR-1676	Public Buildings	Small	Springfield School District	\$45,875.90
DR-1676	Protective Measures	Small	Springfield School District	\$25,719.80
DR-1676	Debris Removal	Small	City of Walnut Grove	\$12,146.59
DR-1676	Debris Removal	Small	Burrell Behavioral Health	\$11,688.30
DR-1676	Protective Measures	Small	City of Strafford	\$11,085.68
DR-1676	Protective Measures	Small	Burrell Behavioral Health	\$2,949.37
DR-1676	Protective Measures	Small	City of Willard	\$4,547.86
DR-1676	Public Utilities	Large	City Utilities of Springfield	\$28,943,379.51
DR-1676	Debris Removal	Small	City Utilities of Springfield	\$19,235.64
DR-1676	Debris Removal	Small	City of Ash Grove	\$50,209.75
DR-1676	Protective Measures	Large	City Utilities of Springfield	\$490,391.65
DR-1676	Protective Measures	Small	City of Willard	\$13,821.01
DR-1676	Protective Measures	Small	Fair Grove Fire District	\$4,577.50
DR-1676	Debris Removal	Small	City of Strafford	\$55,068.47
DR-1676	Protective Measures	Small	Fair Grove Fire District	\$1,525.83
DR-1676	Protective Measures	Small	City of Springfield	\$12,318.24
DR-1676	Protective Measures	Small	City of Walnut Grove	\$5,108.15
DR-1676	Protective Measures	Small	Ash Grove Fire District	\$9,437.95
DR-1676	Protective Measures	Large	Greene County	\$247,488.50
DR-1676	Protective Measures	Large	Logan-Rogersville Fire District	\$61,958.00
DR-1676	Protective Measures	Small	Logan-Rogersville Fire District	\$25,500.30
DR-1676	Protective Measures	Small	City of Springfield	\$24,384.27
DR-1676	Debris Removal	Large	City of Springfield	\$2,892,968.17
DR-1676	Protective Measures	Small	Willard Fire District	\$5,876.60
DR-1676	Protective Measures	Small	City of Ash Grove	\$8,379.27
DR-1676	Protective Measures	Small	Greene County	\$9,905.00
DR-1676	Protective Measures	Small	City of Springfield	\$3,323.69
DR-1676	Protective Measures	Small	Logan-Rogersville Fire District	\$1,816.12
DR-1676	Protective Measures	Small	Willard Fire District	\$11,542.73
DR-1676	Protective Measures	Small	City of Springfield	\$4,900.84
DR-1676	Public Buildings	Small	City of Springfield	\$2,975.90
DR-1676	Protective Measures	Small	City of Republic	\$2,2336.25

2 - PLANNING AREA PROFILES AND CAPABILITIES

DR-1676	Protective Measures	Small	Ebenezer Fire District	\$4,590.36
DR-1676	Protective Measures	Small	Ash Grove Fire District	\$2,913.49
DR-1676	Protective Measures	Small	Strafford Fire District	\$1,334.06
DR-1676	Debris Removal	Small	City of Fair Grove	\$11,738.04
DR-1676	Protective Measures	Large	City of Springfield	\$139,007.77
DR-1676	Public Buildings	Small	City of Springfield	\$0
DR-1676	Protective Measures	Large	City of Springfield	\$78,744.04
DR-1676	Protective Measures	Large	City of Republic	\$107,432.09
DR-1676	Protective Measures	Small	Ebenezer Fire District	\$11,515.30
DR-1676	Protective Measures	Small	City of Republic	\$5,842.32
DR-1676	Protective Measures	Large	Cox Medical Center	\$91,216.50
DR-1676	Debris Removal	Small	Greene County	\$3,410.00
DR-1676	Protective Measures	Large	City of Springfield	\$185,156.52
DR-1676	Protective Measures	Large	City of Springfield	\$70,233.57
DR-1676	Protective Measures	Small	City of Springfield	\$4,287.23
DR-1676	Protective Measures	Small	City of Springfield	\$26,063.59
DR-1676	Protective Measures	Small	City of Republic	\$37,189.88
DR-1676	Debris Removal	Large	Cox Medical Center	\$72,437.00
DR-1676	Protective Measures	Small	City of Springfield	\$54,967.01
DR-1676	Debris Removal	Large	Greene County	\$161,463.84
DR-1676	Roads and Bridges	Large	Greene County	\$522,566.18
DR-1676	Protective Measures	Large	City of Springfield	\$276,989.01
DR-1676	Debris Removal	Small	City of Springfield	\$15,345.60
DR-1676	Public Buildings	Large	Greene County	\$18,675.05
DR-1676	Debris Removal	Large	City of Springfield	\$406,955.84
DR-1676	Debris Removal	Large	Greene County	\$181,183.39
DR-1676	Public Buildings	Small	City of Springfield	\$50,000.00
DR-1676	Debris Removal	Small	Greene County	\$4,380.00
DR-1676	Debris Removal	Large	Greene County	\$207,002.84
DR-1728	Roads and Bridges	Small	Greene County	\$1,440.00
DR-1728	Roads and Bridges	Small	Greene County	\$2,636.59
DR-1728	Roads and Bridges	Small	Greene County	\$37,119.68
DR-1728	Roads and Bridges	Small	Greene County	\$1,599.23
DR-1728	Roads and Bridges	Small	Greene County	\$14,482.94
DR-1728	Roads and Bridges	Small	Greene County	\$1,390.02
DR-1728	Roads and Bridges	Small	Greene County	\$1,998.91
DR-1728	Roads and Bridges	Small	Greene County	\$9,643.51
DR-1728	Roads and Bridges	Large	Greene County	\$13,612.34

2 - PLANNING AREA PROFILES AND CAPABILITIES

DR-1728	Roads and Bridges	Small	Greene County	\$29,741.75
DR-1728	Roads and Bridges	Large	Greene County	\$42,675.68
DR-1728	Roads and Bridges	Small	Greene County	\$59,427.80
DR-1728	Roads and Bridges	Small	Greene County	\$6,853.20
DR-1728	Roads and Bridges	Large	Greene County	\$54,356.73
DR-1728	Debris Removal	Small	Greene County	\$14,102.57
DR-1728	Roads and Bridges	Large	Greene County	\$216,636.24
DR-1728	Roads and Bridges	Large	Greene County	\$24,878.80
DR-1748	Protective Measures	Large	Greene County	\$92,909.48
DR-1748	Debris Removal	Small	City of Springfield	\$25,950.00
DR-1748	Debris Removal	Small	City of Springfield	\$17,851.04
DR-1748	Debris Removal	Small	City of Springfield	\$34,480.00
DR-1748	Debris Removal	Large	City of Springfield	\$205,905.55
DR-1748	Public Utilities	Large	City Utilities of Springfield	\$2,467,809.67
DR-1748	Protective Measures	Small	City Utilities of Springfield	\$31,331.44
DR-1748	Debris Removal	Small	City of Springfield	\$54,871.10
DR-1748	Debris Removal	Small	City of Springfield	\$4,019.17
DR-1748	Public Buildings	Small	City Utilities of Springfield	\$24,897.00
DR-1748	Protective Measures	Large	City of Springfield	\$70,441.56
DR-1748	Debris Removal	Large	City of Springfield	\$160,070.74
DR-1748	Debris Removal	Large	Greene County	\$157,673.00
DR-1748	Protective Measures	Small	City of Springfield	\$1,082.00
DR-1748	Protective Measures	Large	City Utilities of Springfield	\$970,464.52
DR-1847	Protective Measures	Small	Springfield School District	\$5,897.00
DR-1847	Public Buildings	Small	Springfield School District	\$4,103.00
DR-1847	Debris Removal	Small	City of Fair Grove	\$24,340.53
DR-1847	Protective Measures	Small	City of Fair Grove	\$3,900.58
DR-1847	Protective Measures	Small	Fair Grove School District	\$1,000.00
DR-1847	Debris Removal	Small	Fair Grove School District	\$13,440.00
DR-1847	Public Buildings	Small	City Utilities of Springfield	\$1,982.76
DR-1847	Recreational or Other	Small	City Utilities of Springfield	\$2,313.11
DR-1847	Recreational or Other	Small	City of Springfield	\$6,342.09
DR-1847	Roads and Bridges	Small	City of Springfield	\$1,606.52
DR-1847	Protective Measures	Small	City Utilities of Springfield	\$2,366.83

2 - PLANNING AREA PROFILES AND CAPABILITIES

DR-1847	Roads and Bridges	Small	City of Fair Grove	\$5,562.99
DR-1847	Debris Removal	Small	City of Springfield	\$2,307.61
DR-1847	Protective Measures	Small	City Utilities of Springfield	\$17,340.95
DR-1847	Protective Measures	Small	Greene County	\$18,274.61
DR-1847	Debris Removal	Large	Greene County	\$116,821.06
DR-1847	Recreational or Other	Small	City Utilities of Springfield	\$25,916.47
DR-1847	Public Utilities	Small	City Utilities of Springfield	\$10,814.89
DR-1847	Public Utilities	Large	City Utilities of Springfield	\$886,132.11
DR-1847	Protective Measures	Large	City Utilities of Springfield	\$96,102.53
DR-1847	Protective Measures	Small	City Utilities of Springfield	\$12,944.16
DR-1847	Public Utilities	Small	City Utilities of Springfield	\$6,145.90
DR-1980	Protective Measures	Small	Diocese of Springfield-Cape Girardeau	\$2,500.00
DR-1980	Protective Measures	Small	Diocese of Springfield-Cape Girardeau	\$8,241.84
DR-1980	Public Buildings	Large	Diocese of Springfield-Cape Girardeau	\$644,313.00
DR-1980	Protective Measures	Large	Diocese of Springfield-Cape Girardeau	\$234,351.65
DR-4250	Roads and Bridges	Small	City of Springfield	\$10,707.50
DR-4250	Roads and Bridges	Small	Greene County Highway Department	\$7,132.09
DR-4250	Protective Measures	Small	Greene County Highway Department	\$5,593.29
DR-4250	Roads and Bridges	Small	Greene County Highway Department	\$8,9118.14
DR-4250	Public Utilities	Large	City of Springfield	\$149,006.56
DR-4250	Debris Removal	Small	Greene County Highway Department	\$43,916.07
DR-4250	Protective Measures	Small	City of Springfield	\$27,754.87
DR-4250	Debris Removal	Small	City of Springfield	\$3,240.63
DR-4250	Recreational Facilities	Small	City of Springfield	\$3,547.15
DR-4250	Public Utilities	Small	City of Springfield	\$10,026.15
DR-4250	Public Buildings	Small	City of Springfield	\$80,371.98
DR-4250	Public Buildings	Small	City of Springfield	\$106,674.41

2- PLANNING AREA PROFILES AND CAPABILITIES

2.2 JURISDICTIONAL PROFILES AND MITIGATION CAPABILITIES

COMMUNITY PROFILES

The following section will include individual profiles for each participating jurisdiction. It will also include a discussion of previous mitigation initiatives and ongoing mitigation capabilities in the planning area. Participating jurisdictions provided information via data collection questionnaires and individual meetings. The Mitigation Planner also used information from the previous mitigation plan and online resources to complete individual profiles. Greene County will be profiled first, followed by incorporated communities, fire districts and public school districts.

2.2.1 Greene County

FORM OF GOVERNMENT

Greene County includes all unincorporated areas within the county boundaries. Greene County has a non-charter form of government, meaning that the county is governed directly by state law. The Greene County Commission is the executive body of Greene County operating under guidelines established in the Revised Statutes of the State of Missouri. Within that authority, the Commission enacts ordinances, resolutions and policies, supervises the activities of county department, fix salaries, adopts the annual budget, provides for construction and other services and conducts hearing on planning and zoning matters. Greene County has the following offices:

- Archives
- Assessor
- Auditor
- Budget Office
- Circuit Clerk/Court
- Collector
- County Clerk
- County Commission
- Health
- Highway Department
- Human Resources
- Juvenile Justice Center
- Medical Examiner
- Office of Emergency Management
- Pretrial Services
- Prosecuting Attorney
- Public Administrator
- Purchasing Department
- Recorder's Office
- Resource Management
- Sheriff
- Treasurer

2- PLANNING AREA PROFILES AND CAPABILITIES

MITIGATION INITIATIVES AND CAPABILITIES

County Authorities and Responsibilities

The government has a responsibility to its people and the creation of emergency plans is one way in which the government may use its authority to meet its responsibilities. The following is a general outline of some of those authorities and the responsibilities they must be used to fulfill.

Authorities

- To order an evacuation, redirect funders for emergency use, order a curfew, and commandeer facilities and/or equipment and materials.
- To implement authorized lines of succession for the chief elected officials with power to initiate necessary emergency activities
- To implement plans for analysis of possible impacts of potential disasters
- To implement multi-hazard emergency planning
- To complete mutual aid agreements with neighboring jurisdictions

Responsibilities

- To protect the safety and security of citizens
- To safeguard records vital to transparency of government

Mitigation Management Policies

The Springfield-Greene County Office of Emergency Management is charged with planning and preparing for disaster. That duty includes advising the Greene County Commission and the Springfield City Manager on mitigation measures and in some cases coordinating those measures deemed appropriate by the above. In general, county and city policy encourage cooperation between agencies. Many departments (i.e., County: Resource Management, Highway Department, Sheriff's Office; City: Public Works, Police, Fire, ECC, Health Dept., Parks, Airport, City Utilities, Building Development Services, and Planning) identify, assess, and develop mitigation projects.

The Public Safety Center

The Public Safety Center (PSC) is 56,000 square feet, two-story with basement, FEMA 361 compliant and selectively seismically isolated. The PSC houses the Office of Emergency Management, Emergency Operations Center, Regional Multi-Agency Coordination Center and 9-1-1 Emergency Communication Center.



2- PLANNING AREA PROFILES AND CAPABILITIES

Emergency Operations Center (EOC)

Activated during large-scale events, the EOC is a central location for senior officials from city, county, state and federal agencies to coordinate response efforts, make decisions, and disseminate information. With more than 70 workstations to support operations for dozens of agencies, the EOC also serves as a clearing house for sharing information during emergencies. During large-scale emergencies, the Joint Information Center (JIC), located within the EOC, gathers information from EOC personnel to disseminate information to the public.

- **EOC Organization:** Arranged according to NIMS/ICS standard into Management, Operations, Planning, Logistics and Administrative sections.
- **ICS-ESF Layout:** Arranged according to ICS Branch and ESF function.
- **Communications:** The EOC has a local and wide area information technology network, county-wide TRS 800 Mhz. radio system, analog, digital and satellite telephone systems, full integrated audio-video display systems, video conferencing facilities, connection to external video systems, redundant weather radar systems, Missouri's EMS system, WebEOC and local and regional GIS capabilities.
- **Survivability:** Setback from street, perimeter fencing, wind and blast-resistant exterior and interior surfaces, video surveillance, 24-hour onsite occupancy, emergency backup generators, a centralized uninterrupted power source (UPS), reserve water capability, reserve fire water storage, redundant heating/ventilation/air conditioning and reserve waste storage tanks.
- **EOC Dimensions and Features:** Approximately 22,000 square feet, including Operations Room, Conference Room, Policy Room, Control and Information Center, Situation Room, GIS Office, Joint Information Center, NIMS Command and General Staff Rooms, Cafeteria, Dormitory, Laundry and Media Center.
- **Technology:** The entire building utilizes a digital backbone. To facilitate the operation of all functional displays throughout the facility, a matrix system allows for fast and efficient audio/visual use from anywhere in the facility. With limited staffing, wireless technology acts as a force multiplier allowing for remote control of audio/visual, lights and sound.

Emergency Operations Plan (EOP)

This document covers unincorporated areas of Greene County and the City of Springfield. The plan is approved by both the Greene County Commission and the Springfield City Council. The EOP is an all-hazards document divided into a basic plan and 20 emergency support functions.

Mitigation Project Considerations

In the past, flash flooding has been the greatest impact upon the county, comprehensive storm water plans are in place and are kept updated as the need warrants.

With tornado and severe storms always a threat to the area, warning capability assessments have/are being conducted including: Reverse 9-1-1, weather radio placement programs, and the potential need to add additional outdoor warning sirens to areas annexed into the City of Springfield as warranted and dense population areas in unincorporated Greene County as warranted.

2- PLANNING AREA PROFILES AND CAPABILITIES

Office of Emergency Management



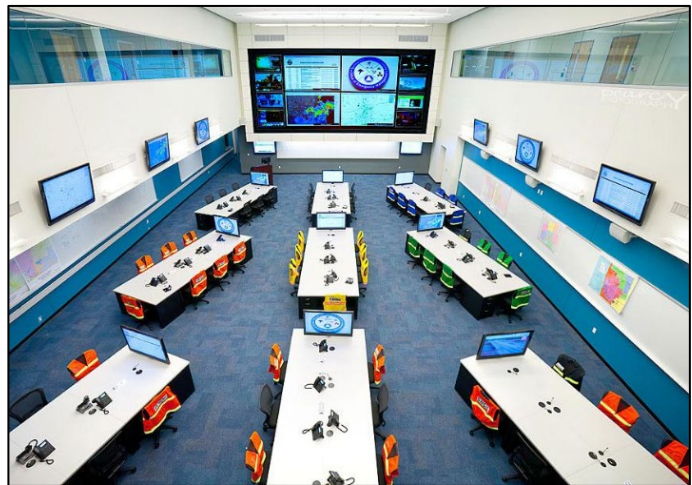
The Springfield-Greene County Office of Emergency Management (OEM) is funded through Federal, State, County and City resources. The original purpose for the office, known as Civil Defense, was to help protect citizens from nuclear attacks. The purpose has grown since the 1980's to include planning and protection from all hazards which could cause disaster situations for the county.

OEM has ten paid staff: Director, Deputy Director, Emergency Planning Specialist, Logistics Specialist, Exercise and Training Specialist, Area Municipality Planning Specialist, Network Systems Administrator, Public Information Officer, Administrative Services Manager and an Administrative Coordinator. Paid staff is often augmented by reservists, contract employees,

university interns and a cadre of volunteers.

In order to save lives and protect property in the face of the hazards that affect the jurisdictions of Greene County, this office, in coordination with Federal, State and local agencies, apply the five domains of Emergency Management: Mitigation, Prevention, Preparedness, Response and Recovery.

The Office of Emergency Management is the primary control point for activation of the outdoor siren warning system which has more than 100 sirens throughout the County. The Springfield-Greene County Emergency Communications Center is the secondary control center for the system. The Public Works Maintenance Center may also activate the system whenever deemed appropriate. Also, any law enforcement officer, firefighter, trained Emergency Management weather spotter, or National Weather Service representative may act as a single source for activation when reporting a funnel cloud or tornado that is threatening the safety of Greene County residents.



The Office of Emergency Management hosts a Severe Weather Spotter training program annually for first responders and Emergency Management personnel. All Greene County OEM personnel are required to complete this training yearly.

The Office of Emergency Management runs awareness campaigns during the spring for severe storms and the fall for severe winter weather. Special statements are issued throughout the year by appropriate departments for heat and drought (Health Department) and Wild Fire (National Weather Service, Department of Conservation and local fire agencies).

Throughout the year, The Greene County Office of Emergency Management works diligently to prepare responders and the community for all hazards that are a threat to the Greene County area.

2- PLANNING AREA PROFILES AND CAPABILITIES

Community Partnerships

The City of Springfield and County collaborate on numerous issues such as a combined Office of Emergency Management, Health Department and Parks and Recreation Department. The Missouri Department of Transportation (MoDOT), City of Springfield and County collaborate on issues concerning transportation. The Missouri Department of Conservation (MDC) and local fire departments work together to safeguard the county's forested areas.

Emergency Services

9-1-1 Emergency Communications

The Springfield-Greene County 9-1-1 Emergency Communications Center is the hub of emergency communications throughout both the City of Springfield and Greene County. Acting as the centralized call center for incoming 9-1-1 calls from the public, as well as outgoing communications to emergency personnel in the field. Basic 9-1-1 service has been available in the Springfield community since 1979. In 1985, the Springfield Fire department and Police Department consolidated their dispatch and telephone operations and in 1989 the Emergency Communication Center was established as a Municipal department by action of the City Council. In 1994, the department became the only 9-1-1 answering point for the enhanced Greene County 9-1-1 system, incorporation the ability for emergency personnel to identify an incoming caller's phone number and address with a landline telephone. In 2002, with the county's new 800 MHz radio system coming on-line, the Greene County Sheriff's Department Communication Division merged with the 9-1-1 Center. The City of Republic merged its dispatch operation into Springfield Greene County 911 Communications in October 2013. Springfield-Greene County Communications also maintains an off-site backup center at a separate City of Springfield facility.



The Emergency Communications Center currently dispatches for eight municipal police departments, 13 fire departments and the Sheriff's Departments. They employ approximately 70 tele-communicators, supervisors and managers.

9-1-1 Call Statistics

YEAR	911 CALLS	PERCENT OF WIRELESS CALLS	% ANSWERED <10 SECONDS	ADMINISTRATIVE CALLS IN/OUT	TOTAL PHONE INTERACTIONS
2018	261,124	82.67%	77.2%	233,677	494,801
2017	263,701	81.97%	78.0%	237,991	501,692
2016	263,166	81.33%	77.2%	252,271	515,437
2015	255,342	80.80%	79.6%	256,440	511,782

Emergency Alert System (EAS)

In response to a failure of the Outdoor Warning Siren System or during situation where the sirens or NOAA all hazard radios may not provide the most effective warning, EAS will be utilized as a secondary redundant means of warning the public potentially impacted by an actual or impending emergency. The EAS system will often be utilized simultaneously with the Outdoor Warning Siren System as well as the established Public Information System within Greene County to ensure that a complete warning message is relayed to the population. The primary Emergency Alert System radio station for Springfield-Greene County is KTTS 94.7 FM; the secondary

2- PLANNING AREA PROFILES AND CAPABILITIES

station is KSGF 1260 AM. The Springfield-Greene County Office of Emergency Management has been designated as a local entry point for EAS activation and can submit emergency alerts directly to KTTS-94.7 FM.

Law Enforcement



The first session of the County court was held March 11-14, 1833, at the house of John P. Campbell, In Springfield. From this first session of the court, John D. Shannon was appointed and commissioned as the first Sheriff of Greene County. Over the course of time, there have been 40 men and women have held the prestigious office of Sheriff in Greene County Missouri.

The Greene County Sheriff's Office is a full service law enforcement agency that provides twenty-four hour road patrol, Criminal Investigations Division, Warrants and Records Division, Civil Process Division, Administrative Services Division, and a jail that houses 600 inmates. Currently, the Sheriff's Office is in the process of building a new jail that will hold approximately 1,300 inmates.

The Greene County's Sheriff's Office Patrol Division is responsible for patrolling 600 square miles of unincorporated Greene County and provides full law enforcement services for 84,159 citizens. The Patrol Division is made up of three squads with care under the leadership of a Sergeant. Each squad also has at least 2 Corporals and 14 Deputies. The County is divided into 5 districts. There is typically one deputy assigned to each district. The Patrol Division handles around 32,000 calls for service a year and makes approximately 20,000 traffic stops.

Fire Services

The Springfield Fire Department consists of 12 fire stations. In addition to Springfield Fire, Rural Greene County is divided into 13 fire protection districts:

- Ash Grove Fire Protection District
- Battlefield Fire Protection District
- Bois D'Arc Fire Protection District
- Brookline Fire Protection District
- Ebenezer Fire Protection District
- Fair Grove Fire Protection District
- Logan-Rogersville Fire Protection District
- Strafford Fire Protection District
- Walnut Grove Fire Protection District
- West Republic Fire Protection District
- Willard Fire Protection District



(Willard Fire District)

For more information on participating fire, services please see their individual profiles.

2- PLANNING AREA PROFILES AND CAPABILITIES

Emergency Medical Services (EMS)



Emergency Medical Services (EMS) for Greene County is provided by Mercy Paramedics and CoxHealth Paramedics. These two private entities have divided the county into multiple response areas. Both EMS systems use system status for deployment of field units. This means that every time an ambulance is displaced to a call for service, all on duty ambulances in the system shift their positions to better cover the service area.

The CoxHealth System covers more than 36,000 requests for service a response year. Ambulances are staffed with approximately 175 licensed paramedics and emergency medical technicians for a fleet of 45 ambulance vehicles. The CoxHealth System also operates a medical evacuation helicopter which is staffed 24 hours a day with a pilot, a flight nurse and a flight paramedic. The helicopter is based in Springfield at Cox South.

The Mercy Health System responds to more than 42,000 emergencies a year. Mercy Life Line operates five helicopters staffed by a registered nurse, a paramedic and a pilot.

Public Health Department

In 1873, the City of Springfield established what was then known as the Department of Health. Today, with a budget of nearly \$10 million and a staff of 110, the Springfield-Greene County Health Department serves a combined population of approximately 267,000 people. The Health Department provides many services including:

- Connecting citizens to community health services
- Developing policies to promote a healthy community
- Educating our community about public health issues
- Enforcing City ordinances
- Evaluating current community health programs
- Monitoring, identifying and investigating potential health threats
- Partnering with other community organization to address local health issues

Many services provided by public health are unseen. Restaurant inspections, communicable disease investigations, well water testing and monitoring of morbidity and mortality reports are a few examples of vital activities which occur behind the scenes each and every day.

Other services are much more visible to the community; health education is an example. Good health is their goal and they make every effort to engage the community and focus public attention on issues for educational purposes.

2- PLANNING AREA PROFILES AND CAPABILITIES

MITIGATION PROGRAMS



The main mitigation program is in the area of floodplain management (regulations updated 2002) and participation in the administration of the National Flood Insurance Program (NFIP). Floodplain Management programs are based on policies to protect the general welfare and health of county residents. The programs are designed to safeguard health, safety and property in times of flood; restrict avoidable increases in flood size; mitigate losses at the time of construction of public facilities; and protect the public from buying land unsuited for the intended use due to flood hazards.

The Federal Clean Water Act requires certification for any construction, placement and disposal of fill material or earth movement within a floodplain or body of water. After serious flooding in 1993, floodplain regulations were revamped and continue to be scrutinized.

In 1983, Greene County adopted Article XIX, Floodplain Management Ordinance requiring participation in the NFIP. This ordinance, based on a model ordinance from the Federal Emergency Management Agency (FEMA) requires any development or construction in floodplain areas to obtain a Floodplain Development Permit from the county. Please see Section 3.6; flooding, for more information on NFIP policies.

The county and city floodplain regulations are aimed at restricting new development in floodplains. Following the 1993 floods, the county and city instituted a property acquisition program. This program is funded through FEMA's Hazard Mitigation Grant Program. Properties in Greene County have been purchased with federal grant money.

Storm water regulations are also in place and are designed to minimize the harmful effects of erosion, sedimentation, and flooding from storm water runoff. This is accomplished by measures to mitigate erosion both during and after construction, the detention and controlled discharge of differential run-off from development, and a well-designed storm water conveyance system.

Utilities

Due to security concerns, utilities are mapped to a certain degree in this plan.

Electric

Electricity in Greene County are mainly provided by four companies. The Springfield area's utilities are provided by City Utilities and the rural areas of the county are provided by Southwest Electric Co-Op, Empire District, Associated Electric Co-Op, and Melton Electric Co.

Natural Gas

Many communities and rural residents have access to natural gas for fueling appliances. Those who are not serviced by natural gas rely on Propane for heating and cooking needs.

Water

Water for the citizens of Greene County is typically provided by each municipality. City Utilities is one of the largest water provider for Greene County. For more information on water distribution, please see individual municipality profiles.

2- PLANNING AREA PROFILES AND CAPABILITIES

Missouri One Call

The Missouri Underground Facility Safety and Damage Prevention statute (RSMO Chapter 319) provides for notification center to be used by participating utilities to receive locate requests. Missouri One Call System, operates as a non-profit Missouri corporation, is such a notification center providing a single-point of contact for notification to its members through a state wide toll-free telephone number operating 24 hours a day, seven days a week. MOCS was established in 1986 and currently is providing statewide services to utilities and excavators to comply with the law.



The Missouri One Call System utility location contact number is 1-800-DIG-RITE. Listing of utility lines posing a possible hazard include a contact number for emergency personnel.

Wells



Unincorporated Greene County has thousands of private wells sunk into the groundwater system. By far, the majority of wells in the county serve individual farms and residences. The actual number of such wells is unknown. The county resource management office is tasked with the job of trying to locate and track both working and abandoned wells in the County. Abandoned wells are often discovered during the redevelopment of a piece of property.

In 1987, the Missouri Department of Natural Resources (DNR) began regulating the installation of private water wells. This includes the licensing of drillers and dictating methods of construction, materials and the amount of casing. Casing depths in Greene County are set ten feet below the Northview formation where it is present, or a minimum of one-hundred feet in other areas. These standards apply to Greene County as a part of "Sensitive Area C" as defined in the Missouri Well Construction Rules. As a practical alternative to actually measuring the depth to Northview at each site the Division of Geology and Land survey-DNR has prepared a casing depth map for the area. This map indicated the amount of casing required in each individual quarter section.

The Springfield-Greene County Health Department maintains a database of tests on private wells. Besides well test results, information is recorded on the well's location, reason for request, and type of construction, when known. The most common tests requests on working wells are for coliform bacteria and nitrates.

In addition to private wells, there are more than 150 public wells in unincorporated Greene County.

Abandoned Wells

A partial survey of wells in Greene County by the Resource Management Department suggests that there are hundreds of abandoned wells in the county. Besides the obvious safety hazards, abandoned wells constitute a pollution hazard for groundwater by serving as an open conduit from the surface or near-surface to deeper aquifers. State laws require the plugging or sealing of abandoned wells and if the well is determined to present a threat to groundwater, the Division of Geology and Land Survey can order it to be plugged. Ultimately, homeowner are responsible for plugging abandoned wells on their property. Often, drillers who notice abandoned wells will notify landowners that they must be plugged. A registration report must be filed with the Division upon plugging the well.

2- PLANNING AREA PROFILES AND CAPABILITIES

Solid Waste Disposal



Most waste is trucked to the Solid Waste dump approximately 10 miles north of Springfield just west of Missouri Highway 13. Greene County continues to focus on reducing its solid waste through pre-cycling, recycling, reuse and numerous other means. However, the Springfield Sanitary Landfill remains a vital part of Springfield’s Integrated Solid Waste Management System (ISWMS). The ISWMS is not supported by general tax revenue. Landfill tipping fees are the major funding source for the ISWMS, in addition to donation and revenues generated by the sale of Yard waste Recycling Center Products.

The Springfield Sanitary Landfill provides efficient, reliable and environmental secure disposal of municipal solid waste that cannot be recycled or reused. Presently, these wastes represent 60-80 percent of Springfield’s solid waste generation. This facility also provides for the proper disposal of those non-hazardous commercial, industrial and residual wasted requiring special handlings to meet state and federal regulations.

In addition to the sanitary Landfill, there are also 2 recycling centers and a yard waste recycling center and a household chemical collection facility. These facilities give resident the option to recycle much of their waste. In addition, the ISWMS has other programs such as: requiring all licensed trash haulers to offer the convenience of curbside collection of recyclables and a program of information and education including a Recycling Hotline webpage.

IDENTIFIED ASSETS

This section provides a survey of exiting fixed assets such as infrastructure, critical facilities, employment centers, commercial centers and recreation centers as a major factor in disaster mitigation. Infrastructure includes transportation, communications, water/sewer, electricity, natural gas, sold waste disposal, law enforcement, fire prevention, emergency medical services and Emergency Management.

Transportation

NAME OF HIGHWAY/ROADWAY	ROUTE
Interstate 44	Major connector from St. Louis to the Southwest U.S.
State Highway 13	Runs from Bethany, Missouri to Springfield
U.S. Highway 60	Runs from Missouri’s eastern border on the Mississippi to the Oklahoma border
U.S. Highway 65	Runs from the Iowa border into Arkansas, the main highway linkage between Springfield and Branson
U.S. Highway 160	Runs from Springfield into Oklahoma
James River Freeway	Connects the U.S. Highway 65 to the east of Springfield to I-44 to the west of Springfield. Also known as the Korean War Veterans Freeway.

The primary mode of transportation in Greene County is the private automobile. Over the past several decades, the growth in the number of vehicles has outpace the population.

2- PLANNING AREA PROFILES AND CAPABILITIES

Railroads

The largest railroad in the region is the Burlington Northern/Santa Fe (BNSF) system that runs from east of Springfield, exiting the area northwest of Monett and Pierce City. Historically, this rail line was part of the “Frisco” line that was the first major transportation route into the region. The BNSF provides southwest Missouri with rail connections to metropolitan areas such as St. Louis, Kansas City, Tulsa and Memphis.

The Missouri and North Arkansas rail line, headquartered in Carthage, Missouri, provides rail service to several industries within the City of Springfield, using tracking rights on the BSNF railroad to reach this portion of its system.

BNSF Railways in Greene County



2- PLANNING AREA PROFILES AND CAPABILITIES

CAPABILITY ASSESSMENT

Building Codes

Building and construction in the county is regulated through building codes based on version of the International Codes. Existing codes and regulations include provisions for drainage, flood hazard, soil, slope, and street connectivity issues.

Planning and Zoning

Greene County is a Class 1 Missouri county. In as much, the County Commission has the power to enact ordinances, rules and regulations regarding building regulations, planning & zoning.

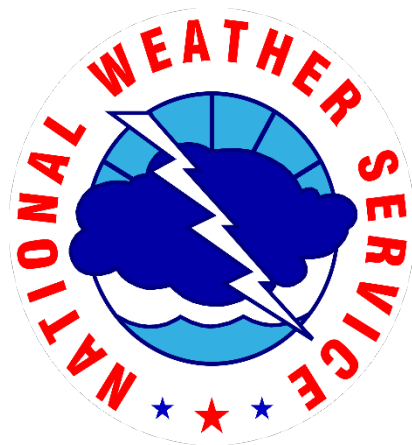
Planning and Zoning for unincorporated Greene County is governed by a board which meets once per month. The Planning Board reviews and approves subdivision plats and variances and acts as an advisory board to the County Commission regarding conditional use permits, zoning requests and amendments to the zoning regulations.

The Board of Zoning Adjustment consists of the three County Commissioners and meets once per month. This board reviews and approves requests regarding variances from the zoning regulations and approves requests for conditional use permits forwarded by the Planning Board.

Current zoning regulations provide for the following fifteen zoning districts: agriculture, agriculture- residence, manufactured home park, suburban residence, one and two family residence, multi-family, multi-family residence, professional office, general office, neighborhood commercial, general commercial, planned shopping, light manufacturing or industrial, general manufacturing or industrial, and plot assignment. Additional regulations cover solid waste and hazardous waste.

Restrictions on hazardous waste storage, treatment and disposal are based upon current Federal and State regulations.

Other Capabilities



- The county and city are able to receive National Weather Service warnings. A vast number of the population could be alerted within 15-20 minutes (estimated), responders within 3-5 minutes and key officials within 15 minutes.
- Public school students receive curricular training on hazards and emergency programs during the school year. Businesses, preschools, private organizations, community leaders, and averages citizens have been exposed to emergency preparedness training.
- Geographic Information Systems (GIS) capabilities allow for limited hazard areas base maps to be available to interested parties.

2 - PLANNING AREA PROFILES AND CAPABILITIES

GREENE COUNTY MITIGATION CAPABILITIES

CAPABILITIES	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Planning Capabilities	
Comprehensive Plan	Yes
Builder's Plan	No
Capital Improvement Plan	No
County Emergency Operations Plan	Updated 2019
County Recovery Plan	Updated 2014
County Mitigation Plan	Expiring 07/2020; New Plan 2020-2025
Debris Management Plan	Yes
Economic Development Plan	No
Transportation Plan	Yes
Land-use Plan	April 2018
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	Yes
Firewise or other fire mitigation plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes - 2015-2020 Greene County Multi-Jurisdictional Mitigation Plan
Policies/Ordinance	
Zoning Ordinance	Yes
Building Code	Yes
Floodplain Ordinance	Yes
Subdivision Ordinance	Yes
Tree Trimming Ordinance	Yes
Nuisance Ordinance	Yes
Stormwater Ordinance	Yes
Drainage Ordinance	Yes
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	Yes
Seismic Construction Ordinance	Yes
Landscape Ordinance	Yes
Program	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
Hazard Awareness Program	No
National Flood Insurance Program (NFIP)	Yes - Member Since 1983
NFIP Community Rating System (CRS) program	No
National Weather Service (NWS) Storm Ready	Yes - January 5 th , 2006
Firewise Community Certification	No
Building Code Effectiveness Grading (BCEGs)	Yes
ISO Fire Rating	

*Continued on next page

2 - PLANNING AREA PROFILES AND CAPABILITIES

CAPABILITIES	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Economic Development Program	No
Land Use Program	Yes - Updated 2018
Public Education/Awareness	Yes
Property Acquisition	Yes
Planning/Zoning Boards	Yes
Stream Maintenance Program	Yes
Tree Trimming Program	Yes
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes
Studies/Reports/Maps	
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes
Evacuation Route Map	Yes
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	Yes
Land Use Map	Yes
Staff/Department	
Building Code Official	Yes
Building Inspector	Yes
Mapping Specialist (GIS)	Yes
Engineer	Yes
Development Planner	Yes
Public Works Official	Yes
Emergency Management Director	Yes
NFIP Floodplain Administrator	Yes
Emergency Response Team	Yes
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Yes
Transportation Department	Yes
Economic Development Department	Yes
Housing Department	Yes
Historic Preservation	Yes
Non-Governmental Organizations (NGOs)	
American Red Cross	Yes
Salvation Army	Yes
Veterans Groups	Yes
Local Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	Yes
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes

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2- PLANNING AREA PROFILES AND CAPABILITIES

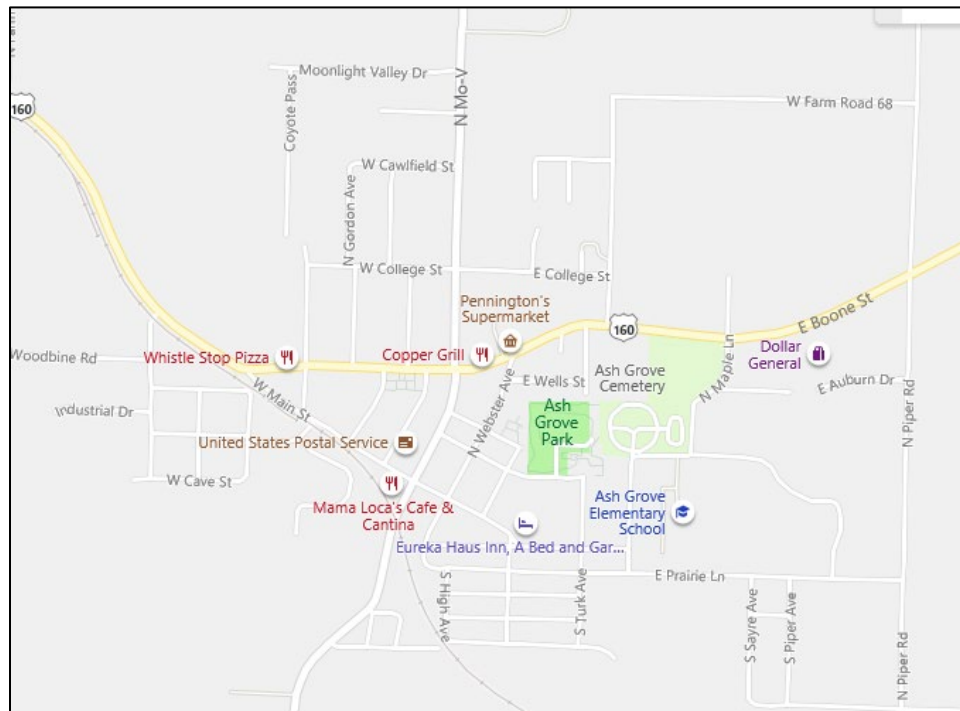
CAPABILITIES	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Local Funding Availability	
Apply for Community Development Block	Yes
Fund projects through Capital	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	Yes
Withhold spending in hazard prone areas	Yes

2- PLANNING AREA PROFILES AND CAPABILITIES

2.2.2 City of Ash Grove

Ash Grove is located in the northwest portion of the county, located about 17 miles from Springfield. Ash Grove has experienced growth in the last 17 years. In 2000, Ash Grove had over 1,400 residents. In 2017, the population grew to approximately 1,600 residents. Ash Grove is governed by a Mayor and four Aldermen. The Mayor appoints, with the Alderman's approval the following positions:

- Chief of Police
- City Clerk
- Director of Emergency Management
- Park Advisory Board
- Planning & Zoning
- Public Works Director
- Utility Billing Clerk



The Board of Aldermen meets at the City Hall at 7:00 p.m. the first and third Monday of the month.

Ash Grove has many community events throughout the year including Car Shows, Concerts, Sparks in the Park, Nathan Boone Homestead Days, Christmas Parades and many more. Ash Grove has a 13-acre City Park which is located in the heart of the city on Parkway. The attractive facility offers many resources and community activities including a swimming pool, tennis courts, basketball courts, disc golf, volleyball and a playground.

2- PLANNING AREA PROFILES AND CAPABILITIES

Early Missourians knew Nathan Boone as a hunter, soldier, surveyor and entrepreneur. They also knew him as his father’s son. Boone, youngest child of the famous Daniel Boone, carried his family’s legacy deep into the Missouri Ozarks and the American West. Boone’s last home, simple but comfortable log house, invites exploration into the life of this second-generation frontiersman. Boone’s three sons and two of his slaves built the house in 1837. It was the hub of a 720-acre Ozark Farm. The current 300-acre site feature the Boone Home, believed to be the oldest and best-preserved walnut log cabin west of the Mississippi, and the Boone slave cemetery.



POPULATION AND DEMOGRAPHICS

General Population Characteristics

CHARACTERISTIC	NUMBER
Total Population	1,607
Male Population	721
Female Population	886
Median Age (Years)	39.6

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Race

RACE	NUMBER
White	1,533
Black or African American	12
American Indian and Alaska Native	8
Asian	0
Native Hawaiian and Other Pacific Islander	0
Other Race	21
Two or More Races	33

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Housing Information

HOUSING OCCUPANCY	NUMBER
Total Housing Units	669
Occupied Housing Units	600
Vacant Housing Units	69
Owned Occupied Housing Units	371
Renter Occupied Housing Units	229

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

2- PLANNING AREA PROFILES AND CAPABILITIES

MITIGATION INITIATIVES

Outdoor Warning Sirens

Ash Grove currently has one warning siren inside the city limits. This siren is activated by the Springfield-Greene County Office of Emergency Management. The siren is also tested on the second Wednesday of every month at 10 a.m., weather permitting. The City of Ash Grove is responsible for maintaining their warning siren.

Other Initiatives

The City of Ash Grove has proposed many mitigation projects to help the City of Ash Grove become more disaster resilient including storm siren replacement with a generator back up, a EOC/Community Safe Room, updating infrastructure physical and electronic security. The City of Ash Grove has also done bridge replacement and maintenance of FEMA Floodplain.

The City of Ash Grove does have major concerns regarding the vulnerability of the city. The City's current EOC is not a hardened facility and lacks capabilities and security needed for operation during a disaster. The Police and Fire Stations are not hardened and does not have a generator to back up the facilities power. The Cities sing Thunderbolt storm siren has exceeded its life expectancy and parts are obsolete. The City also does not have a community safe room for sever weather events or shelter facilities for extreme temperatures or extended durations of power outages. The Ash Grove School District also lacks proper sheltering.

National Flood Insurance Program (NFIP)

The City of Ash Grove is a member in the NFIP. Locally, the Floodplain Manager (City Clerk), Emergency Management Director, Law Enforcement, Building Inspector, and Public Works work jointly to enforce the Floodplain Management activities. In addition, the City also works with partners in the surrounding communities, Greene County and SEMA when needed.

Emergency Services

The Ash Grove Police Department consists of a Police Chief, three full time officers, and five reserve officers. The police department operates out of the Ash Grove City Hall. The City of Ash Grove also has a fire and rescue department which consists of all volunteer fire fighters. The fire district is not officially affiliated with the City of Ash Grove.

Utilities

The City of Ash Grove provides sewer and water services. A private company offers trash collection services. WCA provides Ash Grove with a recycling center. The center has containers for glass and comingled recycling. AT&T and Mediacom provide telephone services and high speed internet service, cable television is offered by Mediacom. Electric services are provided by the Empire District Electric Company; Spire Gas Energy provides natural gas services.

Historic Significant Disaster Events

Wide-spread flooding occurred in 1993 and again in 2007 as a result of weeks of rain. This prompted numerous flooding in our city. The City has a designated floodway that runs from east to west through the town.

Additionally, the ice storm in the winter of 2007 took down many trees and power lines. Ash Grove was without electricity for nearly a week with recovery taking several months and went into the summer season.

2- PLANNING AREA PROFILES AND CAPABILITIES

VULNERABILITY

Ash Grove has many older buildings that cause differences in risk among jurisdictions in the planning area. Ash Grove is considered a Historic town. Out of the 637 housing units, 202 of those homes were built in 1939 or earlier. Ash Grove also has many Historic properties including the Nathan Boone Homestead State Historic Site, Berry Cemetery and the Gilmore Octagonal Barn.

CAPABILITY ASSESSMENT

Facilities

The Public Works Department has several facilities including the following:

- Water/Sewer System
- Waste Water Treatment Plant
- Lift Station
- 2 Operating Wells
- 2 Water Storage Tanks
- Street System
- 1 Public Works Department Building
- 1 Small Building for Equipment Storage
- 1 Small Building for testing Treatment Plan Equipment

The administrative staff works out of City Hall, which is also the location for the primary Emergency Operations Center. The City of Ash Grove also has an Emergency Operations Plan (EOP) and a designated Emergency Management Team in place.

Building Codes

The City of Ash Grove has several codes that help keep the community safe and running smoothly. Several of the city codes and ordinances revolve around building regulations. The City of Ash Grove provides all codes on their website making it easy for the public to access and view.

Planning and Zoning

The Ash Grove Planning and Zoning Commission and the City Council are responsible for managing the growth and development of the City's incorporated area. Development must occur in a manner that results in a logical urban pattern with long-term value rather than short term gain.

The Planning and Zoning Commission is primarily an advisory body for the citizens of Ash Grove. Under Missouri State Statutes of Chapter 89 Zoning and Planning Zoning regulations, a primary duty of the Planning and Zoning Commission is to hold public hearings where public opinion can be expressed.

The Planning and Zoning Commission is a sounding board for community attitudes toward development. The Commission is required, following a public hearing, to adopt a recommendation to the City Council regarding rezoning and subdivision of land, conditional use permits, and text amendments to the regulations.

Back-Up Systems

- City Hall
- East Water Well
- Waste Water Treatment Plant

2- PLANNING AREA PROFILES AND CAPABILITIES

- Waste Water Lift Station

ASH GROVE CAPABILITIES

CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Planning Capabilities	
Comprehensive Plan	Yes - In Final Draft
Builder's Plan	No
Capital Improvement Plan	No
County Emergency Plan	Yes
County Recovery Plan	Yes
County Mitigation Plan	Yes
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	Yes - Included in County Plan- 2018
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Fire wise or other fire mitigation plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes - Located in Mitigation Plan
Policies/Ordinance	
Status Including Date of Document or Policy	
Zoning Ordinance	Yes
Building Code	Yes
Floodplain Ordinance	Yes
Subdivision Ordinance	Yes
Tree Trimming Ordinance	Yes
Nuisance Ordinance	Yes
Storm Water Ordinance	Yes
Seismic Construction Ordinance	Yes
Drainage Ordinance	Yes
Capability	
Status Including Date of Document or Policy	
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	Yes
Debris Management Plan	No plan but ordinances
Program	
Status Including Date of Document or Policy	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	Unknown
ISO Fire Rating	6
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes - Ready in 3
Property Acquisition	Unknown
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes
Studies/Reports/Maps	
Status Including Date of Document or Policy	

2 - PLANNING AREA PROFILES AND CAPABILITIES

Hazard Analysis/Risk Assessment (Local)	Yes - Mitigation Plan
Hazard Analysis/Risk Assessment (County)	Yes - Mitigation Plan
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes
Evacuation Route Map	No
Critical Facilities Inventory	Yes - Currently Updating
Vulnerable Population Inventory	Yes - Mitigation Plan
Land Use Map	Yes - County Level
Staff/Department	Status Including Date of Document or Policy
Building Code Official	PRN Contractor
Building Inspector	PRN Contractor
Mapping Specialist (GIS)	Greene County GIS
Engineer	PRN Contractor
Development Planner	AG Planning and Zoning (Volunteer)
Public Works Official	Full Time
Emergency Management Coordinator	Part Time
NFIP Floodplain Administrator	Part Time
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Waste Management Corp. Springfield
Transportation Department	AG Public Works-Full Time
Economic Development Department	NO
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	No
Historic Preservation	No
Non-Governmental Organizations (NGOs)	Status Including Date of Document or Policy
American Red Cross	Yes - Springfield
Salvation Army	Yes - Springfield
Capability	Status Including Date of Document or Policy
Veterans Groups	Yes - Ash Grove American Legion
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	Yes - Tri County Ministries, Sunshine Center, Food Pantry
Local Funding Availability	Status Including Date of Document or Policy
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Water and Sewer Only
Impact fees for new development	Unknown
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	Yes
Ability to withhold spending in hazard prone areas	Unknown

2- PLANNING AREA PROFILES AND CAPABILITIES

2.2.3 City of Battlefield

The City of Battlefield is located in the southwest portion of Greene County, located approximately one mile from Springfield. Battlefield has experienced rapid growth over the years. In 2000, Battlefield had over 2,300 residents. In 2017, the population of Battlefield was over 5,900. Battlefield was incorporated as a 4th class city in 1971 and as permitted by Missouri State Statutes, has a Mayor and Board of Aldermen form of government. The Mayor and Board of Aldermen are elected. Battlefield also has a City Administrator. Currently, the City has three geographically divided Wards which have two Aldermen each. Aldermen serve two year staggered terms and the mayor services the city for two year terms. The City of Battlefield has many departments including:

- Animal Control
- Economic Development
- Emergency Management
- Fire
- Municipal Courts
- Park Board
- Planning and Zoning
- Police
- Sewer



The City of Battlefield has a community center that is used by residents and non-residents for parties, meetings, and adult education classes. Free community events are planned throughout the year and all are held at the Battlefield Municipal Complex and Cherokee Trail of Tears Park.

There are currently no trails or greenways in or through the city, but there is a walking track around the perimeter of Cherokee Trail of Tears Park, co-located with the Municipal Complex. The City Park comprises approximately eight acres of land, with playground equipment for smaller children, one basketball and two tennis courts. All courts are lighted and available until 11PM during the summer.

2- PLANNING AREA PROFILES AND CAPABILITIES

POPULATION AND DEMOGRAPHICS

General Population Characteristics

CHARACTERISTIC	NUMBER
Total Population	5,986
Male Population	2,860
Female Population	3,126
Median Age (Years)	36.8

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Race

Race	Number
White	5,381
Black or African American	94
American Indian and Alaska Native	0
Asian	108
Native Hawaiian and Other Pacific Islander	0
Other Race	169
Two or More Races	234

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Housing Information

HOUSING OCCUPANCY	NUMBER
Total Housing Units	2,375
Occupied Housing Units	2,338
Vacant Housing Units	37
Owned Occupied Housing Units	1,905
Renter Occupied Housing Units	433

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

MITIGATION INITIATIVES

Outdoor Warning Sirens

There are four outdoor warning sirens within the city limits to warn Battlefield residents of storm threats. The northern and far eastern sides of the city are within Greene County outdoor warning siren coverage. Two smaller outdoor warning sirens have been installed to cover the west side of Battlefield, bringing all residents under outdoor warning siren coverage. All Battlefield sirens are activated by the Springfield-Greene County Office of Emergency Management. The city of Battlefield is responsible for maintaining their outdoor warning siren.

2- PLANNING AREA PROFILES AND CAPABILITIES

Emergency Services

Battlefield has their own law enforcement department consisting of a Chief of Police, a Sergeant and six officers providing 24-7 service to the citizens of Battlefield. The City also has Emergency Medical and Fire Services provided through the Battlefield Fire Protection District that is headquartered in the City. For more information about Battlefield Fire Protection District, please see their individual profile.

The City of Battlefield has appointed the City Administrator as the Emergency Management Director. The Battlefield Fire Protection District and the Springfield-Greene County Office of Emergency Management provide additional emergency management support as requested.

Utilities

The City of Battlefield works closely with the water district, Greene County Public Water Supply District #1, which provided water for the City of Battlefield and much of the surrounding area. The City of Battlefield operates the sewer collections system. Depending on the location of the house or business, electric and gas may be served by either Ozark Electric or Springfield City Utilities. Gas service may be propane or natural gas. Springfield City Utilities provides natural gas to some parts of the city. MediaCom and AT&T provide high speed internet and cable television to the City of Battlefield. The city of Battlefield does not offer trash service but there are multiple vendors available in the Springfield/Republic area.

PREVIOUS MITIGATION ACTIONS

The City of Battlefield has done many things to mitigate potential hazards. Battlefield purchased a natural gas powered generator that was large enough to power the entire municipal complex building. By having this generator, it increased the ability of city staff and police to maintain operative during city, county, or regional emergency situations. The county has also invested in boosting communication ability during emergencies within the city by using 800 MHz radios.

IDENTIFIED ASSETS

State Highway FF – State Highway FF is a four lane roadway with 12' lanes and 10' shoulders. The roadway is under the jurisdiction of the Missouri Department of Transportation. The Ozarks Transportation Organization Major Thoroughfare Plan classifies State Highway FF as an Expressway. Traffic counts on State Highway FF shows 12,100 vehicles per day, 1,210 vehicles per hour in the evening peak hour. The road is currently posted with a 55 MPH speed limit.

State Highway M- State Highway M is a two lane roadway with 12' lanes. The roadway is under the jurisdiction of the Missouri Department of Transportation. The Ozarks Transportation Organization Major Thoroughfare Plan classifies State Highway M as a Primary Arterial. Traffic counts on State Highway M show 7,140 vehicles per day, and 714 vehicles per hour in the evening peak hour. The road is currently posted with a 55 MPH speed limit.

VULNERABILITY

The City of Battlefield is mostly populated by elderly people and younger families. Of the 5,986 people who live in Battlefield, 1,249 (21%) of those people are over the age of 60. The majority of Battlefield is mostly residential.

2 - PLANNING AREA PROFILES AND CAPABILITIES

CAPABILITY ASSESSMENT

Facilities

The City of Battlefield has a City Hall that was built in 2005 after the old city has was destroyed in a tornado event in 2003. A community center and police station are located within City Hall.

Building Codes

The Building Services Department serves as the main point of contact for all new construction in the City of Battlefield. The goal is to provide a high level of building code compliance for the preservation of life, safety and the general welfare for the people of the City of Battlefield. The City does this through the enactment and enforcement of building codes and standards to ensure that all elements of construction, from site selection to final building occupancy, meet the code required standards of life safety in the built environment.

Planning and Zoning

The Planning and Zoning Commission is a group of volunteers working with the City Engineer and Building Inspector to oversee and approve plans for subdivisions and the administration of the Battlefield Zoning Codes. Meetings are held on the second Monday of the month at 6:00 p.m. at City Hall. If another meeting is needed to be held it would be on the fourth Monday. To be placed on the agenda, items must be submitted no later than the Wednesday prior to each meeting.

Back-Up Systems

The City of Battlefield has three servers, one master and two subordinates. These are located in three separate parts of the building and serve to back up the computers located in the court, police side and city side. Off-site backup of servers are to a local server farm with additional backup to cloud storage. Back-up information storage is also kept on transferable storage that will allow the City of Battlefield to reconstruct all files in the event of a disaster. The redundancies built into the information storage allow city staff to reconstitute critical resources anywhere there is internet access.

BATTLEFIELD CAPABILITIES

CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
PLANNING CAPABILITIES	
Comprehensive Plan	Yes
Builder's Plan	Yes
Capital Improvement Plan	Yes
County Emergency Plan	Yes
County Recovery Plan	Yes
County Mitigation Plan	Yes - 2015-2020 Mitigation Plan
Economic Development Plan	No
Transportation Plan	Yes
Land-use Plan	Yes
Flood Mitigation Assistance (FMA) Plan	Unknown
Watershed Plan	Unknown
Fire wise or other fire mitigation plan	Unknown
School Mitigation Plan	Yes - Located in Mitigation Plan
Critical Facilities Plan (Mitigation/Response/Recovery	Yes - Located in Mitigation Plan
POLICIES/ORDINANCE	
Zoning Ordinance	Yes
Building Code	Yes

2 - PLANNING AREA PROFILES AND CAPABILITIES

Floodplain Ordinance	Yes
Subdivision Ordinance	Yes
Tree Trimming Ordinance	Yes
Nuisance Ordinance	Yes
Seismic Construction Ordinance	Yes
Storm Water Ordinance	Yes
Drainage Ordinance	Yes
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	Yes
Debris Management Plan	No
PROGRAM	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes
Property Acquisition	Yes
Planning/Zoning Boards	Yes
Stream Maintenance Program	County
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes
STUDIES/REPORTS/MAPS	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Hazard Analysis/Risk Assessment (Local)	Yes
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes - in Mitigation Plan
Vulnerable Population Inventory	No
Land Use Map	Yes
STAFF/DEPARTMENT	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Building Code Official	Yes
Building Inspector	Yes
Mapping Specialist (GIS)	Yes
Engineer	Yes
Development Planner	Yes
Public Works Official	Yes
Emergency Management Coordinator	Yes
NFIP Floodplain Administrator	Yes
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	No

2- PLANNING AREA PROFILES AND CAPABILITIES

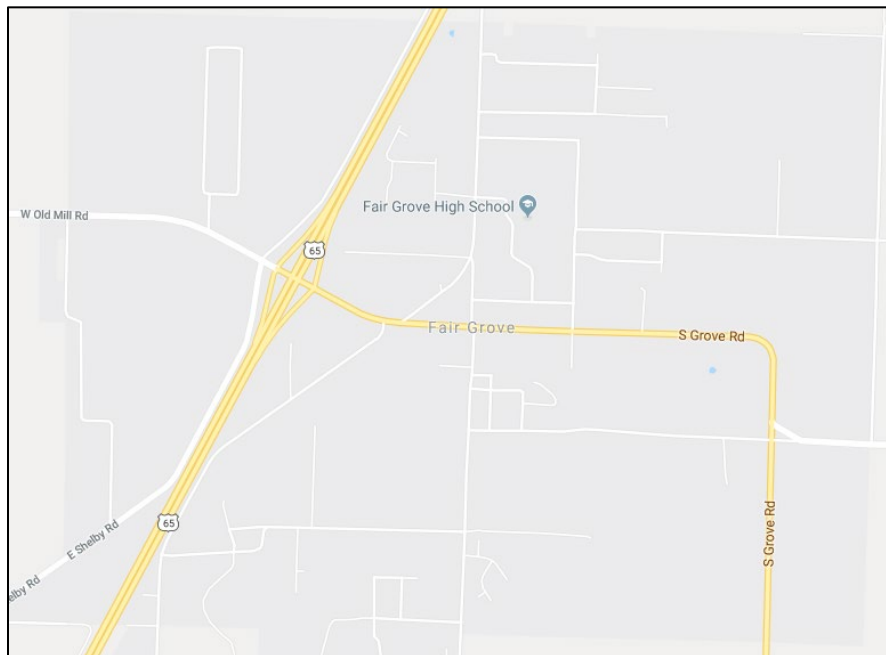
Transportation Department	Yes
Economic Development Department	No
Housing Department	Yes
Planning Consultant	No
Regional Planning Agencies	No
Historic Preservation	No
NON-GOVERNMENTAL ORGANIZATIONS (NGOS)	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
American Red Cross	Yes
Salvation Army	Yes
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	No
LOCAL FUNDING AVAILABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

2- PLANNING AREA PROFILES AND CAPABILITIES

2.2.4 City of Fair Grove

The City of Fair Grove is located in the Northeast portion of Greene County, about 18 miles from Springfield. Fair Grove has also seen growth over the years. In 2000, Fair Grove's population was about 1,100 residents. In 2017, Fair Grove had approximately 1,600 residents. The City of Fair Grove has a Mayor and Board of Aldermen. Fair Grove is divided into three wards and each ward has an Alderman. The Board of Aldermen meet on the second and fourth Tuesday of each month at 6:30 p.m. Fair Grove also had a Planning and Zoning board consisting of eight members. They meet on the first Monday of each month at 6:30 p.m. Fair Grove also has the following departments:

- Building Codes
- City Attorney
- City Clerk
- Court Clerk
- Emergency Management
- Park Board
- Police
- Public Works



The City of Fair Grove has approximately 500 single family homes, several multi-family buildings and duplexes. A Senior Citizen's housing facility has one bedroom apartments for 20 residents. There are over 50 businesses including the historic district, 3 banks, supermarket, pharmacy, convenience stores and restaurants.

Fair Grove offers two different park locations with something for all ages to enjoy. The parks consist of walking paths, skate parks, playgrounds, sandbox, volleyball, basketball courts. The parks hold events throughout the year for residents including fireworks, haunted trick or treat, drive thru light events and many more.

2- PLANNING AREA PROFILES AND CAPABILITIES

POPULATION AND DEMOGRAPHICS

General Population Characteristics

CHARACTERISTIC	NUMBER
Total Population	1,623
Male Population	827
Female Population	796
Median Age (Years)	31.9

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Race

RACE	NUMBER
White	1,582
Black or African American	17
American Indian and Alaska Native	3
Asian	2
Native Hawaiian and Other Pacific Islander	0
Other Race	0
Two or More Races	19

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Housing Information

HOUSING OCCUPANCY	NUMBER
Total Housing Units	602
Occupied Housing Units	574
Vacant Housing Units	28
Owned Occupied Housing Units	427
Renter Occupied Housing Units	147

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

MITIGATION INITIATIVES

Outdoor Warning Sirens

The City of Fair Grove currently has five warning sirens that are located within the city limits. The Springfield-Greene County Office of Emergency Management is responsible for activating the sirens. The sirens are tested on the second Wednesday of every month at 10 a.m., weather permitting. The City of Fair Grove is responsible for maintaining the storm siren.

2- PLANNING AREA PROFILES AND CAPABILITIES

Emergency Services

The City of Fair Grove has their own police department that offers services 24-7. The police department has 11 officers, six full time officers, including one Chief of Police, detective sergeant, patrol corporal, three patrol officers and a reserve squad lead by a sergeant and three reserve officers. The police department also has a full-time School Resource Officer. In 2015, the Fair Grove Police Department launched its Community Resource Officer Program. This initiative is geared towards sustaining healthy civic relations between the department and the citizens it protects through proactive community assistance and support. Each city ward is assigned one officer who is responsible for networking with citizens within the ward through free community workshops, formal and informal onsite meetings, and positive civic interactions with the city.

The City of Fair Grove also has a full time fire protection district that serves the community and surrounding areas. For more information about the Fair Grove Fire Protection District, see their individual community profile.

Utilities

The City of Fair Grove supplies their city with some utilities. The Fair Grove Public Water Supply has been established since 1968 and has 3 wells and 3 storage takes. Water is chlorinated and tested as per DNR regulations. The main water supply comes from two aquifers, the Springfield Plateau Aquifer and the Deep Ozark aquifers.

Electric for the City is provided by Empire Electric and Southwest Electric. Water and sewer services are provided by the City, at residential rates lower than many surrounding municipalities. Trash service is procured through four solid waste haulers. Total Highspeed Internet provided residential and commercial internet services.

Historic Properties



The City of Fair Grove has many historic properties, older buildings and older homes. Fair Grove takes pride in the Wommack Mill which was constructed in 1883 and is still in full operation today. The City has many events that are surrounded around the mill; however, none that are any larger than the Heritage Festival, which takes place annually the last weekend of September. The event draws an estimated 80,000 people each year.

VULNERABILITY

Homes in Fair Grove typically are older. In 2017, there was 574 occupied housing units. 386 of those homes were built in 1980 or earlier.

CAPABILITY ASSESSMENT

Facilities

The City of Fair Grove has a city hall, which houses the police department, all municipal services and a Green County Library. The City also owns and operates its own sewer facility, which includes three substations, that serves the citizen of Fair Grove. The City of Fair Grove has a new fire station that houses Mercy Paramedics and fire personnel that was opened 2019.

2- PLANNING AREA PROFILES AND CAPABILITIES

The Fair Grove High School acts as the Emergency Operations Center (EOC) in times of crisis and an Emergency Management

Building Codes

The City of Fair Grove has building codes that all residents must follow. The City makes it easy to find the codes and regulations, by providing them on their City Website.

Planning and Zoning

The City of Fair Grove has a Planning and Zoning Commission that oversees the planning and development of the Fair Grove area.

Back-Up Systems

The City of Fair Grove has one generator to operate one of the three-sewer lift stations. There is a mobile generator that is available in the event of power loss at the government building; however, this generator is only capable of assisting with minor services. The City does have on Ham Radio in the Office of Emergency Management that can be used for backup communication.

FAIR GROVE CAPABILITIES

CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
PLANNING CAPABILITIES	
Comprehensive Plan	Yes - 2017
Builder's Plan	No
Capital Improvement Plan	Yes - 2017
County Emergency Plan	Yes - 2018
Local Recovery Plan	No
County Recovery Plan	Yes
County Mitigation Plan	Yes - 2015-2020 Updated every five years
Economic Development Plan	Yes
Transportation Plan	Yes
Land-use Plan	Yes
Flood Mitigation Assistance (FMA) Plan	Yes
Watershed Plan	No
Fire wise or other fire mitigation plan	No
School Mitigation Plan	Included in Mitigation Plan
Critical Facilities Plan	Yes Included in Mitigation Plan
Mitigation/Response/Recovery	
POLICIES/ORDINANCE	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	
Zoning Ordinance	Yes
Building Code	Yes
Floodplain Ordinance	Yes - 2010
Subdivision Ordinance	N/A
Tree Trimming Ordinance	N/A
Nuisance Ordinance	Yes
Storm Water Ordinance	Yes
Seismic Construction Ordinance	Yes
Drainage Ordinance	Yes
CAPABILITY	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	Yes
Landscape Ordinance	Yes
Debris Management Plan	Yes-2015
PROGRAM	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	

2 - PLANNING AREA PROFILES AND CAPABILITIES

Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	Yes
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	4
Economic Development Program	No
Land Use Program	Yes
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	County
Tree Trimming Program	Yes
Engineering Studies for Streams (Local/County/Regional)	No
Mutual Aid Agreements	Yes
STUDIES/REPORTS/MAPS	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Hazard Analysis/Risk Assessment (County)	Yes
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	No
Vulnerable Population Inventory	No
Land Use Map	Yes
STAFF/DEPARTMENT	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Building Code Official	Yes - Contracted
Building Inspector	Yes
Mapping Specialist (GIS)	No
Engineer	Yes - Contracted
Development Planner	No
Public Works Official	Yes - Full Time
Emergency Management Coordinator	Yes
NFIP Floodplain Administrator	Yes - Contracted
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Yes - Full Time
Transportation Department	Yes - Public Works
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	No
Historic Preservation	No
NON-GOVERNMENTAL ORGANIZATIONS (NGOS)	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
American Red Cross	Yes
Salvation Army	Yes
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Veterans Groups	Yes - American Legion
Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes - Lions, 4-H, Boy and Girl Scout
LOCAL FUNDING AVAILABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY

2- PLANNING AREA PROFILES AND CAPABILITIES

Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	No
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Ability to incur debt through general obligation bonds	No
Ability to incur debt through special tax bonds	No
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

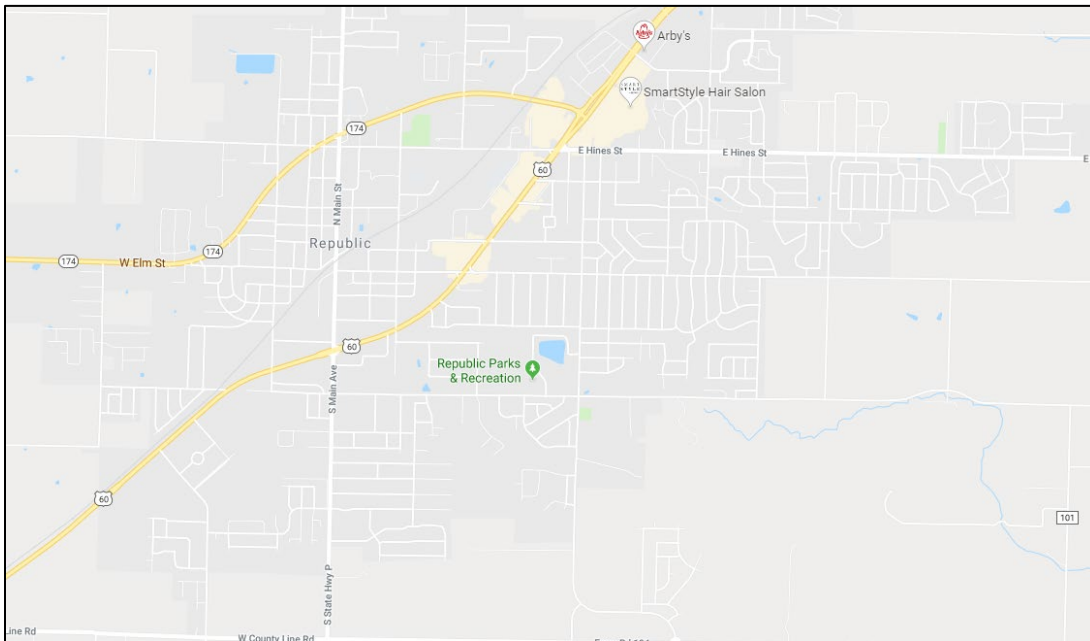
2- PLANNING AREA PROFILES AND CAPABILITIES

2.2.5 City of Republic

The City of Republic is located in the southwest portion of Greene County, about 13 miles from Springfield. Republic has seen rapid growth over the last few decades. The City is the second largest community in Greene County. In 2000, the population was about 8,400 residents. In 2017, the population jumped to over 15,800 residents. The City of Republic is a constitutional charter city pursuant to Article VI of the Missouri Constitution. The city government is led by a City Council of 8 members who are elected from 4 wards. Two members are elected from each ward. The Mayor, is elected and appoints, with the consent of the City Council, a City Administrator to handle all day-to-day operations of the city. The Mayor and Council Members serve two year terms, with four Council Members being elected each year. The City Council meets on the 1st and 3rd Tuesday of each month at 6:30pm. The City of Republic has many department and boards including:

- Board of Adjustments
- Communications and Public Information
- Community Development
- Emergency Management
- Finance
- Fire
- Human Resources
- Municipal Court
- Parks and Recreation
- Planning and Zoning Commission
- Police
- Public Works

The City of Republic has many parks for the residents of the city. There are nine parks that are located throughout the city. J.R. Martin Park is the largest and is located by the Republic Schools. J.R. Martin Park hosts several events throughout the year including one of the largest events for the Fourth of July.



2- PLANNING AREA PROFILES AND CAPABILITIES

POPULATION AND DEMOGRAPHICS

General Population Characteristics

CHARACTERISTIC	NUMBER
Total Population	15,890
Male Population	7,885
Female Population	8,005
Median Age (Years)	30.6

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Race

RACE	NUMBER
White	15,038
Black or African American	20
American Indian and Alaska Native	55
Asian	272
Native Hawaiian and Other Pacific Islander	0
Other Race	48
Two or More Races	457

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Housing Information

HOUSING OCCUPANCY	NUMBER
Total Housing Units	6,901
Occupied Housing Units	5,844
Vacant Housing Units	247
Owned Occupied Housing Units	3,717
Renter Occupied Housing Units	2,127

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

MITIGATION INITIATIVES

Outdoor Warning Sirens

Republic currently has 13 outdoor warning devices within the City of Republic to alert the citizen of impending hazards. Outdoor warning devices have evolved over the last decades from mechanical air horns to battery backed up mechanical sirens to the second generation all hazards electronic warning devices. This evolution has allowed the Republic Office of Emergency Management to provide voice direction to the densely population areas of the City. These devices report their operational readiness continuously to the Emergency Operations Center (EOC) through two-way communication. They can be physically activated from the EOC, Fire Engine, and three mobile command vehicles.

2- PLANNING AREA PROFILES AND CAPABILITIES

Civic Ready subscription is available to all citizens by City of Republic thru Web-page provider; Voice-over outdoor warning devices are available at major green spaces.

Emergency Services

The City of Republic has a full time police department that is made up of a Communications, Criminal Investigations, Records and Patrol, and Auxiliary Divisions. The patrol structure is comprised of four squads of officers; each squad is supervised by a Sergeant and a Corporal. The Division duties include community policing, the protection of life and property, traffic safety and enforcement, and the apprehension of the criminal element while enforcing all local, state and federal laws.

The City of Republic also has a full time fire district that provides 24/7 services to the citizens of Republic. For more information about the fire protection district, please see their individual profile.

Advance Life Support (ALS) ambulance service is provided to the City of Republic by CoxHealth Systems and is served by a local ambulance base located at the West City Limits and staffed 24 hours a day by state-licensed Paramedics and Emergency Medical Technicians.

The City of Republic also has an Emergency Management Department which is a division of the Republic Fire Protection District. The office consists of a Director and nine part-time employees, which provide National Weather Service storm spotting and reporting, National Incident Management Systems compliance, and Emergency Operations Plan maintenance and exercises. They also work with the Springfield-Greene County Office of Emergency Management.

Other Mitigation Initiatives for the City of Republic include storm water management with ongoing Flood Plain Management and COOP Planning.

National Flood Insurance Program (NFIP)

Compliance of NFIP is with the Community Development Office of the City of Republic. New Construction is reviewed through the Technical Review Team including the storm water needs. The compliance officer is responsible for determining non-compliance reporting it back to the Community Development Office for verification and prosecution if necessary.

Utilities

The City of Republic has a Public Works Department which has many different divisions including the following: Animal Control, Street Division, Wastewater and Water. The City of Republic provides their own water and sewer services to the citizens of Republic. Electric Service can be provided by the following companies: City Utilities of Springfield, Empire Electric and Ozark Electric. Gas can be provided by either Spire or City Utilities of Springfield. Internet and Cable can be provided by AT&T, Total Wireless, Cable America, and many other providers.

Historic Significant Disaster Events

The city of Republic and surrounding area was impacted by a nationally declared disaster in January of 2007. The Ice Storm preempted all electrical power within the City for 30 hours, and complete restoration of power was not completed for five days. During this period City offices conducted business from the EOC located within the Police Department.

The City of Republic had damage from a tornado in January of 2008. The path of the damage was along the north central portion of the city including Lyon Elementary Campus. There were no injuries or deaths from the event but 1 business was damaged and reopened in 30 days. Other damages included 6 destroyed homes, moderate damage to an automotive repair shop, a roof was removed from the west wing of Lyon Elementary.

2- PLANNING AREA PROFILES AND CAPABILITIES

VULNERABILITY

The City of Republic has a busy railroad that runs through the City. The BNSF railway tracks are important route linking the ports of California with the southeastern U.S. Republic also has older homes. Of the 4,489 detached homes, 3,245 homes were built in 1980 or earlier. Republic also has 82 mobile homes and approximately 1,100 apartments within the City.

CAPABILITY ASSESSMENT

Facilities

The City of Republic has a City Hall which is the central location for most of the departments for the City.

The City of Republic has two fire stations with living quarters and assembly rooms. The Republic Police Department has their own facility with holding capabilities as well. The Police Department also houses the City of Republic Emergency Operations Center (EOC), located in the basement.

Building Codes

The City of Republic has a Community Development Department which has six full time employees, including the Community Development Director, Administrative Assistant, Principal Planner, Senior Planner, Building Official and the Code Compliance Official. The goal of this department is to serve the citizens of Republic through pursuance, guidance and assistance in the development of the City. This is accomplished through marketing and strategic planning accompanied by oversight and enforcement of the City's Building Codes, Zoning Codes and Subdivision Regulations.

Planning and Zoning

The City of Republic has a Planning and Zoning Commission consists of seven citizens appointed by the Mayor with the majority approval of the City Council. All Members of the Commission shall be residents of the City and membership of the Commission shall consist of at least one representative from each Ward within the City. Members of the Commission shall serve a four-year term. The Planning and Zoning Commission meets the second Monday of every month to review and make recommendations to the City Council for approval or denial of Rezoning cases, Preliminary Plats, Special Use Permits, and Amendments to the Zoning Regulations and the Subdivision Regulations. The Commission's primary responsibility is to create, adopt and amend a Comprehensive Plan to guide the development of the City.

Back-Up Systems

Internal Communication has on site servers with Cloud based back-up. The City would like to have a second server set up in remote location to provide internal communication and storage. Key Waste-water infrastructure such as lift stations has emergency generators to provide power including the waste water facility itself. The Police Department, EOC, and server room has UPS plus and emergency generator to provide power with minimum of 30 hour fuel storage. All deep water wells have emergency power.

2 - PLANNING AREA PROFILES AND CAPABILITIES

CITY OF REPUBLIC CAPABILITIES

CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
PLANNING CAPABILITIES	
Comprehensive Plan	Yes - 10/31/2019
Builder's Plan	
Capital Improvement Plan	Yes - Updated Annually
County Emergency Plan	Yes
County Recovery Plan	Yes
County Mitigation Plan	Yes
Economic Development Plan	Yes - Community Development
Transportation Plan	Yes - In Conjunction with OTO
Land-use Plan	
Flood Mitigation Assistance (FMA) Plan	
Watershed Plan	
Fire wise or other fire mitigation plan	FD Education Outreach- Annual Review and Evaluations
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes - Mitigation Plan
POLICIES/ORDINANCE	
Zoning Ordinance	Yes - Community Development
Building Code	Yes - 2018
Floodplain Ordinance	Yes
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Seismic Construction Ordinance	Yes
Storm Water Ordinance	Yes - Original (2004) Annual Evaluation
Drainage Ordinance	Yes - Original (2004) Annual Evaluation
CAPABILITY	
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	Yes
Landscape Ordinance	Yes
Debris Management Plan	Yes - Incorporated into EOP
PROGRAM	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes - 12/18-2010
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	
National Weather Service (NWS) Storm Ready	Yes - Original 2003 Renewed 2018
Building Code Effectiveness Grading (BCEGs)	5/4
ISO Fire Rating	2
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes - Fire Safety, Household Preparedness
Property Acquisition	Unknown
Planning/Zoning Boards	Yes
Stream Maintenance Program	
Tree Trimming Program	
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes
STUDIES/REPORTS/MAPS	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	

2 - PLANNING AREA PROFILES AND CAPABILITIES

Hazard Analysis/Risk Assessment (Local)	Yes - Mitigation Plan
Hazard Analysis/Risk Assessment (County)	Yes - Mitigation Plan
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes
Evacuation Route Map	unknown
Critical Facilities Inventory	Yes
Vulnerable Population Inventory	No
Land Use Map	Yes
STAFF/DEPARTMENT	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Building Code Official	Yes - Full Time
Building Inspector	Yes - Full Time
Mapping Specialist (GIS)	Yes - Full Time
Engineer	Yes - Full Time
Development Planner	Yes - Full Time
Public Works Official	Yes - Full Time
Emergency Management Coordinator	Yes - Full Time
NFIP Floodplain Administrator	Yes - Full Time
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Contracted
Transportation Department	Yes - Full Time
Economic Development Department	Yes - Full Time
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	No
Historic Preservation	No
NON-GOVERNMENTAL ORGANIZATIONS (NGOS)	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
American Red Cross	Yes - Springfield
Salvation Army	Yes - Springfield
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes
LOCAL FUNDING AVAILABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	Yes

Source: Data Collection Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.2.6 City of Springfield

Springfield is the county seat of Greene County and is the third largest city in the State of Missouri. Springfield has seen consistent growth of the years. In 2000, the population of Springfield was approximately 151,000 residents. In 2017, Springfield had about 165,785 residents. The City of Springfield is governed by a non-partisan City Council utilizing a council/manager form of government consisting of a nine-member City Council. City Council sets the policy and direction of the city while the city manager oversees the day-to-day operations of the organizations. By Charter, the city has eight council members who are each elected for a four-year term on a non-partisan basis, and a mayor who is elected for a two-year term. The presiding officer at council meetings is the mayor. Council meetings take place every other Monday starting at 6:30 p.m. There is also lunch meetings each Tuesday which begins at noon. Council meetings can be seen on Mediacom channels 15.1 and 80 and AT&T UVerse Channel 99, or viewed online. The City Manager is appointed by the council and serves as the chief administrative officer of the organization. The City of Springfield has many departments which include the following:

- Airport
- Art Museum
- Attorney
- Building Development
- City Managers
- City Clerk
- Economic Development
- 9-1-1 Emergency Communications
- Emergency Management
- Environmental Services
- Finance
- Fire
- Hazelwood Cemetery
- Health
- Human Resources
- Information Systems
- Licensing
- Municipal Court
- Parks and Recreation
- Planning and Development
- Police
- Public Information
- Public Works
- Purchasing
- Workforce Development



2- PLANNING AREA PROFILES AND CAPABILITIES

With the City of Springfield being the largest city in Greene County, many of the jurisdictions within Greene County and surrounding counties commute to the city to partake in activities and programs. The City of Springfield has many parks that are listed in the Risk Assessment Folder.

POPULATION AND DEMOGRAPHICS

General Population Characteristics

CHARACTERISTIC	NUMBER
Total Population	165,785
Male Population	79,928
Female Population	85,857
Median Age (Years)	32.8

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Race

RACE	NUMBER
White	146,288
Black or African American	7,514
American Indian and Alaska Native	879
Asian	3,338
Native Hawaiian and Other Pacific Islander	218
Other Race	1,860
Two or More Races	5,688

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Housing Information

HOUSING OCCUPANCY	NUMBER
Total Housing Units	81,045
Occupied Housing Units	72,765
Vacant Housing Units	8,280
Owned Occupied Housing Units	32,671
Renter Occupied Housing Units	40,094

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

MITIGATION INITIATIVES

Outdoor Warning Systems

The City of Springfield currently has 52 outdoor warning sirens located throughout the city. Springfield Greene-County Office of Emergency Management activates Springfield's warning sirens. The secondary activation center is the Emergency Communications Center for the City of Springfield. Springfield Public Works Department maintains the sirens and keeps them running properly. Testing is done on all Greene County Siren on the second Wednesday of every month at 10am. Testing will be canceled if weather doesn't permit. The sirens are activated when:

- National Weather Service (NWS) issues a tornado warning with the jurisdiction in the warned polygon and in the path of the storm.
- A trained spotter reports rotation, funnel cloud, or tornado in the jurisdiction; may include storms tracking towards the jurisdiction from Greene County or adjacent counties

2 - PLANNING AREA PROFILES AND CAPABILITIES

- NWS issues a thunderstorm warning producing life threatening winds approximately 75 mph or greater
- NWS issues a thunderstorm warning producing life threatening winds approximately 75 mph or greater
- Maintenance is needed

EMERGENCY SERVICES

Springfield Police Department

The City of Springfield has a large police department consisting of 362 sworn officers and 81.5 civilian employees. The department serves a population of 167,379 located in 82.5 square miles. The department is organized into two bureaus. The department has many different departments including patrol, criminal investigation, traffic units, specialized units and many other services. The Springfield Police Department has many stations and substations located throughout the city limits. They department also contracts with universities to protect and serve the large universities in Springfield.

Springfield Police Department Locations

FACILITY	LOCATION
Headquarters	321 E. Chestnut Expressway
South District Station	2620 W. Battlefield Rd.
MSU Sub-Station	901 S. National Ave.

Springfield Fire Department

The City of Springfield has a large fire protection district that serves the citizens of Springfield. The Fire Protection District has 12 stations strategically placed throughout the city. The department provides numerous services including fire suppression, water rescue, hazmat response, medical service, fire prevention, technical rescue, investigations and inspections. The department serves over 82 square miles with a full time staff of more than 220 dedicated professionals. The department is accredited with an ISO 2 rating.

Springfield Fire Department Locations

FACILITY NAME	ADDRESS
Springfield Fire Department	830 N. Boonville Ave.
Station 1	720 E. Grand St.
Station 2	608 W. Commercial St.
Station 3	205 N. Patterson Ave.
Station 4	2423 N. Delaware St.
Station 5	2750 W. Kearney St.
Station 6	2620 W. Battlefield Rd.
Station 7	2129 E. Sunshine St.
Station 8	1405 S. Scenic Ave.
Station 9	450 W. Walnut Lawn St.
Station 10	2245 E. Galloway St.
Station 11	4940 S. Fremont Ave.
Station 12	2455 S. Blackman Rd.

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Springfield Health Care Facilities

HOSPITAL NAME	LOCATION	ABOUT
CoxHealth	Cox South- 3801 S. National Ave. Springfield	CoxHealth has six hospitals, more than 80 physician clinics, five emergency departments, a Level 1 trauma center, walk-in clinics and urgent care facilities, including a 24/7 urgent care in Springfield.
	Cox North-1423 N. Jefferson Ave. Springfield	
Mercy Hospital Springfield	1235 E. Cherokee St. Springfield	Mercy Springfield has an Emergency Department, urgent care, air ambulance, etc.

MITIGATION INITIATIVES

The main mitigation programs is in the area of floodplain management (regulations updated 2002) and participation in the National Flood Insurance Program (NFIP). Floodplain Management programs are based on policies to protect the general welfare and health of county residents. The programs are designed to safeguard health, safety and property in times of flood; restrict avoidable increases in flood size; mitigate losses at the time of construction of public facilities; and protect the public from buying land unsuited for the intended use due to flood hazards.

The Federal Clean Water Act requires certification for any construction, placement, and disposal of fill material or earth movement within a floodplain or body of water. After serious flooding in 1993, floodplain regulations were revamped and continue to be scrutinized.

The City of Springfield participates in the National Flood Insurance Program. The city's floodplain ordinance requires all structures in floodplains to be placed 12 inches above the Base Flood Elevation (BFE) or 100-year water surface elevation as established by FEMA. This ordinance also restricts development in floodways to those developments that will cause no increase in the BFE. This ordinance has had a positive effect on storm water quality, erosion, and pollution runoff into streams and tributaries by causing buffer strips to develop along major waterways. Please see Section 3.6 for more information on Springfield's NFIP participation.

The county and city floodplain regulations are aimed at restricting new development in floodplains. Following the 1993 floods, the county and city instituted a property acquisition program. This program is funded through FEMA's Hazard Mitigation Grant Program. 120 properties (110 homes, 10 vacant properties) have been purchased in Springfield. The Springfield properties have been acquired with a combination of grants and Storm water Level Property Tax monies, totaling \$9 million since 1993.

Storm water regulations are designed to minimize the harmful effects of erosion, sedimentation, and flooding from storm water runoff. This is accomplished by measures to mitigate erosion both during and after construction, the detention and controlled discharge of differential run-off from development, and a well-designed storm water conveyance system.

2- PLANNING AREA PROFILES AND CAPABILITIES

MEDIA RELATIONS

Newspapers and Magazines

The Springfield News-Leader is the official newspaper of Springfield. Additionally, the Springfield Business Journal provides in depth coverage of business news. Both provide adequate coverage of planning and mitigation issues. There are a number of other newspapers and magazines owned by colleges or other private organizations that cover local special topics.

Springfield Area Newspapers and Magazines:

Source	Location
417 Magazine	Springfield
Big Sports	Springfield
SGF Neighborhood News	Springfield
Community Free Press	Springfield
Daily Events	Springfield
Springfield Business Journal	Springfield
Springfield News-Leader	Springfield
Drury Mirror	Drury University
The Standard	Missouri State University

Springfield Radio Stations

Springfield is covered by 28 radio stations. These stations occasionally cover local issues in depth. The Springfield broadcast media provide weather reports and warning that detail specific cities and counties at risk. Most radio stations listed also cover all jurisdictions with Greene County. The complete list of media outlets is included below:

FM Frequency

KXUS 97.3 FM	KXTR 101.3 FM	KSGF 104.1
KTTS 94.7 FM	KWTO 93.3 FM	KWFC 89.1
KQRA 102.1 FM	KGBX 105.9 FM	KKLH 104.7 FM
KSWF 100.5 FM	KSGF104.1 FM	KBFL 96.9 FM
KSCV 90.1 FM	KSMU 91.1 FM	KSPW 96.5 FM
KOMG 105.1 FM	KWTO 98.7 FM	KRVI 106.7 FM
KTOZ 95.5 FM	KWND 88.3 FM	KOSP 92.9
KADI 99.5		

AM Frequency

KWTO 560 AM	KBFL1060 AM	KSGF 1260 AM
KICK 1340 AM	KGMV 1400 AM	KRZD 1550 AM

2- PLANNING AREA PROFILES AND CAPABILITIES

Cable Television

There are many different cable providers that give Springfield-Greene County residents access to cable. Some companies include: Suddenlink, Mediacom, AT&T, Spring Net and many more. Springfield-Greene County Emergency Communication Center has access to the cable-interrupt system. Below are the following local television stations that can provide information during emergencies.

KYTV, NBC	KOLR, CBS	KRBK, FOX
PBS	KSPR, ABC	KOZK, Ozark Public Broadcasting
KSFX	City View Local Government News	

ECONOMY

Springfield’s economy is based mainly on health care, manufacturing, retail, education and tourism. The City of Springfield has 14,009 amount of businesses licensed as of August 2, 2019. A business can be licensed under over 200 different categories including:

- Restaurants
- Service Stations
- Apartments
- Loan Companies
- Theaters
- Auto Dealers
- Manufactures
- Retail Merchants
- Beauty Shops
- Contractors
- Auto Repair

Tourism

Tourism has become a major industry in Southwest Missouri. Springfield offers more than 6,000 hotel rooms, over 800 restaurants, shopping facilities, attractions, cultural opportunities, and specially events year-round. Springfield is within a 100-mile radius of more than 7,500 miles of shoreline, along the accessible lakes, floatable streams and rivers. Excellent hunting, camping and fishing are found throughout the area, amidst rolling hills and clear spring-fed streams. Favorite sites include Table Rock Lake and Lake Taneycomo noted for their clean, uncrowded shores and hidden inlets. Bull Shoals Lake offers not only excellent fishing, but is known as one of the best scuba diving lakes in the region. The Branson Area, 35 miles south of Springfield, receives national attention as America’s Live Music Show Capital, U.S.A. Branson draws approximately 7 million people to the area each year.

Springfield is also a one-of-a-kind city for meetings and convention. Springfield can accommodate groups of up to 12,000 and has been consistently ranked by the “Corporate Travel Index” as one of the least expensive convention cities in the nation. Easy access via major highways interstates, and the Springfield-Branson National Airport allows Springfield to be a prime meeting and convention destination.

One of Springfield biggest tourist attractions is Jonny Morris’s Bass Pro Shops. The main location is located on Sunshine Street in Springfield. In September of 2017, Bass Pro Shops reopened Wonders of Wildlife next to the famous Bass Pro Shops. The attraction has brought thousands of tourists to the Springfield area over the last two years. The attraction also won “2017 Best New Attraction” in the United States.



2- PLANNING AREA PROFILES AND CAPABILITIES

Employment

The economy in Springfield is diverse, though more heavily dependent on the services and trade sectors than the state as a whole. The table below provides a profile of employment in various economic segments in Springfield.

INDUSTRY	NUMBER OF EMPLOYEES	PERCENTAGE
Agriculture, forestry, fishing and hunting, and mining	764	.06%
Construction	7,098	5.1%
Manufacturing	11,724	8.5%
Wholesale Trade	4,497	3.3%
Retail Trade	18,523	13.4%
Transportation, Warehousing, and Utilities	6,772	4.9%
Information	3,138	2.3%
Finance and Insurance, real estate, rental and leasing	8,945	6.5%
Professional, Scientific, management, administrative and waste management services	13,945	10.1%
Educational Services, health care and social assistance	36,478	26.4%
Arts, entertainment, recreation, accommodation and food service	14,341	10.4%
Other services, except public administration	7,625	5.5%
Public administration	4,233	3.1%

Source: U.S. Census Bureau, 2013-2017 5-year estimates

Major Employers-Springfield

COMPANY NAME	INDUSTRY	REGION	COMPANY-WIDE
CoxHealth	Healthcare	11,669	11,669
Mercy Hospital Springfield	Healthcare	10,950	41,585
Walmart, Inc.	Retail	5,372	2,300,000
Springfield Public Schools	Education	4,100	4,100
State of Missouri	Government	4,018	51,399
Bass Pro Shops	Retail/Manufacturing	3,341	32,915
United States Government	Government	3,005	2,811,000
Missouri State University	Education	2,874	2,998
Jack Henry and Associates, Inc.	Software Development	2,174	6,347
O'Reilly Auto Parts (HQ)	Retail/Manufacturing	2,042	61,312

Source: Springfield Chamber of Commerce

2- PLANNING AREA PROFILES AND CAPABILITIES

Large Recreation Centers

Mediacom Ice Park



Springfield's downtown has been changing over the last five years to attract more citizens to the businesses, shops and recreational facilities downtown. Jordan Valley Park is the highlight of the Downtown Revitalization Program. The park is designed to mix open space, buildings, water, meadows, playgrounds and plazas to create a place for recreation and revitalization. The park encompasses 250 acres over many city blocks and includes the Jordan Valley Ice Park. The Ice Park provides a place for recreational and competitive ice skating. Citizens may enjoy open ice skating and figuring skating; they can even sign up for a hockey team.

The Ice Park is home to the Missouri State University (MSU) Hockey Bears, the Springfield Youth Hockey Association, the Jordan Valley Figure Skating Club and the Springfield Wolfpack, an indoor football team. The facility can also be rented out for parties, group functions or special events.

Springfield Exposition Center

The Springfield Exposition Center is an 112,000 square foot conference facility located in downtown Springfield. The Exposition Center hosts trade shows, conventions, concerts, sporting events and many other activities throughout the year.



Downtown Springfield

Downtown Springfield has several parking options, including a 900 vehicle multi-level car park with street level retail space. In total, there are 6,000 parking spaces downtown, as demonstrated on the map on the following page. Downtown Springfield holds multiple events throughout the year including The Birthplace of Route 66 Festival which draws over 55,000 people to the area.

2- PLANNING AREA PROFILES AND CAPABILITIES

Downtown Springfield Map and Parking



Creamery Arts Center

The Creamery Arts Center is a city owned building located in Jordan Valley Park. The building is deigned to be a community gathering place and is home to many fine arts organizations including: the Springfield regional Arts Council, Springfield Ballet, Springfield Regional Opera and the Springfield Symphony.

John Q. Hammons (JQH) Arena

The arena is located on Missouri State's Campus and is home to the Missouri State Bears Basketball teams. The arena is also used for concerts, church events, graduations, bull riding and many other events throughout the year. The arena sits 11,000 people.



2- PLANNING AREA PROFILES AND CAPABILITIES



Founders Park

Founders Park is located on a 0.7 acre site at the corner of Jefferson Avenue and Water Street. The site is in the area of the original tree blaze made by John Polk Campbell in 1829, where the development of Springfield began. The site has previously served as the location for a stone quarry, a blacksmith shop, the Herman-Stanford Horse Collar Factory, the Silsby Stove and Hardware Company, a lumberyard, and a railroad right of way. Now, Founders Park is home to a 250 seat Amphitheater with an 18' by 30' stage.

Hammons Field

Hammons Field opened in April of 2004 and is home to the Springfield Cardinals, a Class AA minor leagues baseball team, and the Missouri State University Baseball Bears. The 8,056 seat stadium features 28 luxury box suites with kitchenettes, along with a wide range of concessions. Hammons Field also features hillside seating for those looking for reduced ticket prices and an authentic baseball experience. The hillside seating allows families to spread out a blanket and watch the games from a grassy knoll overlooking the park. The park rivals any minor leagues stadium in the country, containing features like a field drainage system that can withstand monsoon rains and be ready to play on within 30 to 45 minutes, and the largest video scoreboard of any minor leagues park in the United States.



2- PLANNING AREA PROFILES AND CAPABILITIES

Ozark Empire Fairgrounds

The Ozark Empire Fair started in the early 1900's as a traveling display of area crafts and handwork. The Fair had no permanent home but was held in various locations within the Springfield city limits. For the last part of the 1920's and early 1930's, a location around what is now Pickwick and Grand Streets was used. The need for a permanent location was evident, and a group of local businessmen, headed by Louis Reps, organized to locate and establish a permanent headquarters. This research started in the early 1930's. A suitable location was found adjacent to the Zoo grounds and encompassing the city's racetrack and grandstand. This was ideal because of the large amount of acreage and beautiful tree-laden hills. The racetrack, although somewhat primitive, was suitable for the grandstand spectacles that were planned for Fairs to come. The land was already owned by the Springfield Park Department and, as soon as an approval was given by that organization, the formational committee proposed a ¼-mill tax levy that would go for the improvements needed to the grounds. An issuance of stocks was ordered, and stock certificates were sold to investors at ten dollars per share. This, along with many special gifts, provided the working capital for the first year of the Fair.



The Ozark Empire Fairgrounds and Event Center's E*Plex encompasses a total of 85,100 square feet of clear-span exhibit space for year round use, plus roofed, 8,000 seat Grandstand for outdoor events. Three heated and air-conditioned exhibition halls connected by the common 2,000 square foot Darr Family Lobby. The East, West, and Center halls may be combined for one event, or used separately. The E*Plex exhibit halls are suitable for all types of consumer and private trades shows and exhibitions, as well as receptions, meetings, seminars, and training sessions.

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The East and West Halls have easy cargo access through large overhead drive-in doors and loading docks for efficient move in/move out. Parking for 4,000 vehicles is located on the Fairgrounds adjacent to the E*Plex. The East and West Halls each measure 150' x 250' and contain 33,000 net usable square feet of clear-span space. Each has its own restrooms, water fountains, concession stand, seminar room, and small office. Approximately 170 10x10 booths can fit in each hall. The ceiling is 28' high at center; height at side wall is 18', with 14' clearance at exposed sidewall columns.

Designed for flexibility, Center Hall can be open to full size, with accommodate of forty-two 10' by 10' booths for trades shows, 4000 seating at banquets, or 1,000 seating theater-style. Center Hall may also be divided into as many as six smaller rooms with folding partition walls. The walls and the upper plenum are designed to minimize sound interference from concurrent events and have controllable lighting. Center hall has its own restrooms. The floors are sealed concrete.

Every year for a ten-day stretch in late July to early August, the Ozark Empire Fairgrounds hosts the Ozarks Empire Fair. This event includes them park rides, games, food vendors, entertainment and concerts.

2- PLANNING AREA PROFILES AND CAPABILITIES

Public Involvement

Springfield has many events throughout the year to help educate and make Springfield-Greene County Residents weather aware. Two very popular events that take place annually are the Severe Weather Expo that happens at the Battlefield Mall typically at the beginning of the year. This expo is designed to better equip southwest Missouri families with necessary tools to prepare for severe weather. Another large annual event that takes place is the Safe and Sound Expo that takes place in the spring at the Ozark Empire Fair Ground. This event helps families live healthy, safer lives. This event covers topics from severe weather awareness and preparedness to bicycle safety and health screenings. Safe Kids Springfield is an organization that works with kids that provides a variety of safety programs to meet the needs of the community. From classroom education on water safety, parent trainings, bike safety, car seat/seat belt safety, fire safety, home safety and many other topics. Springfield strives to make Greene County residents healthy, safe and prepared.

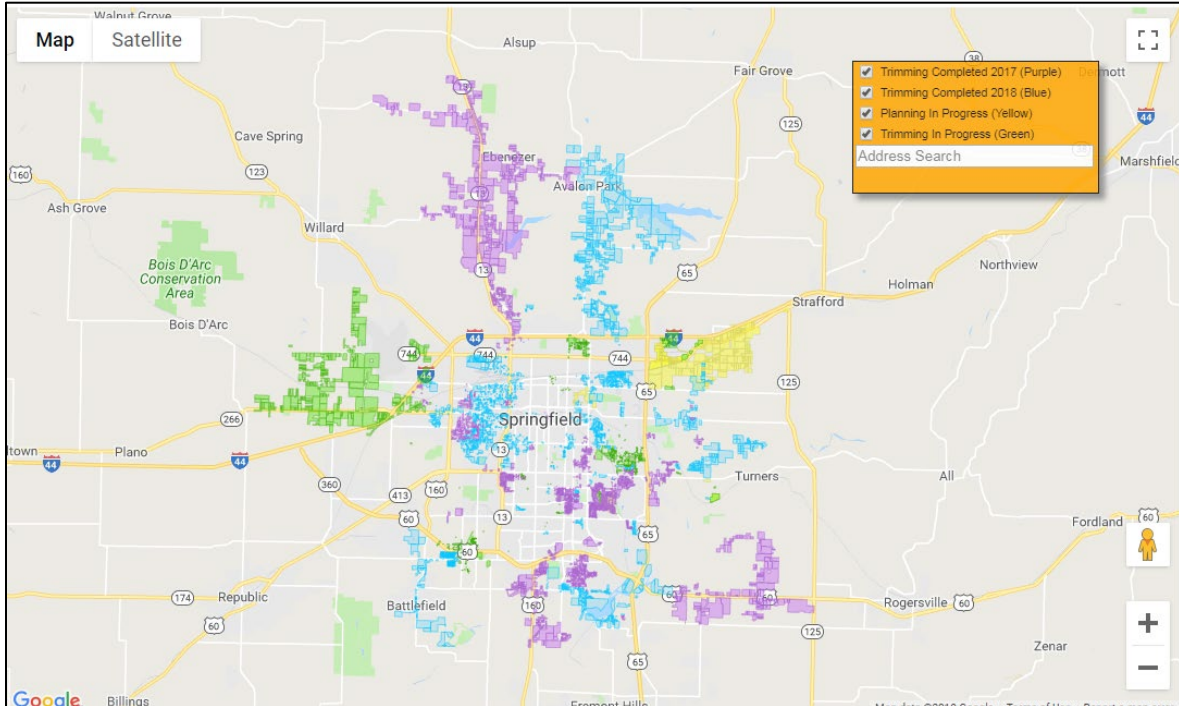
Public Programs

The Springfield Fire Department has many programs to education the public for different emergencies. One program offered is Stop the Bleed, which is a program that teaches people what to do in a mass causality event. They also offer CPR and AED training and response. The fire department offers other free education including fire extinguisher training, fire safety presentations, home safety surveys, overcrowding prevention and many more.

Tree Trimming

City Utilities trims trees in the Springfield-Greene County Area. Below is a map of where past and future tree trimming will take place.

City Utilities' Tree Trimming Map



2 - PLANNING AREA PROFILES AND CAPABILITIES

Utilities

City Utilities provides electric and gas for all citizens within the city limits. City Utilities serves 320 square miles and approximately 229,000 residents. City Utilities also employ approximately 940 full time employees.

Electricity

City Utilities supplies electric to its customers in the city limits of Springfield and the urban service area. Currently, City Utilities maintains two fossil fuel power-generating plants with a combined capacity of 758 MW. They also maintain three combustion turbine power-generating stations with a combined capacity of 359 MW. CU also maintains the Noble Hill Landfill Renewable energy center and has long-term purchased power sources including the CU Solar Farm (5 MW), and Smoky Hills Wind Energy (50 MW).

As Springfield grows, the demand for electricity also grows. In 1980, City Utilities supplied electricity to 60,000 customers. Today, that number is over 200,000 customers.

Natural Gas

City Utilities, in conjunction with their natural gas supplier, provide this service to the population within the corporate limits of the City of Springfield. City Utilities also provides natural gas to residents and businesses in the urban service areas located just outside the corporate city limits.

FACILITY NAME	ADDRESS
Blackman Water Treatment Plant	2601 S. Blackman Rd.
TecHouse Complex	2655 S. Blackman Rd.
Electric Operations center Complex	828 N. Price Ln.
Fellows Lake Dam and Reservoir	Farm Road 66
Bus Transfer Facility	McDaniel and Patton
Transit Operations Complex	1505 N. Boonville St.
Fulbright Water Treatment Plant	2902 N. Farmer Rd.
Gas and Water Operations	1321 W. Calhoun
James River Power Station	5701 S. Kissick Rd.
Lake Springfield	Kissick Rd.
Main Avenue Turbine	400 N. Main St.
McDaniel Lake Dam and Reservoir	Farm Road 45
McCartney Power Station	5701 East Farm Road 112
Main Office Complex	301 E. Central St.
Meter and Service Reader Complex	2115 W. Grand St.
Southwest Power Station	5050 Farm Road 164
Valley Water Mill Road Dam and Reservoir	Farm Road 102 and Farm Road 171

Waste Facilities

FACILITY NAME	ADDRESS
Computer Recycling Center	1434 N. National Ave.
Springfield Recycling Center	731 N. Franklin St.
Springfield Recycling Center	3020 S. Lone Pine Ave.
Springfield Recycling Center	2525 W. College St.
Springfield Recycling Center	1831W. Kearney St.

2 - PLANNING AREA PROFILES AND CAPABILITIES

Stormwater Engineering

The Stormwater Engineering Division of the Department of Public Works and the Water Quality Division of the Department of Environmental Services work together to provide programs, projects, and services to meet the stormwater management needs of the community and protect the quality of our streams, rivers, and lakes. In April of 2018, The City of Springfield posted a Flood Control and Water Quality Protection Manual which goes into great detail about stormwater design for Springfield. That plan is located on the City of Springfield’s website.

Historic Properties and Districts/Archaeological Sites

Springfield was founded in 1835 by John Polk Campbell, and is named for the spring and field on Mr. Campbell’s property. The town was officially established in 1838. In 1858, Springfield received national attention when the City became a stop on the Butterfield Overland Mail, a stagecoach line from Tipton, Missouri, to San Francisco. After the Battle of Wilson Creek in August of 1861, and Zagonyi’s Charge in October of 1861, the streets of Springfield were again embroiled in a conflict during the Battle of Springfield in 1863. The first train of the Atlantic-Pacific Railway, which later became the St. Louis - San Francisco Railway, or "Frisco", arrived in 1870, and has added much to the economic growth of the area. Please see Table 3.9 for a full list of Historical sites for Greene County.

The Pearson Creek Archeological District also known as the Pierson Creek Mines, Phelps Digging or Schoolcraft’s Camps is located in a restricted access area of Springfield.

IDENTIFIED ASSETS

The quality of life and economy of Springfield is dependent on the ability to effectively move people and goods locally, regionally nationally and internationally. Listed below are the major roadways within the City of Springfield. Many residents use highways and roadways that run throughout the county (e.g. Interstate 44). The following list is specific to roadways that are located in Springfield.

Major Springfield Corridors

STREETS	LOCATION
Kearney Street	East/West corridor from east of U.S. Highway 65 to the Springfield/Branson Regional Airport
Division Street	East/West corridor from east of U.S. Highway 65, West into the county (State Highway EE)
Chestnut Expressway	East/West corridor from east of U.S. Highway 65, West into the County (State Highway 266)
Sunshine Street	East/West corridor from U.S. Highway 65, turns into State highway 13, West into the county.
Battlefield Road	East/West corridor from just east of U.S. Highway 65, to West Bypass
Republic Road	East/West corridor form approximately Glenstone Avenue, West into the county (State Highway M)
National Street	North/South corridor from just North of I-44, south into the county
Glenstone	North/South corridor from North of I-44, to the James River Freeway
Campbell Street	North/South corridor form I-44, to South into the county (U.S. Highway 160)
Kansas Expressway	North/South corridor from North of I-44, to Republic Road
West Bypass	North/South Corridor from North of I-44, turns into State Highway FF

The primary mode of transportation in Springfield is the private automobile. Over the past several decades, the growth in the number of vehicles has outpaced the population.

2- PLANNING AREA PROFILES AND CAPABILITIES

The goals for planning area streets and highways is to provide an adequate system of thoroughfares that will ensure logical development of the community, safe and efficient movement of people and goods, and an economical expenditure of public funds.

Airports

The Springfield-Branson National Airport serves as the largest airport in Southwest Missouri. In May of 2009, the airport moved from the terminal accessed via Kearney Street to the new 275,000 square foot modern Midfield Terminal. The Midfield Terminal is located at 2300 Airport Boulevard. The airport was moved to a different location because the Springfield-Branson Regional Airport was landlocked by industrial building and runways.



The Midfield Terminal is a unique building. It is environmentally efficient and designed to minimize heat absorption, loss of air conditioning and heat at entry ways, and uses natural gas, which burns clean, to provide heat. The building is designed to reflect the natural beauty founded in the Ozarks. Porcelain tiles wrap themselves around interior and exterior walls and are inspired by the dramatic rock cut from the landscape along Highway 65.

The Midfield Terminal at the Springfield-Branson National Airport features 10 fully functional gates with the ability to expand to 60 fully functional gates as the need arises. Everything in the terminal is on one level. There are 10 direct destinations provided by four airlines. Passengers can fly directly to Las Vegas, Los Angeles, Phoenix, Denver, Dallas, Chicago, Atlanta, Fort Meyers, Tampa and Orlando. The four airlines available are American, Allegiant, Delta and United Airlines.

The City of Springfield also has a Downtown airport that is privately owned and is open for public use. It covers an area of 160 acres and has one runway.

Freight Trucking

The shipment of freight is critical to the production and selling of goods. In addition to rail and airport facilities, numerous trucking companies make their home in Springfield. The area is in a strategic location for freight shipping by motor carriers. The region's location at the center of the continent means that southwest Missouri is a prime location for motor freight shipping, especially as trade expands on a continental scale due to the North American Free Trade Agreement.

2 - PLANNING AREA PROFILES AND CAPABILITIES

CAPABILITY ASSESSMENT

Vision 20/20

Springfield-Greene County continues to be a vibrant and progressive community that is action oriented with an eye to the future and an understanding of the past. Much of the success in addressing issues and in fostering positive actions that have benefited the overall community is due to the commitment to community-based planning principles.

The beauty of the region, with its forests, hills, and streams, continues to attract people throughout the country as a place to visit and live; and the quality of life in our community provides residents and visitors with a mixture of culture, education, job opportunities, housing, and friendliness. These traits will continue to attract visitors and residents to the area.

The continuing challenge is to maintain, and in some cases improve, the quality of the community present today. Much has been accomplished through the Vision 20/20 process; but goals must be reviewed frequently to assess where Springfield has been and what the future holds.

Affordable Housing

The affordable housing element is a five-year strategic plan for providing affordable housing in Springfield and Greene County. The plan will serve as a guide to be utilized by housing developers, public service providers, neighborhood leaders, and elected officials to direct Springfield and Greene County in ensuring an ample supply of quality affordable housing during the five year planning period.

Strategic Action Plan

- Establish a City-County Office
- Update the Housing Condition Survey for the City and undertake for the County
- Explore National Safe-Haven models for transient housing and identify funding sources
- Support and expand the existing home repair programs to include a greater variety of repair options.
- Encourage and support Universal design to accommodate needs of aging and disabled
- City should enforce health and building codes encouraging rental property owners to recognize problems and take actions.
- Encourage local businesses to develop Employer Assisted Homeownership Programs
- Continue the Landlord Training Program

Center City

Center City Springfield consists of four separate districts: Downtown, Commercial Street, Walnut Street, Government Plaza/Central Street Corridor. The Center City element focuses on development of several distinctive, urban districts oriented around high-quality public spaces that are linked to one another and collectively recognized and organized as Center City. Goals for Center City include:

- Develop Center City as distinct districts
- Orient each district around attractive public streets and spaces
- Define the boundaries and link the Center City Districts
- Strengthen and utilize the Urban District Alliance to guide Center City Development

2- PLANNING AREA PROFILES AND CAPABILITIES

Cultural Planning

The Springfield Regional Cultural Plan is a community-wide blueprint form promoting and developing healthy arts and cultural organizations, a vibrant Center City with rich artistic elements, accessible arts education opportunities, leadership for regional cultural arts development, and an environment to attract, support, and retain articles. The Cultural Plan Steering Committee has been established to provide comprehensive stewardship of the Cultural Plan during its planning, implementation, and evaluation stages. The Steering Committee receives facilitation form the Springfield Regional Arts Council, and organization dedicated to community betterment through leadership, supports, and advocacy on behalf of the arts. Five-Year Plan goals include:

- Continue to foster and build the community of artists and supporters of the arts (i.e. teachers, churches, visual arts organizations, performing arts organizations, and cultural organizations) in the Springfield region to strengthen the region’s presence as an authentic, arts rich community.
- Fund and capitalize arts and cultural development.
- Stabilize and strengthen strong and healthy arts and cultural organizations, not only through funding, but also through collaboration, leadership, training, and communication.
- Provide leadership for regional arts and cultural development, positioning Springfield as the Ozark’s cultural hub.
- Increase resident and visitor interest, participation, and support in and for the arts and cultural events throughout the Springfield region.
- Demonstrate and increase the awareness of the economic impact of the arts as one of the foundations/building blocks of overall economic and community development.
- Contribute to the further creation of a vibrant Center City—as the region’s center—that is enriched by arts and culture.
- Strengthen efforts for lifelong education, accessible to all ages and encompassing partnerships in higher education as well as pre-schools, schools, and the general community, with education provided in and through the arts.

Growth Management and Land Use

The Growth Management Action Plan proposes a five-year strategic plan for the actions found in the Growth Management and Land Use Plan, which is one element of the Springfield-Greene County Comprehensive Plan. This strategic plan will be utilized by citizens and elected officials to direct Springfield and Greene County in Growth Management and Land Use Planning for the next five years.

Strategic Action Plan

- Initiate ordinance change to implement a Unified Development Ordinance for the Urban Service Area. This would make all development regulations in the Urban Service Area and City similar.
- Reserve a sufficiently wide public right-of-way for any additional arterial road by adopting an “official map” of the planned road system. Right-of-way width beyond what may normally be required through dedication at the time of a land subdivision should be acquired by purchase. The necessary width of the future arterial road right-of-way should be determined based upon the standards included in the Vision 20/20 Transportation Plan.
- Use parks and linear public open space to improve quality of life, provide recreation and exercise opportunities, protect sensitive environmental resources, guide and enhance development, and give form to the community.
- The City of Springfield and Greene County should work to establish the future function and design of every foreseeable road in and around Springfield as far in advance as possible. This should be done by

2- PLANNING AREA PROFILES AND CAPABILITIES

adopting and following the Vision 20/20 Transportation Plan, which includes approximate future road alignments, a roadway functional classification plan, and road right-of-way dimensions.

Public Education

Strategic Action Plan

- Create and implement a public awareness plan for Springfield Public Schools with non-tax dollars that will inform the public of the unique learning opportunities available at Springfield Public Schools as well as create a greater awareness of the quality of education that is currently available for students.
- Expand the efforts to offer alternative revenue sources like income tax or sales tax to increase funding and stabilize the revenue stream for Springfield Public Schools.
- Continuation of a Vision 20/20 Education Planning Group that will continue to monitor progress of accepted recommendations and provide valuable feedback on critical issues involving education.
- Support the creation of a Commission on Children to focus on critical early childhood initiatives and issues.
- Create school choice options within the public school district by providing programs and schools that offer unique learning environments and opportunities.
- Continue to place emphasis on academic achievement by reducing or maintaining class sizes at the “desirable” level as recognized in the Missouri School Improvement Plan.

Regional Planning

The Springfield-Greene County area has become a metropolitan region where each community in the region has ties with several or many other communities in the region. Better transportation systems, population growth, jobs, education, and health care facilities have served to create interdependence among the various communities in the region.

Over time, organizations have been formed to address particular issues that go beyond city and county boundaries within the region. These organizations address a number of issues including environmental issues, transportation concerns, economic development, and others. Coordination among agencies with overlapping boundaries or scope can provide opportunities for collaboration and avoid duplication.

Strategic Action Plan

- Develop growth area or urban service area agreements among Springfield, surrounding communities in Greene County, and Nixa, Ozark, and Fremont Hills in Christian County
- Determine where regional organizations can share and/or consolidate resources or responsibilities.
- Coordinate transportation issues on a multi-county level.
- Ensure appropriate labor skill levels throughout the region to meet workforce needs.
- Encourage Open Space and Greenway planning and trail development on a regional scale that provides linkages throughout the region.
- Continue to market the region as a tourist destination and incorporate the concept of eco-tourism to take advantage of our natural features, streams, National Forests, and multitude of outdoor activities and challenges.

2- PLANNING AREA PROFILES AND CAPABILITIES

Transportation

The transportation planning group was tasked with reviewing over 200 individual recommendations contained within the Ozark Transportation Organization's 2001 Long-Range Transportation Plan. Rather than attempt to try and prioritize over 200 recommendations, the group focused their efforts on those that not been completed or were part of an on-going process and were a priority that could be addressed within five years.

The Transportation Plan was broken into 10 components (shown below), each of which hold multiple action plan items. Representative actions are shown below for each of the 10 components.

- Streets and Roadways
- Transit and Paratransit
- Bicycle System
- Pedestrian System
- Transportation System and Demand Management
- Airport
- Trucking
- Intercity Buses
- Railroads
- Fiscal Plan

Water Quality

Citizens of Springfield and Greene County depend upon area lakes and bountiful supplies of high quality groundwater for drinking water. Sixty thousand residents of rural Greene County and all of the cities in the County, except for Springfield, rely on untreated well water as their water supply. Industries depend heavily on groundwater for cooling, irrigation and process water. A study by the U.S. Geological Survey in the late 1980's indicated that are groundwater levels are declining sharply. It is clear that we must take action to conserve both the quantity and quality of our water resources.

Much progress has been made since a 1996 Water Resources Task Force report, however much remains to be done. Our goals and objectives represent a complete, fundamentally sound, and progressive water management program, which, if implemented by Springfield and Greene County, can effectively preserve our water resources for years to come. It has become clear, however, that these goals will not be achieved unless additional funding and resources are provided. Since the first Vision 20/20 plan, we have become more and more aware of the urgency of protecting our water resources. This cannot be achieved without addressing the issue of long term funding. This must become a community priority.

Strategic Action Plan

- Inform and educate community leadership on water issues and needs.
- Build community understanding and support.
- Require water quality BMPs for new developments in all watersheds in the City and County.
- Revise regulations & policies to require consideration of water quality and quantity early in development planning process.
- Adopt improved design criteria for water quality BMPs.
- Amend city sinkhole ordinance to include water quality protection policy BMP standards.
- Continue and enhance existing water quality education and outreach activities.
- Conduct a formal funding study for stormwater and non-point source pollution programs.
- Conduct a study to determine current status of groundwater usage, water table levels, and forecast future trends.
- Develop the Watershed Institute.
- Adopt stream buffering protection ordinance.
- Offer community / voters opportunity to fund a stormwater and non-point source pollution program.

2- PLANNING AREA PROFILES AND CAPABILITIES

- Draft and adopt standards for re-development.
- Expand city and county programs for operation and maintenance for stormwater facilities, as required by state and Federal stormwater permits.
- Develop program for regulating operation and maintenance of septic systems in areas not served by public sewers.
- Develop water management plans for all watersheds in Springfield-Greene County. Establish priorities based upon water quality and quantity issues. Ensure that comprehensive plans, zoning ordinances, subdivision regulations and other city and county plans and regulations are consistent with established water management plans.
- Expand the erosion and sediment control program in the City of Springfield and provide resources for plan review and construction site inspection for enforcement of the city's grading ordinance, similar to the county's program.
- Expand the water quality education and outreach program.

Building Codes

The City of Springfield is a Class 1 city with municipal government provided by the City Charter shall be known as a "council-manager government." Pursuant to the provisions of the Charter and subject only to the limitations imposed by the state constitution and by the Charter, all powers of the city shall be vested in an elective council which shall enact local legislation, adopt budgets, determine policies, and appoint the city manager, who shall execute the laws and administer the government of the city.

The city has all powers of local self-government and home rule, and all powers possible for any city to have under the constitution and laws of Missouri, or those powers which the legislature would be competent to grant; except as prohibited by the constitution or laws of the state, the city may exercise all municipal powers, functions, rights, privileges and immunities of every name and nature whatsoever. Such powers are exercised in the manner prescribed in the Charter, or, if not prescribed, in such manner as may be prescribed by the council.

Springfield has adopted the 2012 version of the International Building code, International Residential code, International Mechanical code, International Plumbing code, International Fuel Gas code, International Private Sewage Disposal code, International Fire code and the 2011 National Electric code.

The City has also put into place, ordinances related to apartment safety, housing, dangerous buildings, and zoning, all of which establish regulations and standards for ensuring the safety and welfare of the occupants.

Planning and Zoning

Springfield is a zoned community where business, industry and residential development are controlled to allow good neighbors to live in a growing community.

Capital Improvement Program Planning

The following strategies, endorsed by the City Council, and recognized as the underlying philosophy of the Capital Improvements Program:

- The City of Springfield's primary responsibility is the protection of life, health, and public safety. Projects which address serious health and safety needs should receive the highest rating.
- Improving the City's existing infrastructure also rates high. Projects which improve the efficiency and effectiveness of the City's basic service systems; and projects which enhance City government's ability to provide basic services should receive the second highest rating. The City Council states as a matter of policy that, all other considerations being equal, improvement of existing infrastructure should rate higher than construction of new infrastructure improvements.

2- PLANNING AREA PROFILES AND CAPABILITIES

- Construction of new infrastructure improvements (new streets, new parks, greenways, etc.) is necessary to keep up with the community's growth.

Other Capabilities

- The County and city are able to receive National Weather Service warnings. A vast number of the population can be alerted within 15-20 minutes of an incidents. Responders can be notified within 3-5 minutes and key official within 15 minutes.
- Public school students receive curricular training on hazards and emergency programs during the school year. Businesses, preschools, private organizations, community leaders, and averages citizens have been exposed to emergency preparedness training.
- Geographic Information Systems (GIS) capabilities allow for limited hazard areas base maps to be available to interested parties.

INTERGOVERNMENTAL AND INTERAGENCY COORDINATION

The following meetings occur on a routine basis:

Weekly Meetings:

- Springfield City Management Team Meeting
- Vision 20/20 Meeting
- Chamber of Commerce Meetings
- Springfield-Greene County Department Heads
- Springfield City Council

Monthly Meetings:

- County Court Commission Meeting
- City/County Staff Meeting
- Local Emergency Planning Committee (LEPC)
- Ozarks Watershed Committee Meeting
- Metropolitan Planning Organization
- Law Enforcement Neighborhood Watch Meetings
- Neighborhood Association Meetings
- Downtown Association Meeting
- Radio Amateur Communications Emergency Service
- County Mayors Meetings
- Greene County Fire Chiefs
- Watershed Meetings

Quarterly:

- Southwest Missouri Emergency Support Organization Meeting
- Public Safety Collaborative
- County Safety and Security Meeting
- Regional Homeland Security Oversight Committee

Bi-Annual:

- County Commission-City Mayor

2- PLANNING AREA PROFILES AND CAPABILITIES

City of Springfield Capabilities

CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Planning Capabilities	
Comprehensive Plan	Yes 2000 - Update started 2019
Builder's Plan	Yes
Capital Improvement Plan	Yes
County Emergency Operations Plan	Yes - Updated 2019
County Recovery Plan	Yes-2019
County Mitigation Plan	Yes - Updated every 5 years
Economic Development Plan	Yes
Transportation Plan	Yes - 2001 Update Started 2019
Land-use Plan	Yes - 2018
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	Yes
Fire wise or other fire mitigation plan	No
School Mitigation Plan	Included in Mitigation Plan
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes - Mitigation Plan
POLICIES/ORDINANCE	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	
Zoning Ordinance	Yes
Building Code	Yes
Floodplain Ordinance	Yes
Subdivision Ordinance	Yes
Tree Trimming Ordinance	Yes
Nuisance Ordinance	Yes
Storm Water Ordinance	Yes
Seismic Construction Ordinance	Yes
Drainage Ordinance	Yes
CAPABILITY	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	Yes
Landscape Ordinance	Yes
Debris Management Plan	Yes
PROGRAM	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes -
NFIP Community Rating System (CRS) Participating Community	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	2
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes
Property Acquisition	Yes
Planning/Zoning Boards	Yes
Stream Maintenance Program	Yes
Tree Trimming Program	Yes
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes
STUDIES/REPORTS/MAPS	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	
Hazard Analysis/Risk Assessment (County)	Yes - Mitigation Plan
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	Yes

2- PLANNING AREA PROFILES AND CAPABILITIES

Evacuation Route Map	Yes
Critical Facilities Inventory	Yes - Located in Mitigation Plan
Vulnerable Population Inventory	Yes - Located In Mitigation Plan
Land Use Map	Yes
STAFF/DEPARTMENT	STATUS
Building Code Official	Yes
Building Inspector	Yes
Mapping Specialist (GIS)	Yes
Engineer	Yes
Development Planner	Yes
Public Works Official	Yes
Emergency Management Coordinator	Yes
NFIP Floodplain Administrator	Yes
Bomb and/or Arson Squad	Yes - Springfield Police and Fire Department
Emergency Response Team	Yes
Hazardous Materials Expert	Yes - Springfield Fire Department
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Yes
Transportation Department	Yes
Economic Development Department	Yes
Housing Department	Yes
Planning Consultant	Yes
Regional Planning Agencies	No
Historic Preservation	Yes
NON-GOVERNMENTAL ORGANIZATIONS (NGOS)	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
American Red Cross	Yes
Salvation Army	Yes
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Veterans Groups	Yes
Environmental Organization	Yes
Homeowner Associations	Yes
Neighborhood Associations	Yes
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	Yes
LOCAL FUNDING AVAILABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Unknown
Ability to incur debt through special tax bonds	Unknown
Ability to incur debt through private activities	Unknown
Ability to withhold spending in hazard prone areas	No

2 - PLANNING AREA PROFILES AND CAPABILITIES

2.2.7 City of Strafford

The City of Strafford is located in the eastern portion of Greene County, approximately 13 miles from Springfield. Strafford has seen growth over the years. In 2000, the population of the city was about 1,800 people. In 2017, the estimated population was over 2,100. Strafford is governed by an elected Mayor and board of Aldermen. Strafford is divided up into three wards and each ward has two aldermen representing. Both the Mayor and the Aldermen serve terms of two years. They meet the first and third Monday of each month. Strafford also has a Planning and Zoning Commission and a Board of Adjustment.

Strafford has the following departments:

- Administration
 - City Administrator
 - City Clerk
- Utilities
- Public Works
- Police Department
- Fire Department
- Municipal Court
- Planning
- Building Regulations
- Parks
- Emergency Management
- Animal Control

The City of Strafford has two parks, Howard Smith Community Park and Croxdale Park. The Howard Smith Community Park offers two pavilions for picnics and meetings, two sets of playground equipment and slides, several charcoal grills and a walking track. Howard Smith Community Park is located on Bumgarner Road. Croxdale Park offers a pavilion for picnics, playground, and trees for shade. The park is located on the North side of town on Airport Road.



2- PLANNING AREA PROFILES AND CAPABILITIES

POPULATION AND DEMOGRAPHICS

General Population Characteristics

CHARACTERISTIC	NUMBER
Total Population	2,152
Male Population	1,066
Female Population	1,086
Median Age (Years)	38.2

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Race

RACE	NUMBER
White	2,006
Black or African American	16
American Indian and Alaska Native	0
Asian	4
Native Hawaiian and Other Pacific Islander	0
Other Race	0
Two or More Races	126

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Housing Information

HOUSING OCCUPANCY	NUMBER
Total Housing Units	877
Occupied Housing Units	807
Vacant Housing Units	70
Owned Occupied Housing Units	506
Renter Occupied Housing Units	301

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

MITIGATION INITIATIVES

Outdoor Warning Sirens

Strafford currently has three warning sirens placed within the city limits. The sirens are activated from the Springfield-Greene County Office of Management, Springfield-Greene County 9-1-1 Emergency Communications Center, or the Springfield Public Works Department. The warning sirens are tests on the second Wednesday of every month at 10 a.m., weather permitting. The City of Strafford is responsible for maintaining their sirens.

Other Initiatives

The City of Strafford has a lot of older homes. There are 319 of 647 homes that were built before 1980 putting them at a higher risk for damage in a severe disaster. There are 44 houses that were built in 1939 or earlier. Strafford is located right off I-44 and has a large commercial industry. This brings large numbers of daily commuters, and when combined with interstate traffic, the population far exceeds the official resident population. Strafford does not have an approved FEMA Safe Room putting the population at risk.

2 - PLANNING AREA PROFILES AND CAPABILITIES

Emergency Services

The City of Strafford has a police department that provides services 24/7 to the citizens of Strafford. The Strafford Police Department has seven officers including a Chief, Sergeant, Resource Officer and four other officers.

The City of Strafford also has a fire protection district that serves the community. The Fire Protection district has two stations. The Strafford Fire Protection District has 17 employees including a Chief, Office Manager, 3 Battalion Chiefs, 3 Captains and nine other firefighters. For more information about the Strafford Fire Protection District, please see their individual profile.

The City of Strafford does have an emergency manager that works for the City. The Emergency manager works closely with the Springfield- Greene County Office of Emergency Management. The City of Strafford also does have an Emergency Operations Center (EOC) if an incident were to occur. The location of the EOC is Strafford City Hall.

Utilities

The City of Strafford provides the city residents and businesses with clean water. The Strafford water system consists of three elevated storage tanks with a total capacity of 550,000 gallons, three wells with a total capacity of approximately 800 gallons per minute, and associated distribution system. The existing water distribution system consists of pipe ranging in size from 1 inch to 10 inch. Existing pressure throughout the system is adequate under normal operating conditions. Available fire flow in some parts of the water system is less than desirable. All water lines are owned and maintained by The City of Strafford. The Maintenance Department works daily to maintain and repair any problems that arise from these water liens. Strafford has contracts with outside companies to oversee the maintenance of the water towers.

The community is also responsible for wastewater or sewer services from homes and businesses. Strafford currently has a contract with the City of Springfield to pump all sewage to their treatment plan. Currently the Strafford Sewer System consists of one regional and 11 lift stations with generators on nine of them. Sewer lines and lift stations are owned and maintained by the City of Strafford, but the City of Springfield accepts all Strafford sewage for a fee. The Maintenance Department works daily to maintain and repair any problems that arise from these sewer lines and lift stations.

Trash Service is mandatory in the City of Strafford and is provided by Republic Services. Trash is included in the utility bill. Electric is provided by either Empire and Southwest Electric.

Identified Assets

There are approximately 45,000 to 50,000 vehicles that travel through Strafford on any given day. A couple popular road ways include:

- Highway Interstate: Strafford has three sections to its town. The North side of town is located North of Interstate 44; The Center of the city is located between Interstate 44 and State Highway 125; The South side of town is located south of State Highway 125 and the Railroad.
- Old Route 66: Old Route 66 runs through the center of the City and provides an interesting piece of trivia found in "Ripley's Believe it or Not". The building that Family Pharmacy has occupied for over thirty years was noted by the publication as having two front doors; one on the Route 66 side and one on the Pine Street Side.
- Air and Rail: There is no air service to the community. The Railroad tracks that run through Strafford are used for freight. The last passenger train rolled through Strafford in May, 1967.

2- PLANNING AREA PROFILES AND CAPABILITIES

CAPABILITY ASSESSMENT

Facilities

The City of Strafford has one police station, a City Hall buildings that takes place as the Emergency Operations Center (EOC), and a public works building.

The City of Strafford has 3 ground source water wells and 3 water towers with a combination of 500,000 gallons of water storage.

Building Codes

The City of Strafford has a list of building codes that all residents and businesses must follow. The building codes are located on the city website and can be accessed easily.

Planning and Zoning

The City of Strafford has a Planning and Zoning Committee that is made up of volunteers. The Planning and Zoning Committee is responsible for the planning and zoning for the City of Strafford. The Planning and Zoning Committee make studies and recommend to the Board of Alderman plans, goals and objectives relating to the growth, development, and redevelopment of the City. They also make recommendations to the Board of Aldermen concerning proposed preliminary plat approvals, conditional use permits, and proposed Zoning Map changes.

Back-Up Plans

The City of Strafford have generators, radios and a computer server that are part of the Strafford's back-up system. Additional emergency communications equipment would enhance and support the City of Strafford.

City of Strafford Capabilities

CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
PLANNING CAPABILITIES	
Comprehensive Plan	Yes - Update in progress
Builder's Plan	No
Capital Improvement Plan	No
County Emergency Operations Plan	Yes- 2019
County Recovery Plan	Yes- 2014
County Mitigation Plan	Yes - Updated Every 5 Years
Economic Development Plan	No
Transportation Plan	Yes
Land-use Plan	Yes - Update in progress
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes - Located in Mitigation Plan
POLICIES/ORDINANCE	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	
Zoning Ordinance	Yes - Chapter 400 Municipal
Building Code	Yes - 2012
Floodplain Ordinance	Yes - 10/4/2010 Chapter 415
Subdivision Ordinance	Yes
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	Yes
Seismic Construction Ordinance	Yes
Drainage Ordinance	No
CAPABILITY	
STATUS INCLUDING DATE OF DOCUMENT OR POLICY	
Site Plan Review Requirements	Yes

2- PLANNING AREA PROFILES AND CAPABILITIES

Historic Preservation Ordinance	No
Landscape Ordinance	Yes
Debris Management Plan	No
PROGRAM	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	Unknown
ISO Fire Rating	3
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	No
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes-Greene County and Fair Grove
STUDIES/REPORTS/MAPS	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Hazard Analysis/Risk Assessment (Local)	Yes - Mitigation Plan
Hazard Analysis/Risk Assessment (County)	Yes - Mitigation Plan
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes - Mitigation Plan
Vulnerable Population Inventory	Yes - Mitigation Plan
Land Use Map	Yes
STAFF/DEPARTMENT	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Building Code Official	Yes - Part time
Building Inspector	Yes - Part Time
Mapping Specialist (GIS)	Yes - Contract
Engineer	Yes - Contract
Development Planner	Yes - City Administrator
Public Works Official	Yes - Full-Time
Emergency Management Coordinator	Yes - City Administrator
NFIP Floodplain Administrator	Yes - City Administrator
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Yes - Contract Revenue Service
Transportation Department	Yes - Public Works
Economic Development Department	Yes - City Administrator
Housing Department	Yes
Planning Consultant	Yes
Regional Planning Agencies	No
Historic Preservation	Yes
NON-GOVERNMENTAL ORGANIZATIONS (NGOS)	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
American Red Cross	Yes - Springfield
Salvation Army	Yes - Springfield
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY

2- PLANNING AREA PROFILES AND CAPABILITIES

Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	Yes - By Subdivision Code
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.)	No
LOCAL FUNDING AVAILABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	Unknown

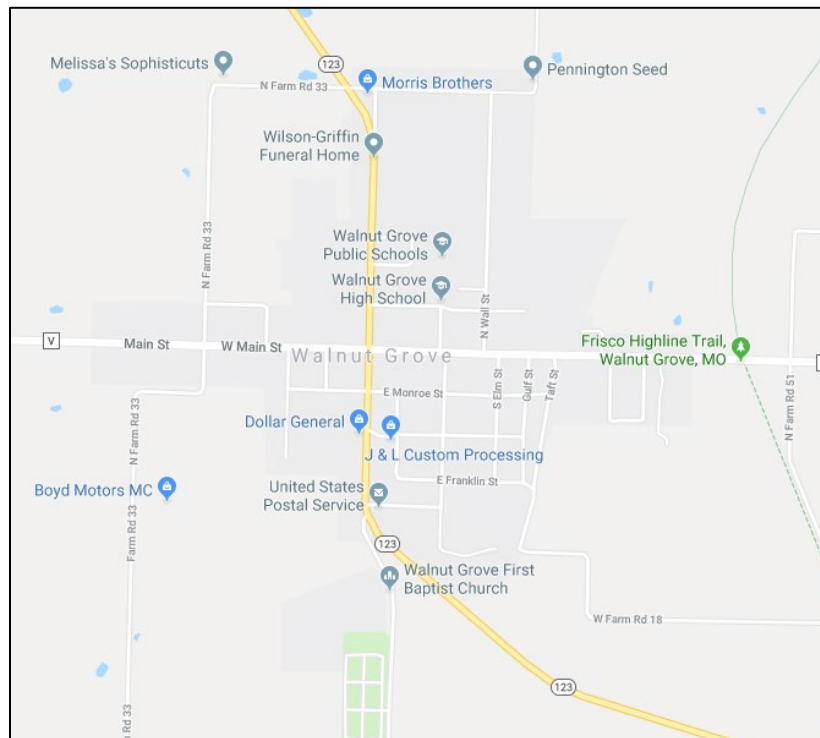
2- PLANNING AREA PROFILES AND CAPABILITIES

2.2.8 City of Walnut Grove

The City of Walnut Grove is located in the Northwest portion of Greene County, approximately 23 miles from Springfield. The population of Walnut Grove has always been small. In 2000, the population of the City was 630 residents. In 2017, the population fell to about 610 residents. Walnut Grove has a “Class 4” rating. The P1 Census Class Code for Walnut Grove indicated a populated place that is also an incorporated place with the same name and the same census code. The Incorporated Place has a Functional Status Code “A” which identified an active government providing primary general-purpose functions. The City of Walnut Grove has an elected Mayor and five Board of Aldermen. The city has 3 full time employees; Police Chief, Public Works, City Clerk, 2 part time police officers and 6 reserve officers. The Board of Aldermen meets on the third Thursday of every month at 6:30 p.m. Walnut Grove does have a Planning and Zoning Committee that meets on the first Tuesday of the month at 7:00 p.m. The City of Walnut Grove has the following departments:

- City Clerk
- City Utilities
- Municipal Court Clerk
- Emergency Management
- Utilities/Public Works
- Police
- Fire

The City of Walnut Grove does have parks for their citizens to enjoy. The City Park hosts an annual event “Annual Pickin in the Park”.



2- PLANNING AREA PROFILES AND CAPABILITIES

POPULATION AND DEMOGRAPHICS

General Population Characteristics

CHARACTERISTIC	NUMBER
Total Population	612
Male Population	298
Female Population	314
Median Age (Years)	44.1

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Race

RACE	NUMBER
White	599
Black or African American	0
American Indian and Alaska Native	4
Asian	0
Native Hawaiian and Other Pacific Islander	0
Other Race	0
Two or More Races	9

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Housing Information

HOUSING OCCUPANCY	NUMBER
Total Housing Units	286
Occupied Housing Units	246
Vacant Housing Units	40
Owned Occupied Housing Units	165
Renter Occupied Housing Units	81

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

MITIGATION INITIATIVES

Outdoor Warning Sirens

Walnut Grove currently has one warning siren located within in the city limits. The siren is new with the City of Walnut Grove using Mitigation funds in 2017 to purchase a new siren. The siren is activated by the Springfield-Greene County Office of Emergency Management. The siren is tested on the second Wednesday of every month at 10 a.m., weather permitting. The City of Walnut Grove is responsible for maintaining their outdoor warning siren.

Other Initiatives

Walnut Grove has a lot of older buildings and homes. Of the 246 homes, 165 of them were built before 1980. 39, or 15.85%, of those homes were built in 1939 or earlier. Older homes can put residents more at risk for a hazard or disaster. Walnut Grove does not have a FEMA approved shelter in the area. Walnut Grove's location also puts them at risk because they are farther away from services like healthcare, jobs and other community resources.

2- PLANNING AREA PROFILES AND CAPABILITIES

Emergency Services

The City of Walnut Grove does have a small police department that protects the citizens of the city. The police department has three police officers and 6 reserve officers.

The City is served by the Walnut Grove Fire Protection District. The Fire Department has four stations that house 19 fire and rescue units with 26 officers and firefighters and 4 junior firefighters. The Walnut Grove Fire Protection District does have mutual aid agreements with all of the Greene County Fire Protection Districts. For more information about the Walnut Grove Fire Protection District, please see their individual profile.

National Flood Insurance Program (NFIP)

The City of Walnut Grove has a Floodplain Coordinator established. There are no floodplains present within Walnut Grove city boundaries.

Utilities

The City has its own water source from two wells and maintains a water treatment plant. Empire Electric serves power within the City Limits along with Ozarks Electric from Mt. Vernon and Southwest Electric of Bolivar in the outlying areas. The city is also served by natural gas.

CAPABILITY ASSESSMENT

Facilities

The City of Walnut Grove has a City Hall which houses all municipal services. The City also owns and operates its own sewer facility. The Police Department has its own facility as well.

Building Codes

The City of Walnut Grove implements building codes and ordinances that must be adhered to for future and current development by the Planning and Zoning Committee.

Planning and Zoning

The City of Walnut Grove has a Planning and Zoning Committee that meets on the 1st Tuesday of the month at City Hall at 7:00 p.m.

City of Walnut Grove Capabilities

CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
PLANNING CAPABILITIES	
Comprehensive Plan	Yes - Update in Progress
Builder's Plan	No
Capital Improvement Plan	No
County Emergency Operations Plan	Yes - 2019
County Recovery Plan	Yes - 2014
County Mitigation Plan	Yes - Updated every 5 years
Economic Development Plan	No
Transportation Plan	No
Land-use Plan	Yes - Update in Progress
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Fire wise or other fire mitigation plan	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes - located in Mitigation Plan
POLICIES/ORDINANCE	STATUS INCLUDING DATE OF DOCUMENT OR POLICY

2- PLANNING AREA PROFILES AND CAPABILITIES

Zoning Ordinance	Yes
Building Code	Not adopted
Floodplain Ordinance	No
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	No
Storm Water Ordinance	No
Seismic Construction Ordinance	Yes
Drainage Ordinance	No
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Site Plan Review Requirements	Yes
Historic Preservation Ordinance	No
Landscape Ordinance	Yes
Debris Management Plan	No
PROGRAM	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	No
National Weather Service (NWS) Storm Ready	No
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	
Economic Development Program	No
Land Use Program	No
Public Education/Awareness	Yes
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes
STUDIES/REPORTS/MAPS	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Hazard Analysis/Risk Assessment (Local)	Yes - Hazard Mitigation Plan
Hazard Analysis/Risk Assessment (County)	Yes - Hazard Mitigation Plan
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes-Mitigation Plan
Vulnerable Population Inventory	No
Land Use Map	Yes
STAFF/DEPARTMENT	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Building Code Official	No
Building Inspector	No
Mapping Specialist (GIS)	No
Engineer	Yes - PRN
Development Planner	No
Public Works Official	Yes - Full Time
Emergency Management Coordinator	Yes - Full Time
NFIP Floodplain Administrator	Yes - Full Time
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes

2 - PLANNING AREA PROFILES AND CAPABILITIES

Sanitation Department	No
Transportation Department	No
Economic Development Department	No
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	No
Historic Preservation	No
NON-GOVERNMENTAL ORGANIZATIONS (NGOS)	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
American Red Cross	Yes - Springfield
Salvation Army	Yes - Springfield
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Veterans Groups	No
Environmental Organization	No
Homeowner Associations	No
Neighborhood Associations	No
Chamber of Commerce	No
Community Organizations (Lions, Kiwanis, etc.)	Yes - Masonic Lodge
LOCAL FUNDING AVAILABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Ability to apply for Community Development Block Grants	Yes
Ability to fund projects through Capital Improvements funding	No
Authority to levy taxes for a specific purpose	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	Yes
Ability to incur debt through special tax bonds	Yes
Ability to incur debt through private activities	No
Ability to withhold spending in hazard prone areas	No

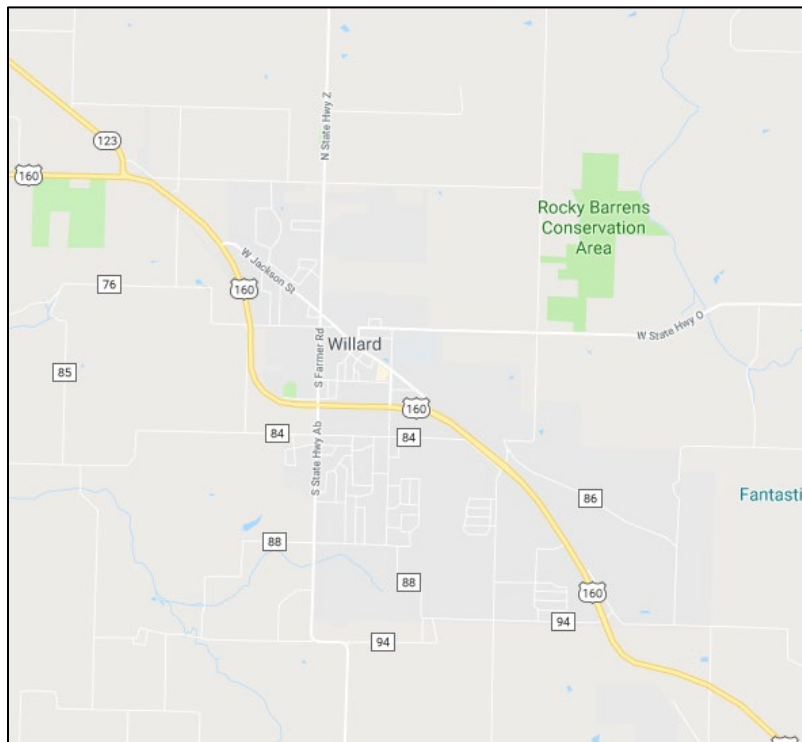
2- PLANNING AREA PROFILES AND CAPABILITIES

2.2.9 City of Willard

The City of Willard is located in the Northwest portion of Greene County, approximately 6 miles from Springfield. Willard has experience rapid growth over the last decades. In 2000, the population of the city was about 3,100 residents. In 2017, the population jumped to over 5,400 residents. The City of Willard was incorporated as a 4th class city in 1949 and as permitted by Missouri State Statutes has the Mayor/Board of Aldermen form of government. Currently, the City is comprised of three geographically divided wards with have two aldermen representing each ward. The City of Willard also has a Board of Adjustment, Economic Development Task Force, Parks and Recreational Advisory Board, Planning and Zoning Commission, Traffic Advisory Committee, Citizen Advisory Committee and a Tree Board. The City of Willard also has the following departments:

- City Clerk
- City Administrator
- Finance
- Public Works
- Utilities
- Emergency Management
- Police
- Fire
- Municipal Court
- Park and Recreating
- Economic Development
- Planning and Development

The City of Willard has many parks around the city. Willard Sports Complex is a 20 acre park that holds a recreating center, playground, concessions stand, pond, and two baseball/softball fields. The Jackson Street Park is also approximately 20 acres and has picnic tables, playground equipment, aquatic center, walking trails, outdoor basketball court and many other amenities. The City of Willard also has Miller Farm Park, a community center and a recreating center. The City of Willard hosts many community events for the residents of the city including, a Veterans Day Parade, Freedom Feast, Christmas Parade and many more.



2- PLANNING AREA PROFILES AND CAPABILITIES

POPULATION AND DEMOGRAPHICS

General Population Characteristics

CHARACTERISTIC	NUMBER
Total Population	5,426
Male Population	2,649
Female Population	2,777
Median Age (Years)	35.4

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Race

RACE	NUMBER
White	5,049
Black or African American	63
American Indian and Alaska Native	28
Asian	0
Native Hawaiian and Other Pacific Islander	0
Other Race	156
Two or More Races	130

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

Housing Information

HOUSING OCCUPANCY	NUMBER
Total Housing Units	2,117
Occupied Housing Units	2,073
Vacant Housing Units	44
Owned Occupied Housing Units	1,556
Renter Occupied Housing Units	517

Source: U.S. Census Bureau American Community Survey, 5 year-estimates 2013-2017

MITIGATION INITIATIVES

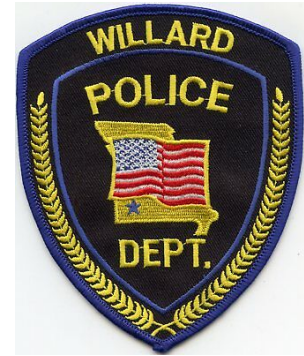
Outdoor Warning Sirens

The City of Willard has six warning sirens located within the city limits. The sirens are located at Arrowhead Road and West Jackson Street, Main and Robberson Street, Southview Street and King Drive, New Melville at Quarry Road, Hughes road and Ross Rad and Farm Road 94. Willard's outdoor warning system is activated by the Springfield-Greene County Office of Emergency Management. The warning system is connected for radio control activation, programmed with the Springfield-Greene County Office of Emergency Management, allowing activation from the many activation sites within Springfield. The sirens are tested on the second Wednesday of every month at 10:00 a.m., weather permitting. The City of Willard is responsible for maintaining their outdoor warning sirens.

2- PLANNING AREA PROFILES AND CAPABILITIES

Emergency Services

The City of Willard Police Department has established a great working relationship with the community. The community's ideas and values reflect on the Police Department and how it functions. The Police department protects the community 24/7. The department has 10 full time police officers, 2 civilian employees, 6 reserve officers, 2 school resource officers who are commissioned by the Department but receive their pay and benefits from the Willard School District. The Police Department also has two certified investigators, a D.A.R.E Program and the Police Athletic League.



The City of Willard is also protected by the Willard Fire Protection District. The District uses both volunteer and paid staff to respond to fires, medical emergencies, rescue and other calls. The District responds to over 1400 calls for service a year. For more information about the Willard Fire Protection District, please see their individual profile.

The City of Willard has established an Emergency Manager which oversees the emergency operations of the City. The City of Willard does have a local Emergency Operations Plan. The Emergency Manager for the City of Willard is currently the City Clerk.

City of Willard's Automated External Defibrillator Program

The Willard Emergency Management Department oversees the City of Willard's Automated External Defibrillator (AED) Program. There are a total of five AED's that Emergency Management oversee which are located at:

- City Hall
- Willard Community Center
- Willard Recreation Center
- 2 AED's within the Willard Police Department

Utilities

The City of Willard has a Public Works Department which is responsible for overseeing/maintaining/repairing the City's street and road system, water, and wastewater management systems, snow removal, grass cutting, maintaining street and traffic signage, sidewalk maintenance/repair, animal controls, as well as the ongoing upkeep and maintenance of all City-Owned buildings and structures.

Sewer

Currently the City of Willard has:

- 62,627 feet of force mains
- 17 air valves
- 8 lift stations
- 229,522 of sewer line of which 166,895 feet are gravity
- 400+ manholes
- 2 cell lagoon system
- 12 acres of sewer irrigation

Water

Currently, the City of Willard has:

- 4 wells
- 382,600 feet of water lines
- 3 water towers totaling 850,000 gallons of storage
- 3,200 water meters

2- PLANNING AREA PROFILES AND CAPABILITIES

The City of Willard has a Recycling Center that is located on Tower Road. Recycling for residents that live in the City of Willard is free and trash service is available for all rural and residential customers. Electric and Gas are provided from outside companies.

IDENTIFIED ASSETS

The City of Willard is located about 11 miles off Interstate I-44. The main travel into the City of Willard comes from US 160. This road sees busy traffic at all times of the day. Currently there is a project working on expanding US 160 to help the follow of traffic into Willard. For more information on project, please refer to the Risk Assessment Chapter under Future development.

CAPABILITY ASSESSMENT

Facilities

The City of Willard has one police department, four sanitation areas, one Emergency Operations Center and a City Hall.

Building Codes

The City of Willard has a building official designated for the City. This person conducts plan reviews and issues all building permits for the City as well as coordinates and performs the R-1 and other basic, minor inspections. The building inspector oversees all inspections and performs all commercial development inspections within the City to ensure life safety measures pertaining to the adopted building codes have been met.

Planning and Zoning

The City Willard has a Planning and Development Department located in City hall. The mission of this department is “To help create and maintain a quality environment with maximum density growth and adjacent, compatible land uses, by guiding growth which enhances the City’s vision accomplished through working with residents, businesses, elected leaders and other departments in the City and region to achieve the highest quality of life standards”. The department was established in 2003 to begin the supporting framework for a department that would coordinate future planning and development activities in an organized manner.

The City of Willard also has a Planning and Zoning Commission that consists of 7-15 member, which include the Mayor, a member of the Board of Aldermen and other residents appointed by the Mayor with approval of the Board of Aldermen. The Commission has meetings are scheduled for the fourth Tuesday of each month at 7:00 p.m.

Back-up Systems

The City of Willard has one back-up server for the City. The City also has HAM Radio capabilities and 800 MHz radios are used as back-up communication resources.

City of Willard Capabilities

CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
PLANNING CAPABILITIES	
Comprehensive Plan	Yes - Updated 06/10/2019
Builder's Plan	No
Capital Improvement Plan	No
County Emergency Operations Plan	Yes - 2019
County Recovery Plan	Yes - 2014
County Mitigation Plan	Yes - Updated every 5 years
Economic Development Plan	Yes

2- PLANNING AREA PROFILES AND CAPABILITIES

Transportation Plan	No
Land-use Plan	Yes
Flood Mitigation Assistance (FMA) Plan	No
Watershed Plan	No
Fire wise or other fire mitigation plan	No
School Mitigation Plan	Yes - Located in County Mitigation Plan
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes - Mitigation Plan
POLICIES/ORDINANCE	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Zoning Ordinance	Yes
Building Code	Yes - 2012
Floodplain Ordinance	Yes - 2010
Subdivision Ordinance	No
Tree Trimming Ordinance	No
Nuisance Ordinance	Yes
Storm Water Ordinance	No
Seismic Construction Ordinance	Yes
Drainage Ordinance	No
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Site Plan Review Requirements	No
Historic Preservation Ordinance	No
Landscape Ordinance	Yes
Debris Management Plan	No
PROGRAM	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Zoning/Land Use Restrictions	Yes
Codes Building Site/Design	Yes
National Flood Insurance Program (NFIP) Participant	Yes
NFIP Community Rating System (CRS) Participating Community	No
Hazard Awareness Program	Yes
National Weather Service (NWS) Storm Ready	Yes - Oct. 7 th , 2019
Building Code Effectiveness Grading (BCEGs)	No
ISO Fire Rating	4
Economic Development Program	Yes
Land Use Program	Yes
Public Education/Awareness	Yes - Through Fire and Public Newsletter
Property Acquisition	No
Planning/Zoning Boards	Yes
Stream Maintenance Program	No
Tree Trimming Program	No
Engineering Studies for Streams (Local/County/Regional)	County
Mutual Aid Agreements	Yes
STUDIES/REPORTS/MAPS	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Hazard Analysis/Risk Assessment (County)	Yes - Mitigation Plan
Flood Insurance Maps	Yes
FEMA Flood Insurance Study (Detailed)	No
Evacuation Route Map	No
Critical Facilities Inventory	Yes - Mitigation Plan
Vulnerable Population Inventory	No
Land Use Map	Yes
STAFF/DEPARTMENT	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Building Code Official	Yes - Full Time
Building Inspector	Yes - Full Time
Mapping Specialist (GIS)	Yes - Full Time
Engineer	No - Contracted
Development Planner	Yes - Full Time

2 - PLANNING AREA PROFILES AND CAPABILITIES

Public Works Official	Yes - Full Time
Emergency Management Coordinator	Yes - Full Time
NFIP Floodplain Administrator	Yes - Full Time
Bomb and/or Arson Squad	No
Emergency Response Team	No
Hazardous Materials Expert	No
Local Emergency Planning Committee	Yes
County Emergency Management Commission	Yes
Sanitation Department	Yes - Full Time
Transportation Department	No
Economic Development Department	Yes -Full Time
Housing Department	No
Planning Consultant	No
Regional Planning Agencies	No
Historic Preservation	No
NON-GOVERNMENTAL ORGANIZATIONS (NGOS)	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
American Red Cross	Yes - Springfield
Salvation Army	Yes - Springfield
CAPABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Veterans Groups	Yes
Environmental Organization	No
Homeowner Associations	Yes
Neighborhood Associations	No
Chamber of Commerce	Yes
Community Organizations (Lions, Kiwanis, etc.	Yes
LOCAL FUNDING AVAILABILITY	STATUS INCLUDING DATE OF DOCUMENT OR POLICY
Ability to apply for Community Development Block Grants	No
Ability to fund projects through Capital Improvements funding	Yes
Authority to levy taxes for a specific purpose	N/A
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Ability to incur debt through general obligation bonds	N/A
Ability to incur debt through special tax bonds	N/A
Ability to incur debt through private activities	N/A
Ability to withhold spending in hazard prone areas	N/A

2- PLANNING AREA PROFILES AND CAPABILITIES

2.2.10 Summary of Jurisdictional Capabilities

CAPABILITIES	UNINC. GREENE COUNTY	ASH GROVE	BATTLEFIELD	FAIR GROVE	REPUBLIC	SPRINGFIELD	STRAFFORD	WALNUT GROVE	WILLARD
PLANNING CAPABILITIES									
Comprehensive Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Builder's Plan	No	No	Yes	No	No	Yes	No	No	No
Capital Improvement Plan	No	No	Yes	Yes	Yes	Yes	No	No	No
County Emergency Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Recovery Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County Mitigation Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Debris Management Plan	Yes	No	No	Yes	Yes	Yes	No	No	No
Economic Development Plan	No	No	No	Yes	Yes	Yes	No	No	Yes
Transportation Plan	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
Land-Use Plan	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Flood Mitigation Assistance (FMA) Plan	N/A	No	Unknown	Yes	No	No	No	No	No
Watershed Plan	Yes	No	Unknown	No	No	Yes	No	No	No
Firewise or Other Fire Mitigation Plan	No	No	Unknown	No	Yes	No	No	No	No
Critical Facilities Plan (Mitigation/Response/Recovery)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
POLICIES/ORDINANCE									
Zoning Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Building Code	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Floodplain Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Subdivision Ordinance	Yes	Yes	Yes	No	No	Yes	Yes	No	No
Tree Trimming Ordinance	Yes	Yes	Yes	No	No	Yes	No	No	No
Nuisance Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Seismic Construction Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Storm Water Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
CAPABILITIES	UNINC. GREENE COUNTY	ASH GROVE	BATTLEFIELD	FAIR GROVE	REPUBLIC	SPRINGFIELD	STRAFFORD	WALNUT GROVE	WILLARD
Drainage Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No

2- PLANNING AREA PROFILES AND CAPABILITIES

Site Plan Review Requirements	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Historic Preservation Ordinance	Yes	No	No	Yes	Yes	Yes	No	No	No
Landscape Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PROGRAM									
Zoning/Land Use Restrictions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Codes building Site/Design	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
National Flood Insurance Program (NFIP) Participant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NFIP Community Rating system (CRS) Participating community	No	No	No	No	No	No	No	No	No
Hazard Awareness Program	No	No	No	Yes	No	Yes	No	No	Yes
National Weather Service (NWS) Storm Ready	Yes	No	No	No	Yes	No	No	No	Yes
Building code Effectiveness Grading (BCEGs)	No	No	No	No	5/4	No	No	No	No
ISO Fire Rating		6		4	2	2	3		4
Economic Development Program	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Land Use Program	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Public Education/Awareness	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Property Acquisition	Yes	Unknown	Yes	No	Unknown	Yes	No	No	No
Planning/Zoning Boards	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stream Maintenance Program	Yes	No	Yes	No	No	Yes	No	No	No
Tree Trimming Program	Yes	No	No	Yes	No	Yes	No	No	No
Engineering Studies for Streams (Local/County/Regional)	County	County	County	County	County	County	County	County	County
Mutual Aid Agreements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
STUDIES/REPORTS/MAPS									
Hazard Analysis/Risk Assessment (Local)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hazard Analysis/Risk Assessment (County)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CAPABILITIES	UNINC. GREENE COUNTY	ASH GROVE	BATTLEFIELD	FAIR GROVE	REPUBLIC	SPRINGFIELD	STRAFFORD	WALNUT GROVE	WILLARD
Flood Insurance Maps	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEMA Flood Insurance Study (Detailed)	Yes	Yes	No	No	Yes	Yes	No	No	No

2- PLANNING AREA PROFILES AND CAPABILITIES

Evacuation Route Map	Yes	No	NO	No	No	Yes	No	No	No
Critical Facilities Inventory	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Land Use Map	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
STAFF/DEPARTMENT									
Building Code Official	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Building Inspector	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Mapping Specialist (GIS)	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Engineer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Development Planner	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Public Works Official	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emergency Management Coordinator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NFIP Floodplain Administrator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emergency Response Team	Yes	No	No	No	No	yes	No	No	NO
Hazardous Materials Expert	No	No	No	No	NO	Yes	No	No	No
Local Emergency Planning Committee	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes
County Emergency Management Commission	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sanitation Department	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Transportation Department	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Economic Development Department	Yes	No	No	No	Yes	Yes	Yes	No	Yes
Housing Department	Yes	No	Yes	No	No	Yes	Yes	No	No
Historic Preservation	Yes	No	No	No	No	Yes	Yes	No	No
NON-GOVERNMENTAL ORGANIZATIONS (NGOS)									
American Red Cross	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Salvation Army	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Veterans Groups	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Environmental Organization	No	no	No	No	No	Yes	No	No	NO
Homeowner Associations	Yes	no	Yes	Yes	Yes	Yes	Yes	No	Yes
CAPABILITIES	UNINC. GREENE COUNTY	ASH GROVE	BATTLEFIELD	FAIR GROVE	REPUBLIC	SPRINGFIELD	STRAFFORD	WALNUT GROVE	WILLARD
Neighborhood Associations	Yes	No	No	No	No	Yes	No	No	No
Chamber of Commerce	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes

2- PLANNING AREA PROFILES AND CAPABILITIES

Community Organizations (Lions, Kiwanis, etc)	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
FINANCIAL RESOURCES									
Apply for Community Development Block Grants	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Fund Projects Through Capital Improvement Funding	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Authority to Levy taxes for Specific Purposes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Fees for water, Sewer, Gas, or Electric Services	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Impact Fees for New Development	Yes	Unknown	Yes	No	Yes	Yes	Yes	Yes	Yes
Incur debt Through General Obligation Bonds	Yes	yes	Yes	No	Yes	Unknown	Yes	Yes	No
Incur Debt Through Special Tax Bonds	Yes	Yes	Yes	No	Yes	Unknown	Yes	Yes	No
Incur debt Through Private Activities	Yes	Yes	No	No	No	Unknown	No	No	No
Withhold Spending in Hazard Prone Areas	Yes	Unknown	No	No	Yes	No	No	No	No

Source: Data Collection Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.3 SPECIAL DISTRICTS

2.3.1 Ash Grove Fire Protection District



The Ash Grove Fire Protection District covers approximately 34 square miles. District lines are as follows: UU Highway East to Farm Road 1 (Greene County/Dade County Line); West Farm Road 56 to Clear Creek North; T Highway to the South. The district is funded through taxes and they do have the power to levy taxes. The fire district has one station located at 112 N. Piper Road in Ash Grove. The ISO Fire Rating for Ash Grove is 6.

Equipment:

- 1 Engine Pumper
- 2 Water Tender Tankers
- 2 Brush Trucks
- 800 MHZ Radios (Mobile and Portable)

Personnel

TYPE OF TRAINING	NUMBER OF STAFF TRAINED
Paramedic	1
EMT	7
Firefighter 1	7
Firefighter 2	7
Hazmat	7
Water Rescue	5

Station Locations:

- Ash Grove Fire Protection District- 112 N. Piper Road Ash Grove, Missouri

The Ash Grove Fire District is governed by a five member board elected by registered voters within the district. There is an appointed fire chief who runs day to day operations and fire personnel.

The Ash Grove Fire District has the following staff:

- Part Time paid Fire Chief
- 5 Part time paid Firefighters/EMT's
- 4 volunteer firefighters

2 - PLANNING AREA PROFILES AND CAPABILITIES

Services Provided

- Fire Suppression
- Fire Prevention
- EMT Rescue
- Vehicle Extrication
- Structural Collapse
- Weather Spotting

Mitigation Initiatives

The Ash Grove Fire Protection District does have mutual aid agreements with all surrounding fire protection districts. The fire district is also in process of developing public education programs for fire safety, household preparedness or environmental education.

Back-Up Systems

In 2014, Ash Grove installed a large outside generator that is capable of powering the station. It is kept in a locked shed, and is checked monthly.

2- PLANNING AREA PROFILES AND CAPABILITIES

2.3.2 Battlefield Fire Protection District

The Battlefield Fire District covers approximately 32 square miles of mostly residential housing. The district operates from four strategically located fire stations with full-time staffing to offer services to residents and visitors. The District has a state-of-the-art training center and is recognized by the state as a certified training facility. Training consists of many facets including an Emergency Medical Technician-Basic course. The district is funded by a property tax levy. The district also has the power to levy taxes and do so. The levy amount is set by the taxpayers.



Equipment:

- 6 Engine Pumpers
- 2 brush trucks
- 4 portable generators
- 4 Command Vehicles
- 1 Support Vehicle
- 1 Medium rescue Truck/Unit
- 1 Aerial Ladder
- 1 Rescue Boat
- 1 Water Tender
- 44 800Mhz
- 5 MOSWIN
- 14 VHF Mobile Radio
- 20 VHF Portable Radio
- 1 Snow Plow
- 1 Medium Rescue
- 1 Special Ops Trailer
- 1 Incident Command Team Cache
- 25 Computers
- 4 Generators
- 1 Fork Lift

Personnel:

TYPE OF TRAINING	NUMBER OF STAFF TRAINED
Paramedic	0
EMT	42
Firefighter 1	42
Firefighter 2	42
Hazmat	5
Water Rescue	15

Station Locations:

- Battlefield Fire Protection District Station 1 – 4117 W. 2nd St. Battlefield, Missouri
- Battlefield Fire Protection District 3 -3490 W. Beechwood St. Springfield, Missouri
- Battlefield Fire Protection District Station 2- 2251 E. Farm Road 188 Ozark, Missouri
- Battlefield Fire Protection District Station 4 1268 W. Farm Road 182 Springfield, Missouri
- District Headquarters- 4117 W. 2nd Street. Battlefield, Missouri

A Board of Directors consisting of five members governs the Battlefield Fire District. The District constituents responsible for direction and control of the organization elect the Board of Directors officials. They ensure the District is following all applicable laws and ordinances. The Board approves organization goals, maintains adequate

2- PLANNING AREA PROFILES AND CAPABILITIES

funding, and seeks new and additional funds to manage the growth of the organization. The Fire Chief is the only member of the district that reports to the Board of Directors.

The Battlefield Fire District has the following staff:

- Chief
- 2 Deputy Chiefs
- 3 Battalion Chiefs
- 1 Chaplin
- 2 Building and Fleet Management Personnel
- 1 Administrative Support Personnel

The District has 44 full time employees, 42 who are response capable. The staff includes administrative personnel. The District also has a part-time janitor and no volunteers.

Services Provided

The District Responds to approximately 2800 calls annually. Current services provided by the District include:

- Fire suppression
- Emergency Medical Response Basic Life Support
- Vehicular/Equipment Extrication
- Swift Water Rescue
- Type III Structural Collapse (Region D)
- Incident Management Team Type III.

The District hosts two yearly EMT-B courses through the District and are a certified training entity for EMS in Missouri.

Mitigation Initiatives

Mutual Aid Agreements:

The district has automatic aid agreements with every agency that borders the district. The district is also part of the statewide mutual aid agreement through the Division of Fire Safety.

- City of Springfield Fire Department
- City of Republic Fire Department
- Logan-Rogersville Fire Department
- Willard Fire Department
- Nixa Fire Department
- Ozark Fire Department

The Battlefield Fire Protection District has a Department Operations Center for Emergency Management. All stations have redundancy for power. The district is also MOSWIN capable in the field.

Back-Up Systems

The Battlefield Fire District has the following back-up systems:

- Fire Extinguishers
- Personal Protective Equipment (Bunker Gear)
- Portable Generators
- Computers

2- PLANNING AREA PROFILES AND CAPABILITIES

2.3.3 Ebenezer Fire Protection District



In 1991, residents voted to grow the district from a membership based service to a tax based all volunteer fire protection district. In 2011, voters agreed to grow the district again, to allow for full time fire protection in the form of 13 full time firefighters. Recently, in April 2015 voters took to the polls again and agreed to merge the Pleasant View and Ebenezer Fire Protection District into one Ebenezer Fire Protection District.

The district has boundaries ranging from Springfield City Limits (Southern Boundary) running North to the Polk County Line. The east/west boundaries job a lot and vary from the

north end to the south end of the district; the western boundary is State Highway 13/State Highway HH/Farm Road 115 all the way East to Us-65 and Farm Road 173 (Eastern Boundary).

The District has the following equipment:

- 1 Aerial Ladder Truck
- 1 Watercraft
- 6 Engines (Pumper)
- 1 QUINT Engine Pumper with Aerial Ladder
- 7 Water Tenders
- 6 Brush Trucks
- 2 Support Vans
- 6 Command Vehicles
- Mobil Light Tower
- 800Mhz Radio
- MOSWIN
- VHZ

Personnel:

TYPE OF TRAINING	NUMBER OF STAFF TRAINED
Paramedic	0
EMT	18
Firefighter 1	20
Firefighter 2	20
Hazmat	23
Water Rescue	3

Other Personnel:

- Emergency Medical Responders: 12
- Fire Investigator: 5
- Basic Fire: 4

2- PLANNING AREA PROFILES AND CAPABILITIES

Station Locations:

- Station 1-7918 N. Farm Road 145 Springfield, Missouri
- Station 2- 3433 W. Farm Road 34 Brighton, Missouri
- Station 3- 1170 E. State Highway CC Pleasant Hope, Missouri
- Station 4- 387 E. Farm Road 96 Springfield, Missouri
- Station 5 -2313 E. State Highway AA Springfield, Missouri
- Station 6- 1391 W. Highway WW, Springfield, Missouri
 - Station used for parking trucks, equipment, etc

Currently the fire district operates 6 fire stations; 2 full time, 1 part time, and 3 volunteer. Ebenezer Fire Protection District operates a fleet of 34 trucks and has a roster of approximately 25 firefighters and EMTs.

The Ebenezer Fire Protection District is governed by a five-man board of directors. The board is selected by vote and they board meets once a month.

Services Provided

- Fire Suppression
- Water Rescue
- Hazmat
- EMT
- Rope Rescue Technician
- Vehicle Extrication
- Wildland Firefighting

Mitigation Initiatives

Mutual Aid Agreements

- Willard Fire Department
- Walnut Grove Fire Department
- Morrisville Fire Department
- Pleasant Hope Fire Department
- Fair Grove Fire Department
- Strafford Fire Department
- Logan-Rogersville Fire Department
- Bois D'Arc Fire Department
- Springfield Fire Department

Back-Up Systems

The district has fire extinguishers and pieces of communication equipment should they be needed.

2- PLANNING AREA PROFILES AND CAPABILITIES

2.3.4 Fair Grove Fire Protection District

The Fair Grove Fire Protection District is committed to providing the highest level of protection, prevention, and education to our service area, ensuring that all available resources are used effectively and efficiently. The District covers 92 miles in 4 different counties including: Greene, Dallas, Webster and Polk. The department is tax based and does have the levy to levy taxes.

The District does have an Emergency Plan in place.



Equipment:

- 3 Command Vehicles
- 4 Engines
- 3 Tenders
- 1 Service
- 3 Brush
- 1 Heavy Rescue

Personnel:

TYPE OF TRAINING	NUMBER OF STAFF TRAINED
Paramedic	0
EMT	2
Firefighter 1	10
Firefighter 2	10
Hazmat	10
Water Rescue	3

Other Staff:

- 1 Inspector
- 1 Hazmat IC
- 1 Investigator
- 1 Red Card Certed
- 1 EOD and Munitions

Station Locations:

- Station 2 (Headquarters)- 645 E. Shelby Road, Greene County Missouri
- Station 3- 1139 State Road AA Dallas County
- Station 4 4242 Sate Highway KK, Greene County

A five member Board of Directors, elected by the constituents of the District, governs the Fair Grove Fire Protection District. Elected board members serve a 6-year term for the District. The Board of Directors hold Regular Monthly Board Meetings at Station #2, on the 2nd Monday of every month.

2- PLANNING AREA PROFILES AND CAPABILITIES

The Fair Grove Fire Protection District has the following staff:

- Fire Chief
- Assistant Fire Chief
- Battalion Chief/Secretary
- 2 Captains
- 9 Full Time Staff
- 5 Volunteers

Services Provided

- Fire Suppression
- Water Rescue
- Wildland
- EMT
- Mercy ALS Ambulance

Mitigation Initiatives

The Fair Grove Fire Protection District has provided weather radios for the community. The department also just finished a major project with a new station and new apparatus.

Mutual Aid Agreements

- Ebenezer Fire Department
- Stafford Fire Department
- Elkland Fire Department
- Southern Dallas Fire Department,
- Pleasant Hope Fire Department

Back-Up Systems

The District has smoke detectors and fire extinguishers available on all apparatus and in all fire stations. The truck radios are the only form of back-up communication for the district.

2- PLANNING AREA PROFILES AND CAPABILITIES

2.3.5 Logan-Rogersville Fire Protection District



The Logan-Rogersville Fire Protection District covers 162 square-miles. The response areas includes three different counties: Greene, Christian and Webster counties. The Fire District is a combination district with both career and volunteer firefighters. The District provide fire protection, emergency medical services, rescue, hazardous materials response, fire prevention and fire education

programs to an estimated 20,000 individuals. The District is funded through taxes and does have the power to levy taxes.

The District does have emergency procedures in place for departmental use. Additionally, the staff/support vehicles and front line apparatus are now equipped with MCD laptops to aid in dispatch and getting information distributed to responding personnel.

Equipment:

- 1 Aerial Ladder Truck
- 1 Watercraft
- 4 Engines (Pumpers)
- 1 Pumper/Tanker
- 4 Brush/Medical Trucks
- 3 Tenders
- 1 Medium Rescue Truck
- Command Vehicles (Staff vehicles)

Personnel:

TYPE OF TRAINING	NUMBER OF STAFF TRAINED
Paramedic	3
EMT	26
Firefighter 1 & 2	43
Hazmat	22
Water Rescue	11

The District has 30 full time staff, 5 part time staff, and 24 volunteers that work for the district.

2- PLANNING AREA PROFILES AND CAPABILITIES

Station Locations:

- Station 1- 1675 N. Missouri Blvd. Rogersville, Missouri
- Station 2- 2377 S. Blackman Road Springfield, Missouri
- Station 3- 120 Audubon Road Rogersville, Missouri
- Station 4- 5383 State Highway B Rogersville, Missouri
- Station 5-8274 E. Farm Road 174 Rogersville, Missouri
- Station 6- 1120 Mill Street Rogersville, Missouri

A five member Board of Directors who serve six-year terms governs the Logan-Rogersville Fire Protection District.

The Logan-Rogersville Fire Protection District has the following staff:

- 1 Secretary
- 1 Fire Chief
- 1 Deputy Chief
- 3 Assistant Chiefs
- 6 Captains
- 3 Lieutenants
- 9 Equipment Operators
- 18 Firefighters
- 2 Chaplains
- 3 paramedics

Services Provided

- Water Rescue
- Fire Suppression
- Wildland Fire Suppression
- EMT/Paramedic Medical Response
- Auto Extrication,
- HazMat
- Pre-Incident Planning
- Fire Prevention

Mitigation Initiatives

The Logan-Rogersville Fire Protection District participates in many mitigation initiatives around the county. The district participates in trainings offered by LEPC, MU-FRTI, Missouri Division of Fire Safety, EMS continuing education groups and many more agencies not listed. The District also participated in the Springfield Safe Kids Coalition and has seven certified car seat technicians who help install car seats and educate families about the proper use of these life saving devices.

The Logan-Rogersville Fire Protection district also conducts annual inspections of all commercial buildings (e.g. schools, churches, restaurants, etc.) Part of this program includes Knox Boxes, which are required to be installed at all new commercial structures and are available for residential structures. These help responders gain rapid entry to a structure while minimizing property loss.

The Logan-Rogersville Fire Protection District also participates in public mitigation initiatives including an Annual Safety Day Camp and starting in 2019, a Youth Fire Academy. The District also sets off the storm sirens for the district.

2- PLANNING AREA PROFILES AND CAPABILITIES

Mutual Aid Agreements

- Springfield Fire Department
- Strafford Fire Protection Distirct
- Ozark Fire Protection District
- Battlefield Fire Protection District
- Sparta Fire Protection District
- Southern Webster Fire Protection District
- Fair Grove Fire Protection District
- Ebenezer Fire Protection District
- Nixa Fire Department
- Brookline Fire Protection District
- Republic Fire Department
- Marshfield Fire Department
- Marshfield Fire Protection District.

Additional Information

Station 1 is considered the central district that house the districts command staff and the district's administrative assistant. Additionally, this station has a large pond and a community room both available for public use.

With the addition of station 6 in the summer of 2018 a second community room became available for he public to use, and a third fully staffed station 24 hours a day to aid in quicker response times to incidents. This facility also houses back-up systems to set off the storm sirens for the Rogersville area.

The district currently has an ISO (Insurance Services Office) rating of four in areas with fire hydrants and seven in areas with no fire hydrants.

The Logan-Rogersville Fire Protection District covers portions of three different counties, each with its own unique systems. The District strives to keep informed and up to date on what is happening in each county to better prepare the citizens of the district.

Back-Up Systems

- Generators
- Radios
- Fire extinguishers
- Back up storm siren location

2- PLANNING AREA PROFILES AND CAPABILITIES

2.3.6 Walnut Grove Fire Protection District

The Walnut Grove Fire Protection District is one of Greene County's largest fire district per square mile. The district covers approximately 120 square miles. The district is funded through taxes and they do have the power to levy taxes. The Walnut Grove Fire District is governed by a 3 man board. The board members are all elected into office. The board meets once a month and hired a book keeper who is the only paid member in the fire district. The book keeper only works during the monthly meetings.



Equipment:

- Aerial Truck
- 800 MHz Radio
- 4 Pumper Engines
- 2 Support Vehicle
- 3 Water Tender
- 4 Brush Trucks
- Generator

Station Locations:

- 540 N. Washington St. Walnut Grove

Staff:

- 20 Volunteer Firefighters
- One Chief
- One Assistant Chief
- One Lieutenant
- One Book Keeper (PRN)

Services Provided:

- Fire Suppression
- Light Water Rescue
- EMT
- Weather Spotting
- Light Frame Collapsed Structure Rescue

Mitigation Initiatives

The Walnut Grove Fire Protection District has a designated Emergency Manager, currently that is the fire district chief. The District also participated with the IRIS Emergency Alert System. The District has one weather radio located in the station. The district also participated in Fire Prevention School with the Walnut Grove Public School District.

The District likes to remain active in the community when possible helping out with miscellaneous tasks including setting up flags and supplying EMT's to large community events throughout the year.

Mutual Aid Agreements

The Walnut Grove Fire Protection District has mutual aid agreement with all surrounding counties and fire protection districts.

2- PLANNING AREA PROFILES AND CAPABILITIES

2.3.7 Willard Fire Protection District



The Willard Fire Protection District is a combination fire district with both paid and volunteer firefighters. The district has 18 full time employees and 16 volunteers. The District covers 72 square miles, which serves approximately 25,000 people. The District averages amount 1,300 calls per year. The District is funded thru taxes collected thru the district levy. All taxes are approved thru public vote. The Willard Fire Protection District has a Duty Roster, Emergency Operations Plan and an Evacuation Plan.

Equipment:

- 1 Engine Pumper with Aerial Ladder
- 4 Engine Pumpers
- 3 Tenders
- 1 Light Rescue Truck
- 2 Brush Trucks
- 1 ATV
- 3 Support Vehicles
- 800 MHz Radios

Personnel:

TYPE OF TRAINING	NUMBER OF STAFF TRAINED
Paramedic	3
EMT	22
Firefighter 1	26
Firefighter 2	25
Hazmat	25
Water Rescue	6

Station Locations:

- Station 1- 240 N. State Highway Z Willard, Missouri
 - Headquarters
- Station 2- 3891 W. Farm Road 94 Springfield, Missouri
- Station 3- 2455 N. Pine Avenue Springfield, Missouri

A five member Board of Directors governs the Willard Fire Protection District. The board consists of a president, vice president, secretary/treasurer and 2 other members.

2- PLANNING AREA PROFILES AND CAPABILITIES

The Willard Fire Protection District has the following staff:

- 1 Chief
- 1 Assistant Chief
- 2 Battalion Chiefs
- 3 Captains

Services Provided:

- Fire Suppression
- Emergency Medical Response
- Fire Protection
- Advanced Life Support
- Hazardous Materials response
- Brush Fire Response
- Technical Vehicle Extraction
- Investigations
- Public Relations
- Fire Training Academy Instruction
- Swift Water Rescue

Mitigation Initiatives

The District has a dedicated shelter room. It maintains its own ham radio frequency with separate computer back up. The room is completely reinforced and designed to withstand any type of emergency. It was designed to withstand a disaster the community of Willard.

Public Education has exploded in the last several years with the entire Willard School District relying upon the fire district for public education, involving 8 different facilities with a total enrollment of over 8,000 students. Dickerson Park Zoo, Willard's Freedom Fest, the Southwest Missouri Veterans Day Parade, alone with the exploding, Fall on the Frisco are all events that are challenging the district.

Mutual Aid Agreements

Currently, the district has mutual aid agreements with all bordering districts and are currently exploring expanding our aid agreements with the City of Springfield.

Additional Information

The Willard Fire Protection District has a community room with a seating capacity of 70. The community room is a host for Mercy Hospital trainings, held quarterly. The room also serves for University of Missouri Training Classes. The district utilize the room for Monday night departmental training.

Willard has seen a steady growth rate of 4% each year. The district is growing each year with the total call volume topping over 1,600 calls in 2019. The district is stretched as far as labor and equipment costs to provide the best to the taxpayer as they can. Willard stands alone in the county as an advanced life support department. The cost of the narcotics, training and equipment is forever rising. The intent of the district is to remain a combination full time profession/volunteer department. The challenges of a new 4 lane highway, continue subdivision growth, bordering multiple volunteer districts equipment, and maintenance lie ahead in the district's future.

Back-Up Systems

The Willard Fire Protection District has the following back-up systems:

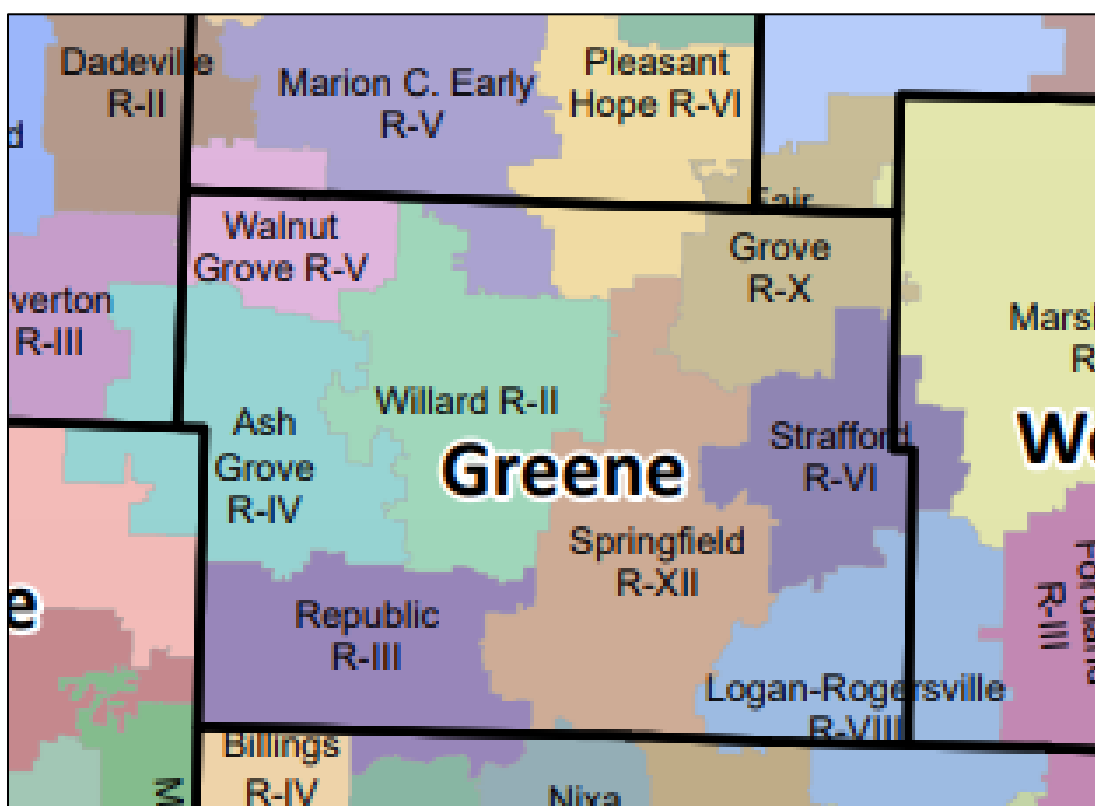
- Fire Extinguishers
- Ham Radios
- VHF Repeaters
- VHF Portable Radios
- Emergency Generator
- Command Generator
- V-Tac Narrow Band

2- PLANNING AREA PROFILES AND CAPABILITIES

2.4 PUBLIC SCHOOL DISTRICT PROFILES AND MITIGATION CAPABILITIES

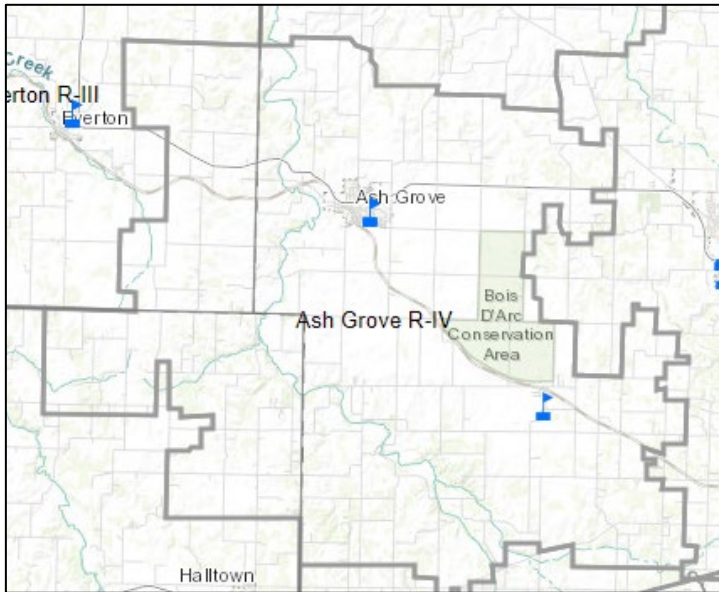
All the school districts participated in the 2020 Multi-Jurisdictional Hazard Mitigation Plan. Each school district covers different portions of Greene County. Each school district has an individual profile included within this section. Their profiles list buildings, enrollment information, mitigation capabilities and other information about the district.

Map: School Districts Boundaries in Greene County



2- PLANNING AREA PROFILES AND CAPABILITIES

2.4.1 Ash Grove Public School District



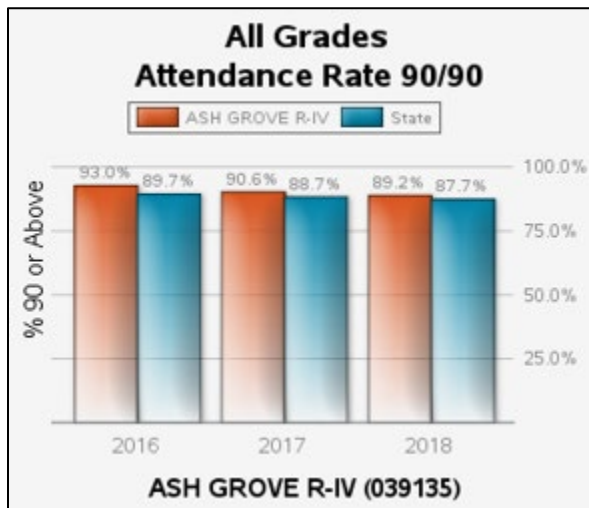
The Ash Grove School District covers 119 Square miles. The schools district covers three counties, 16 square miles in Dade County, 19 square miles in Lawrence County and 84 square miles in Greene County. The Ash Grove School district has a lot of programs for their students including:

- Special Education Programs
- Counseling Services
- Gifted Program
- Athletics
- Music

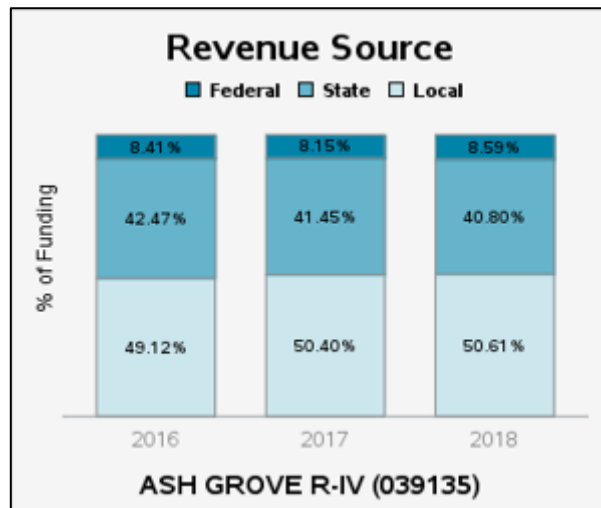
The school district has a Board of Education consisting of 7 members including one president, one vice president, one treasurer, and four other members. Each member serves

three year terms. The vision for Ash Grove School District is one in which children are educated through a collaborative effort among faculty, staff, students, parents, and the community.

All Grades Attendance Rate



Revenue Source



The Ash Grove School District does cover more than one county; the enrollment information provided on the next page covers the whole district, not just Greene County.

2- PLANNING AREA PROFILES AND CAPABILITIES

Ash Grove Buildings and Enrollment Data, 2019

DISTRICT NAME	BUILDING NAME	BUILDING ADDRESS	BUILDING ENROLLMENT	BUILDING TEACHERS
Ash Grove R-IV	Ash Grove Elementary	100 N. Maple Lane	218	20
Ash Grove R-IV	Ash Grove High	100 N. Maple Lane	334	34
Ash Grove R-IV	Bois D'Arc Elementary	10315 W. State Highway T	152	15

Source: <http://mcids.dese.mo.gov/quickfacts/pages/district-and-school-information.aspx>, 2019

CAPABILITY ASSESSMENT

Personnel:

TYPE OF PERSONNEL	QUANTITY AVAILABLE
Resource Officer	0
Nurse(s)	2
Counselors	2
Bilingual Staff	0
Special Education	7

Equipment:

- Two-Way Radios
- Buses
- Phone/Internet/Computers
- Portable Generators
- Cell Phones

Back-Up Systems

At this time, the school district has very few redundant systems that would help provide communication, electricity, water, etc in times of need. The one service that is provided is emergency lighting in each school.

2 - PLANNING AREA PROFILES AND CAPABILITIES

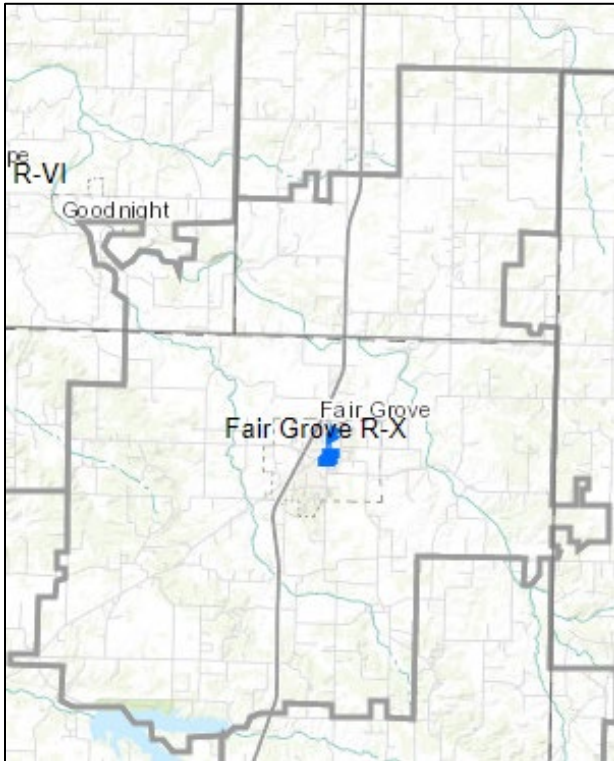
Ash Grove Mitigation Capabilities

CAPABILITY	ASH GROVE SCHOOL DISTRICT
PLANNING ELEMENTS	
Master Plan/Date	Yes - 4/4/2019
Capital Improvement Plan/Date	Yes -2019
School Emergency Plan/Date	Yes -2018
Weapons Policy/Date	Yes -2001
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes
Emergency Manager	Yes - Superintendent
Grant Writer	No
Public Information Officer	No
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	Yes
Special Tax Bonds	Yes
Private Activities/Donations	Yes
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes - each building has an intercom system
NOAA Weather Radios	Yes
Lock-Down Security Training	Yes
Mitigation Programs	Yes - Bond for new security cameras, secure entrances
Tornado Shelter/Saferoom	No
Campus Police	Ash Grove Police Handles security needs

Source: Data Collection Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.4.2 Fair Grove School District



The Fair Grove School District covers approximately 82 square miles. The District spreads across four counties including Greene, Polk, Dallas and Webster. The majority of the school district is in Greene County. A bigger portion of the school district crosses into Dallas County and very few square miles in Polk and Webster.

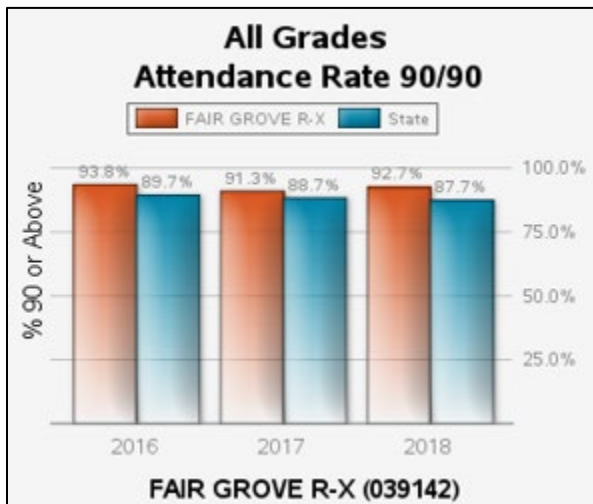
Starting in the fall of 2019, the Fair Grove School District started a 4-day school week. The school district offers a wide variety of programs for their students including:

- Athletics
- Music
- Counseling
- Special Education
- Gifted Education
- School Safety

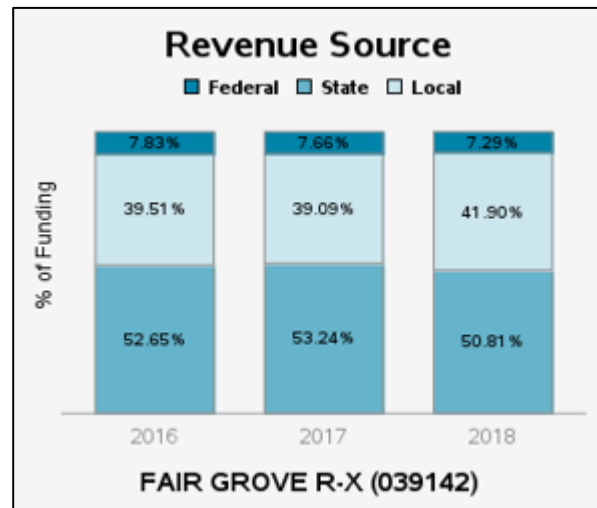
The Fair Grove School District has a Board of Education consisting of seven members including one president, one vice president, treasurer, secretary, and three

other members. Meetings are typically held on the third Wednesday of every month. School board members have no power or authority except that which results from participating in decisions and actions of the board in an official session.

All Grades Attendance Rate



Revenue Source



The Fair Grove School District does cover more than one county; the enrollment information provided on the next page covers the whole district, not just Greene County.

2- PLANNING AREA PROFILES AND CAPABILITIES

Fair Grove Building and Enrollment Data

DISTRICT NAME	BUILDING NAME	BUILDING ADDRESS	BUILDING ENROLLMENT	BUILDING TEACHERS
Fair Grove R-X	Fair Grove Elementary	132 N. Main St	502	41
Fair Grove R-X	Fair Grove Middle	132 N. Main St.	342	35
Fair Grove R-X	Fair Grove High	132 N. Main St.	323	37

Source: <http://mcids.dese.mo.gov/quickfacts/pages/district-and-school-information.aspx>, 2019

Additional Information

The Fair Grove School District has adopted the ALERTNOW Notification Service to keep all patrons of the District informed of important and emergency information. This service is free to all persons; however you must sign up for the service to receive alerts. The District also has a notification system through STAFETIPS, which is also a reporting application for all persons to report potential threats and crimes to school administration.

The Fair Grove School District also has a FEMA Safe Room located in the middle of the school campus property on a roadway named "High Drive".

CAPABILITY ASSESSMENT

Personnel:

TYPE OF PERSONNEL	QUANTITY AVAILABLE
Resource Officer	1
Nurse(s)	N/A
Counselors	N/A
Bilingual Staff	N/A
Special Education	N/A

Other Personnel Information

The School Resource Officer is POST Certified and carries a handgun for security at all times, and an 800 MHz Radio for communication with emergency officials, along with a digital handheld radio for constant communication with school officials.

The Maintenance Department assists with water, electrical and gas issues in all of the facilities and provide tools for any necessary repairs.

The nurses are certified in CPR and First Aid for all ages.

Equipment:

- 800 MHz radio
- Weather Radios
- Computers
- Digital Radios
- Intercom System
- Telephones
- Buses
- Battery Back-Up for Phones
- Televisions
- Lumen Alert System
- Special Needs Bus (With lift)
- Security Camera System

2 - PLANNING AREA PROFILES AND CAPABILITIES

The School District is projected to see an increase of 5% over the next five years.

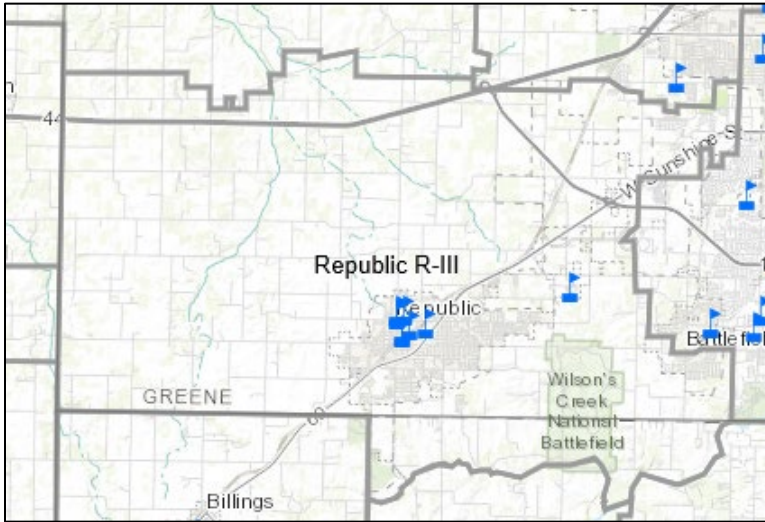
Fair Grove Mitigation Capabilities

CAPABILITY	FAIR GROVE SCHOOL DISTRICT
PLANNING ELEMENTS	
Master Plan/Date	Yes -2018
Capital Improvement Plan/Date	Yes -2014
School Emergency Plan/Date	Yes -2018
Weapons Policy/Date	Yes -2019
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes - 3 principals, 2 assistant principals
Emergency Manager	Yes - Director of Safety
Grant Writer	No
Public Information Officer	No
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	Yes
Special Tax Bonds	Yes
Private Activities/Donations	No
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes - Elementary School PA System is unreliable
NOAA Weather Radios	Yes
Lock-Down Security Training	Yes
Mitigation Programs	Yes
Tornado Shelter/Saferoom	Yes - Center of school campus connected to middle school.
Campus Police	Resource Officer and Safety and Security/EMD

Source: Data Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.4.4 Republic School District



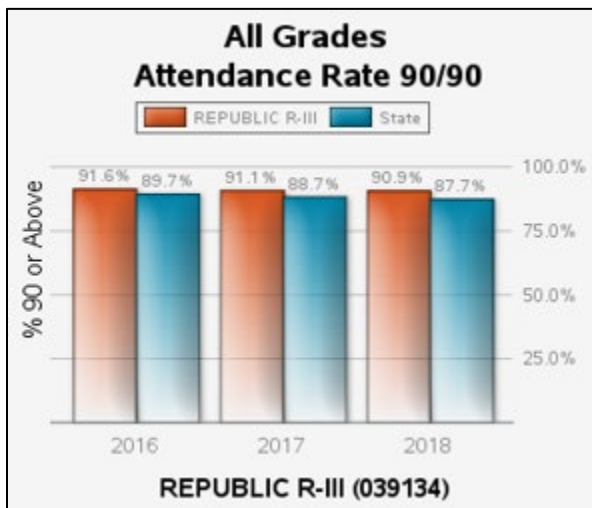
The Republic School District covers approximately 100 square miles across Greene and Christian County. The school district serves over 4,900 students. The school district has a history of student performance that is in the upper rank of public schools across Missouri. The Missouri Department of Elementary and Secondary Education assigned a “grade” to all public schools in the state based on a 140 point scale called the “Annual Performance Report (APR). Republic’s most recent “grade” was 100% as the district achieved 140 out of 140 points possible. The school district also has been

rated as “Accredited with Distinction in Performance” by the Missouri Department of Elementary and Secondary Education. The School District has one FEMA Safe room that is located at Sweeny Elementary to serve the community, students and faculty. The school district has many programs for students which include:

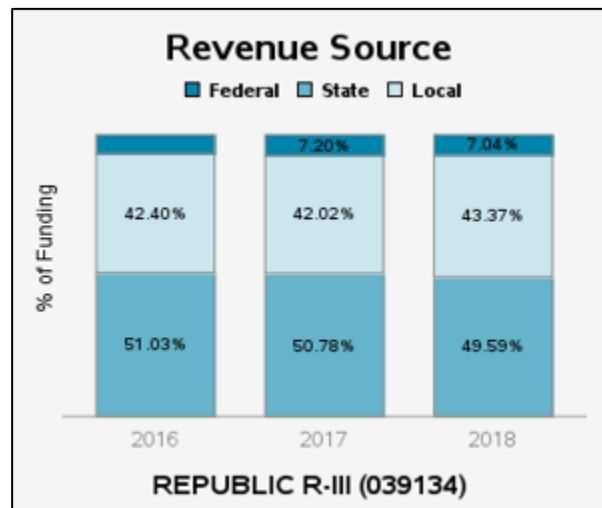
- STRIPES 360
- Speech
- Band
- Theatre
- FCCLA
- FFA
- Athletics
- GO CAPS
- FCCLA
- FFA

The Republic School Board consists of seven members who are elected to three year terms. The School Board meets monthly on the third Thursday at 7:00 p.m. The School Board consists of a president, vice president, treasurer and 4 other members. Central Office Administration includes a Superintendent Assistant Superintendent, and Executive Director of Operations.

All Grades Attendance



Revenue Source



2- PLANNING AREA PROFILES AND CAPABILITIES

The Republic School District does cover more than one county; the enrollment information provided below covers the entire school district, not just Greene County.

Republic School District Building and Enrollment Data

DISTRICT	BUILDING NAME	BUILDING ADDRESS	BUILDING ENROLLMENT	TEACHER ENROLLMENT
Republic R-III	Early Childhood Center	636 N. Main St	117	12
Republic R-III	Lyon Elementary	201 E. Highway 174	437	45
Republic R-III	Mcculloch Elementary	234 E. Anderson St.	481	44
Republic R-III	Price Elementary	518 N. Hampton St.	452	44
Republic R-III	Republic High	4370 S. Repmo Drive	1403	98
Republic R-III	Republic Middle	#1 Tiger Drive	1171	86
Republic R-III	Schofield Elementary	235 E. Anderson	473	45
Republic R-III	Sweeny Elementary	720 N. Main	373	44

Source: <http://mcds.dese.mo.gov/quickfacts/pages/district-and-school-information.aspx>, 2019

CAPABILITY ASSESSMENT

Personnel:

TYPE OF PERSONNEL	QUANTITY AVAILABLE
Resource Officer	5
Nurse(s)	10
Counselors	18
Bilingual Staff	1
Special Education	44

*The bilingual and special education numbers are just teachers. This does not include deaf interpreters, staff that may be bilingual, or staff that assists with special educations like paras.

Equipment:

- Buses
- Computers
- Mobile Devices
- Portable radios
- Police/Emergency Management Radios
- Handheld Radios
- Intercom/PA System
- Transport Van
- Televisions

Back-Up Systems

The District primarily uses virtual servers but does utilize 15 nodes and three redundant data storage points. VHF radios are available in facilities to provide a second means of communication.

2 - PLANNING AREA PROFILES AND CAPABILITIES

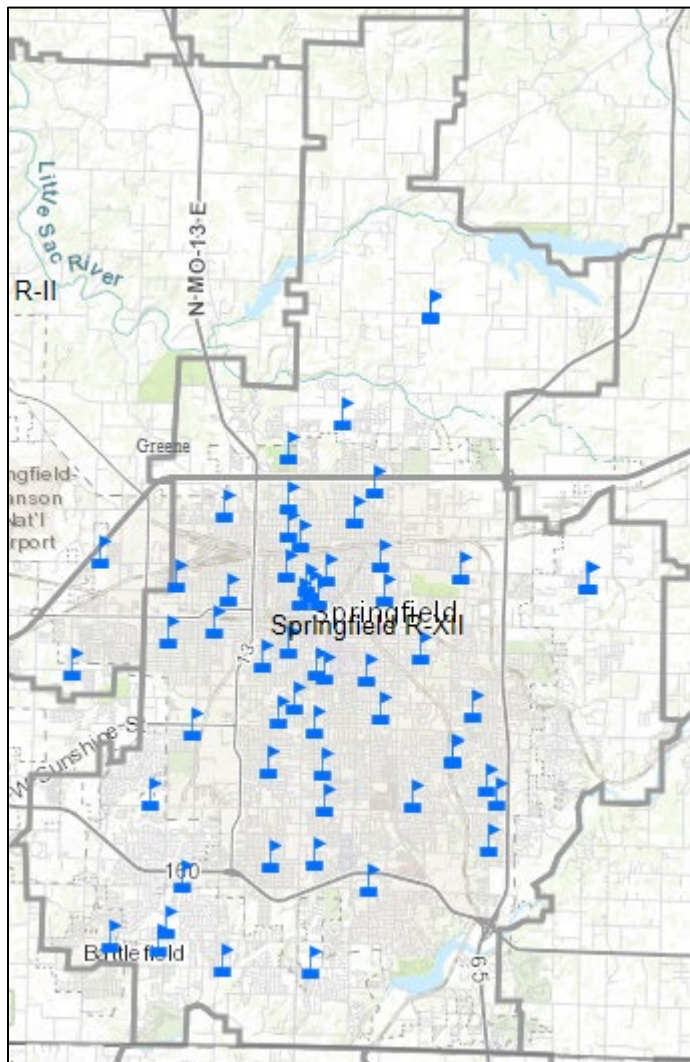
Republic School District Mitigation Capabilities

CAPABILITY	REPUBLIC SCHOOL DISTRICT
PLANNING ELEMENTS	
Master Plan/Date	Yes - 05/17/2019
Capital Improvement Plan/Date	Yes - 05/17/2019
School Emergency Plan/Date	Yes - 06/01/2018
Weapons Policy/Date	Yes - 05/24/2019
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes - Principal in each Building
Emergency Manager	Yes - Director of Safety and Security
Grant Writer	No
Public Information Officer	Yes
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	Yes
Special Tax Bonds	Yes
Private Activities/Donations	Yes
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes - Each Building
NOAA Weather Radios	Yes
Lock-Down Security Training	Yes
Mitigation Programs	Yes - Sink Hole Mitigation
Tornado Shelter/Saferoom	Yes - Sweeny Elementary FEMA Shelter
Campus Police	Five Commissioned Officers

Source: Data Collection Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.4.5 Springfield Public School District



The Springfield Public School District is the largest school district in Greene County and also the largest school district in the State of Missouri. It covers 137 square miles. Springfield School District serves over 25,000 students and has over 4,000 employees. The District has a long tradition of providing quality education to all students and exceeding community expectations. Some of the programs and services that the school district offers are:

- A+ Program
- Attendance Services
- Choice Program
- Counseling Services
- Early Childhood Learning
- Go GAPS
- Health and Wellness Services
- Nutrition services
- Project Lead the Way
- Special Education Services
- Study Alternative Center

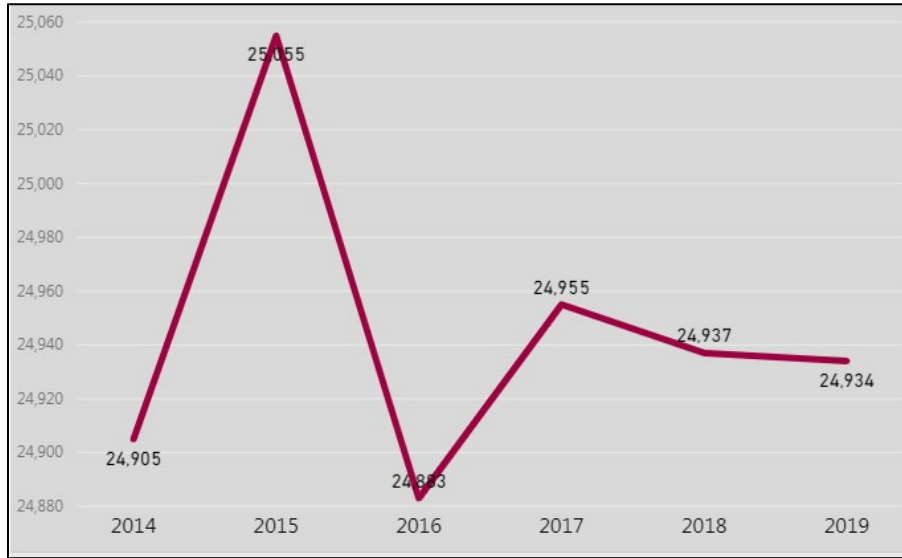
Springfield Public Schools has a board of education that has seven members including: one president, one vice president, and five other members. School board members must be a resident of the school district and have resided within the state for one year at the time of election or appointment and be at least 24 years of age. The term of a member is three years. The

board has full legislative authority and control of the district as provided for in state law. The Springfield Board of Education typically meets twice a month at 5:30 p.m. at Kraft Administrative Center.

Springfield Public School's Mission is to prepare all students for tomorrow by providing engaging, relevant and personalized educational experiences today. Their vision is to serve as a catalyst for lifelong learning, equipping students for their future.

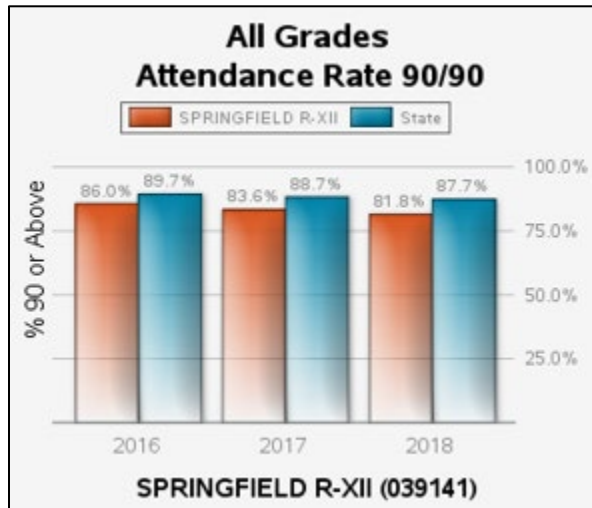
2- PLANNING AREA PROFILES AND CAPABILITIES

Springfield Official Student Count-Yearly

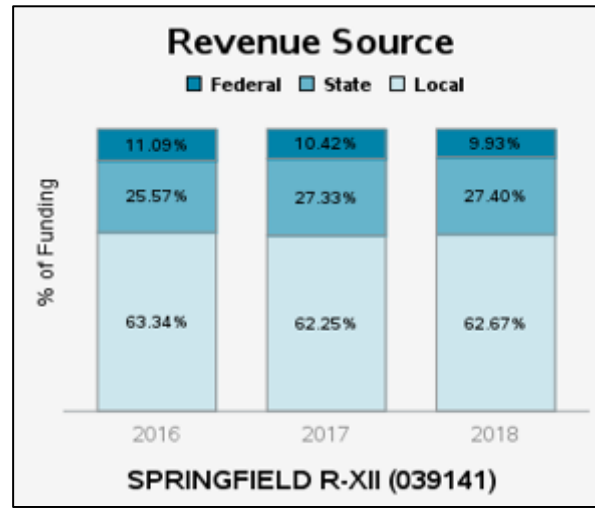


Source: Springfield Public Schools

All Grades Attendance



Revenue Source



The enrollment rate is currently projected to remain stable over the next several years with no anticipated significant changes in enrollment.

2- PLANNING AREA PROFILES AND CAPABILITIES

Springfield School District Building and Enrollment Data

DISTRICT NAME	BUILDING NAME	BUILDING ADDRESS	BUILDING ENROLLMENT	BUILDING TEACHERS
Springfield R-XII	Bingham Elementary	2126 E. Cherry St.	436	72
Springfield R-XII	Bissett Elementary	3014 W. Calhoun	244	25
Springfield R-XII	Bowerman Elementary	2148 N. Douglas Ave	264	28
Springfield R-XII	Boyd Elementary	1409 Washington St.	175	24
Springfield R-XII	Campbell Elementary	506 S. Grant Ave.	151	19
Springfield R-XII	Carver Middle School	3325 W. Battlefield Rd.	766	59
Springfield R-XII	Central High	423 E. Central St.	1,728	180
Springfield R-XII	Cherokee Middle	420 E. Farm Road 182	926	55
Springfield R-XII	Cowden Elementary	2927 S. Kimbrough Ave.	310	27
Springfield R-XII	David Harrison Elementary	3055 W. Kildee Ln.	368	26
Springfield R-XII	Delaware Elementary	1505 S. Delaware St.	235	34
Springfield R-XII	Field Elementary	2120 Baratavia St.	414	31
Springfield R-XII	Fremont Elementary	2814 N. Fremont Ave.	384	32
Springfield R-XII	Glendale High	2727 S. Ingram Mill Rd.	1377	88
Springfield R-XII	Gray Elementary	2102 W. Farm Road 182	523	33
Springfield R-XII	Hickory Hills Elementary	4650 E. State Highway YY	426	30
Springfield R-XII	Hickory Hills Middle	4650 E. State Highway YY	488	40
Springfield R-XII	Hillcrest High	3319 N. Grant Ave.	1090	73
Springfield R-XII	Holland Elementary	2403 S. Holland Ave.	271	25
Springfield R-XII	Horace Mann Elementary	3745 S. Broadway Ave.	395	29
Springfield R-XII	Jarrett Middle	840 S. Jefferson St.	499	41
Springfield R-XII	Jeffries Elementary	4051 S. Scenic Ave.	488	36
Springfield R-XII	Kickapoo High	3710 S. Jefferson	1809	102
Springfield R-XII	Mark Twain Elementary	3252 S. Weaver Rd.	394	32
Springfield R-XII	McBride Elementary	5005 S. Farm Road 135	494	33
Springfield R-XII	McGregor Elementary	1221 W. Madison	274	38
Springfield R-XII	Parkview High	516 W. Meadowmere St.	1392	97

2- PLANNING AREA PROFILES AND CAPABILITIES

Springfield R-XII	Pershing Elementary	2120 Ventura St.	186	16
Springfield R-XII	Pershing Middle	2120 Ventura St.	736	49
Springfield R-XII	Pipkin Middle	1215 Booneville Ave	598	50
Springfield R-XII	Pittman Elementary	2934 E. Bennett St.	315	25
Springfield R-XII	Pleasant View Elementary	2210 E. State Highway AA	192	19
Springfield R-XII	Pleasant View Middle	2210 E. State Highway AA	333	29
Springfield R-XII	Portland Elementary	906 W. Portland St.	234	21
Springfield R-XII	Reed Middle	2000 N. Lyon St.	674	56
Springfield R-XII	Robberson Elementary	1100 E. Kearney St.	222	21
Springfield R-XII	Rountree Elementary	1333 E. Grand St.	257	21
Springfield R-XII	Sequiota Elementary	3414 S. Mentor Rd.	395	27
Springfield R-XII	Shady Dell Early Childhood Center	2757 E. Division St.	429	36
Springfield R-XII	Sherwood Elementary	2524 S. Golden Ave.	551	37
Springfield R-XII	Study Alternative High	2343 W. Olive St.		
Springfield R-XII	Sunshine Elementary	421 E. Sunshine St.	181	18
Springfield R-XII	Truman Elementary	3850 N. Farm Road 159	317	29
Springfield R-XII	Walt Disney Elementary	4100 S. Fremont Ave.	611	36
Springfield R-XII	Watkins Elementary	732 W. Talmage St.	268	29
Springfield R-XII	Weaver Elementary	1461 N. Douglas St.	258	29
Springfield R-XII	Weller Elementary	1630 N. Weller St.	342	33
Springfield R-XII	Westport Elementary	415 S. Golden Ave.	405	28
Springfield R-X-II	Westport Middle Schools	415 S. Golden Ave	462	50
Springfield R-XII	Wilder Elementary	2526 S. Hillsboro St.	420	30
Springfield R-XII	Williams Elementary	2205 W. Kearney St.	311	31
Springfield R-XII	Wilson's Creek 5-6	4035 W. Weaver Rd.	475	33
Springfield R-XII	York Elementary	2100 Nichols St.	249	25

Source: <http://mcds.dese.mo.gov/quickfacts/pages/district-and-school-information.aspx>, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

CAPABILITY ASSESSMENT

Personnel:

TYPE OF PERSONNEL	QUANTITY AVAILABLE
Police Officer (s)	26
Nurse(s)	61
Counselors	84
Bilingual Staff	Unknown
Special Education	522

Equipment:

- Computers
- Two-Communications
- Telephone (Land Based)
- Telephone (Cellular)
- Buses
- District Vehicles
- Intercom Systems
- Shelters
- Camera Systems
- 800 MHz Radio
- Weather Radio

Back-Up Systems

There are 150 back-up servers used by more than 12,000 computers in the district. There are 65 fire detection systems and EMCCS intercoms.

Other Capabilities

There are more than 65 emergency procedures in place to adequately address individual site and district policies. These procedures are tests through table-top exercises. Additional funding would enhance the emergency procedures through both the planning process and exercises.

2 - PLANNING AREA PROFILES AND CAPABILITIES

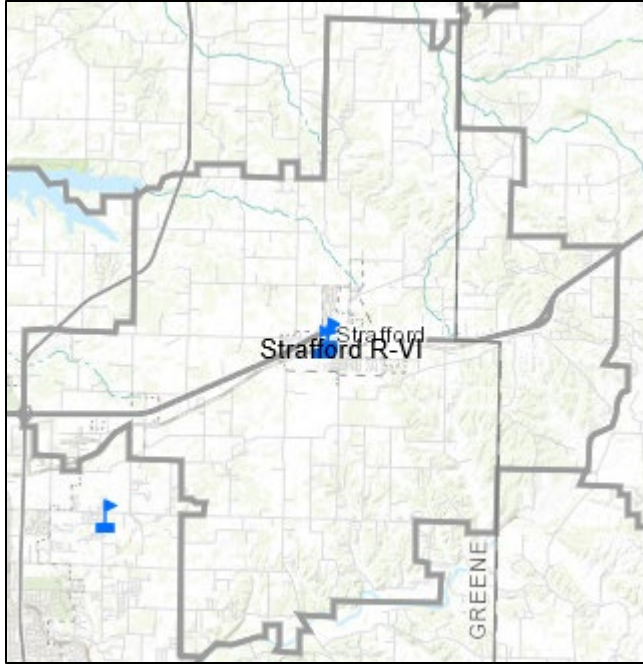
Springfield School District Mitigation Capabilities

CAPABILITY	SPRINGFIELD SCHOOL DISTRICT
PLANNING ELEMENTS	
Master Plan/Date	Yes - 11/15/2016 Facilities Master Plan
Capital Improvement Plan/Date	Yes - 4/2/2019 Proposition S Projects
School Emergency Plan/Date	Yes - 10/1/2018 Annually updated by GCOEM
Weapons Policy/Date	Yes - 7/1/2018 Page 68 Student Handbook
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes - Each Building has a Principal
Emergency Manager	Yes - School Resource Officer
Grant Writer	No
Public Information Officer	Yes
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	Yes
Special Tax Bonds	Yes - Storm Shelters, Secure entrances
Private Activities/Donations	Yes
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes - Academic buildings include warning tones for different hazards.
NOAA Weather Radios	No
Lock-Down Security Training	Yes
Mitigation Programs	Yes - Routine safety assessments are provided by GCOEM
Tornado Shelter/Saferoom	Yes - 6 Schools
Campus Police	Yes - 26 commissioned officers

Source: Data Collection Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.4.6 Strafford School District



The Strafford Public School District covers approximately 75 square miles in both Greene and Webster counties. The school district serves over 1,100 students. The Strafford School district has been rated as “Accredited with Distinction” by the Missouri Department of Elementary and Secondary Education since 1999. This is the highest level of accreditation that the department awards to public schools in Missouri. The school district offers many programs to their students including:

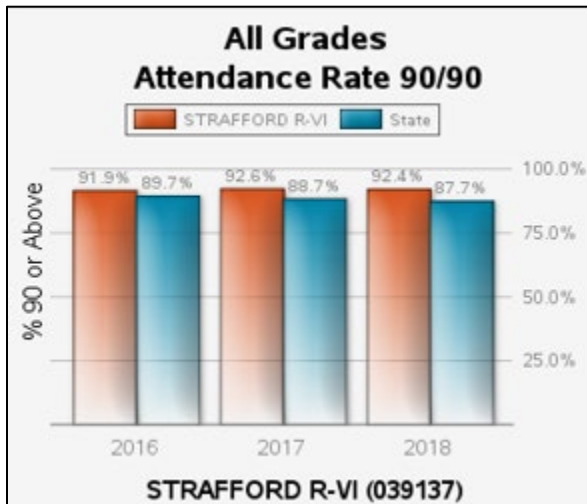
- Athletics
- Music
- Special education
- Health Services

Strafford School district does have a Board of Education that consists of 7 members including: one president, one vice president, one secretary, one treasurer, and three other members. The board of

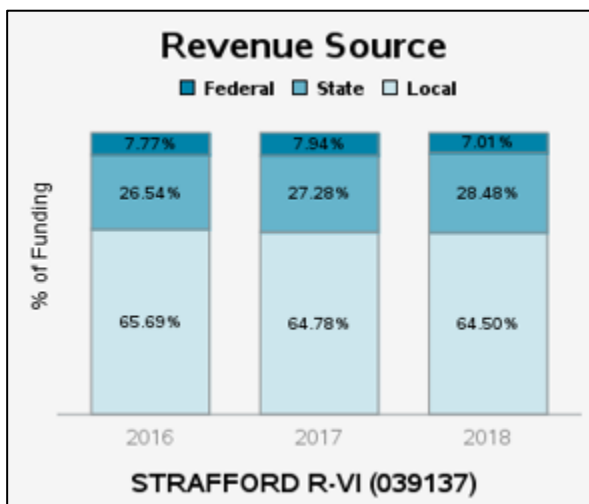
education controls all aspects of the operation of the district within the limits of the law.

The Strafford School District’s Mission is to develop the potential in every student by providing a learning environment conducive to developing mature, responsible individuals who contribute to our changing society. The district’s vision is that the Strafford community will graduate individuals with the skills to be productive, responsible citizens.

All Grades Attendance Rate



Revenue Source



2- PLANNING AREA PROFILES AND CAPABILITIES

The Strafford School District does cover more than one county; the enrollment information provided on the next page covers the entire school district, not just Greene County.

Strafford School District Building and Enrollment Data

DISTRICT NAME	BUILDING NAME	BUILDING ADDRESS	BUILDING ENROLLMENT	TEACHER ENROLLMENT
Strafford R-VI	Strafford Elementary	310 W. McCabe St.	466	36
Strafford R-VI	Strafford Middle	213 W. McCabe St.	394	32
Strafford R-VI	Strafford High	211 W. McCabe St.	373	38

Source: <http://mcids.dese.mo.gov/quickfacts/pages/district-and-school-information.aspx>, 2019

Additional Information

The Strafford School District implemented an Emergency Alert Call system at the beginning of the 2008-2009 school year. This system is set up to alert parents and staff in case of a crisis or just simply for a snow day. The records management and emergency alert system for the district is set up by Lumen.

Strafford School District has a resource officer who has direct contact with 911 dispatch as well as local police and fire department by radio. The resource officer also monitors cameras that are placed around the campus.

CAPABILITY ASSESSMENT

Personnel:

TYPE OF PERSONNEL	QUANTITY AVAILABLE
Resource Officer	1
Nurse(s)	2
Counselors	3.5
Bilingual Staff	0
Special Education	1 Director, 10 Teachers, 15 Para Professionals

Equipment:

- Computers
- Telephone (Landline)
- Buses
- Security Systems
- Weather Radio
- 800 MHz Radio
- Hand Radios
- Intercom System
- Lumen Alert System
- Televisions for Alerts
- Batter Back-Up for Phones

Back-Up Systems

Back up batteries are available for phones. Each building also has fire alarms and a sprinkler system. The intercom system uses bells to alert students and staff of emergency situations.

2 - PLANNING AREA PROFILES AND CAPABILITIES

Other Capabilities

All doors lock from the outside, and each building has a calling tree. Additionally, the district has emergency procedures in place and has them accessible through software to increase the amount of people and locations that can access them. The Strafford School District has several locations designated for storm refuge designed by the Springfield-Greene County Office of Emergency Management.

Strafford School District Mitigation Capabilities

CAPABILITY	STRAFFORD SCHOOL DISTRICT
PLANNING ELEMENTS	
Master Plan/Date	Yes - 2019
Capital Improvement Plan/Date	N/A
School Emergency Plan/Date	Yes - 2018 Updated Yearly
Weapons Policy/Date	Yes
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes - Principal in each Building
Emergency Manager	Yes - Superintendent
Grant Writer	No
Public Information Officer	Yes
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	No
Special Tax Bonds	No
Private Activities/Donations	No
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes
NOAA Weather Radios	No
Lock-Down Security Training	Yes
Mitigation Programs	No
Tornado Shelter/Saferoom	Yes
Campus Police	Resource Officer

Source: Data Collection Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.4.7 Walnut Grove School District



The Walnut Grove School District covers 53 square miles across Greene and Polk counties. The Walnut Grove School District serves around 250 students making it the smallest district in the planning area.

The District offers many programs to their students including:

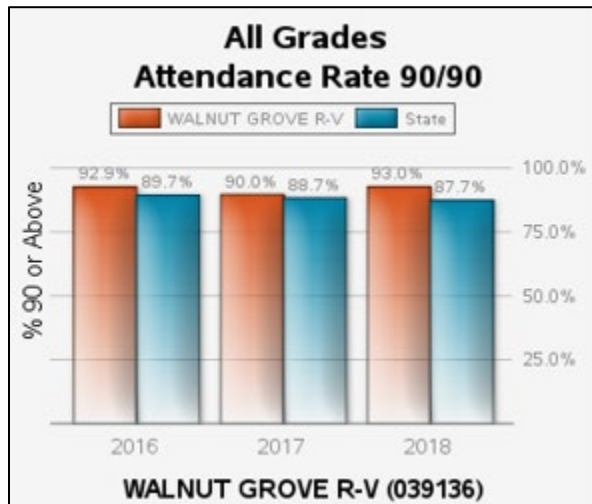
- Athletics
- A+ Program
- Special Services
- Health Services

The Walnut Grove School District does have a Board of Education. The Board consists of 8 members including: one president, one vice president, one secretary, one treasurer and four other members. The Board typically

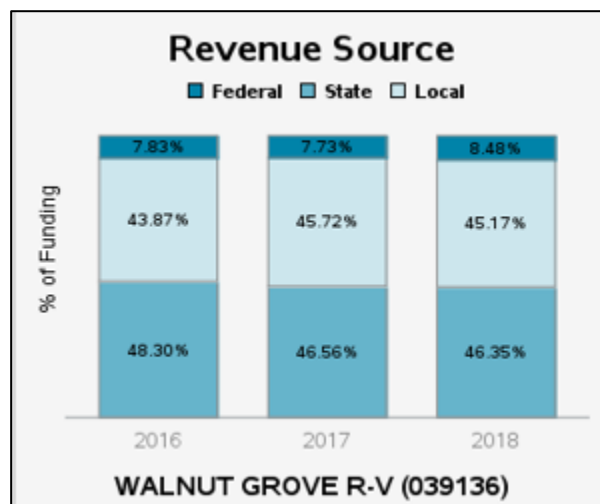
meets once a month.

The Walnut Grove’s Mission Statement is “to instill in every student the conviction that ‘I believe I can learn and I will learn’ and to make this conviction educationally possible.”

All Grades Attendance Rate



Revenue Source



2- PLANNING AREA PROFILES AND CAPABILITIES

The Walnut Grove School District does cover more than one county; the enrollment information provided below covers the entire school district, not just Greene County.

Walnut Grove School District Building and Enrollment Data

DISTRICT NAME	BUILDING NAME	BUILDING ADDRESS	BUILDING ENROLLMENT	TEACHER ENROLLMENT
Walnut Grove R-V	Walnut Grove Elementary	300 E. College St.	150	18
Walnut Grove R-V	Walnut Grove High	300 E. College St.	136	17

Source: <http://mcds.dese.mo.gov/quickfacts/pages/district-and-school-information.aspx>, 2019

Additional Information

The Walnut Grove School District maintains positive and community based relations with the following organizations:

- Walnut Grove Ministerial Alliance
- Parent Teacher Organization
- O'Sullivan Lodge #7 AF&AM
- Walnut Grove Alumni Association
- Walnut Grove Booster Club
- Walnut Grove Community Development

CAPABILITY ASSESSMENT

Personnel:

TYPE OF PERSONNEL	QUANTITY AVAILABLE
Resource Officer	1
Nurse(s)	1
Counselors	1
Bilingual Staff	0
Special Education	1

Equipment:

- Telephone Systems
- Computers
- Buses
- PA System
- Security Cameras

Back-Up Systems

The Walnut Grove School District has implemented many back-up security systems, including fire detectors, burglar alarms, CO2 detectors, back-up servers, video cameras, and two computers with batter back-up.

Other Capabilities

The Walnut Grove School District has many organizational procedures in the case of emergencies. These procedures involve lockdown measures, emergency call lists, and emergency plan, two separate evacuation plans, and Bomb/Intruder/Active Shooter Plans.

2 - PLANNING AREA PROFILES AND CAPABILITIES

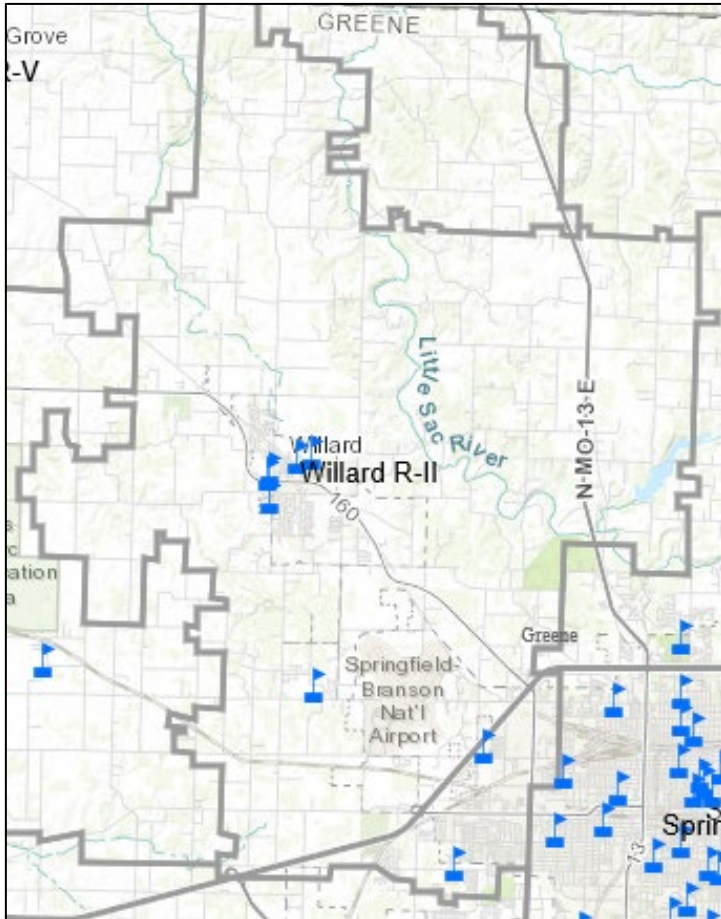
Walnut Grove School District Mitigation Capabilities

CAPABILITY	WALNUT GROVE SCHOOL DISTRICT
PLANNING ELEMENTS	
Master Plan/Date	Yes - 03/2019
Capital Improvement Plan/Date	Yes - 03/2019
School Emergency Plan/Date	Yes
Weapons Policy/Date	Yes - 12/2018
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes
Emergency Manager	Yes
Grant Writer	Yes
Public Information Officer	Yes
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	Yes
Special Tax Bonds	No
Private Activities/Donations	Yes
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes
NOAA Weather Radios	Yes
Lock-Down Security Training	Yes
Mitigation Programs	Yes - Working on shelters using a tax levy
Tornado Shelter/Saferoom	Yes - Not FEMA Standards
Campus Police	No

Source: Data Collection Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.4.8 Willard Public School District



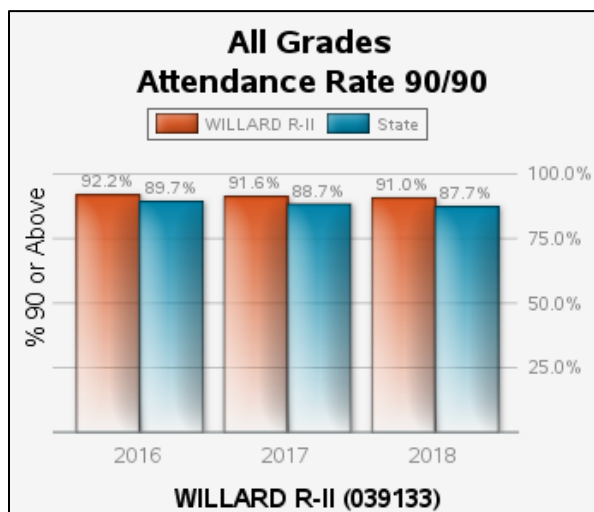
The Willard School District covers about 112 square miles in Greene County. The school district has approximately 4,500 students. Teachers at Willard School District rank high with 65% of the 371 certified staff members having Master's Degrees or higher. The Willard School District has many programs throughout the district including:

- A+
- Dual Credit College Classes
- Virtual Classes
- Music Programs
- Language Arts
- Speech
- Industrial Arts
- Special Education Programs

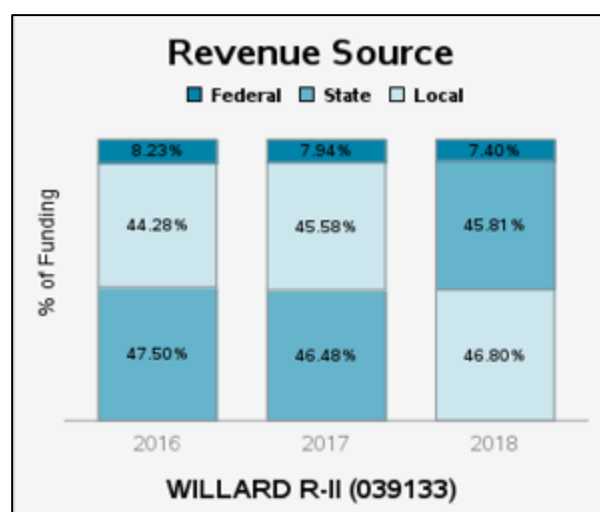
The Willard School District does have a Board of Education consisting of 7 members including: one president, one vice president, and five other members. The School Board is responsible for the organization and control of the public schools within the district boundaries. Each member is elected for three-year terms. School Board meetings are held on the third Thursday of each months.

Willard has a very simple mission statement of Student Focused, Strongly Connected, and Success Driven.

All Grades Attendance Rate



Revenue Source



2- PLANNING AREA PROFILES AND CAPABILITIES

Willard School District and Building Enrollment

DISTRICT NAME	BUILDING NAME	BUILDING ADDRESS	BUILDING ENROLLMENT	TEACHER ENROLLMENT
Willard R-II	Willard Central Elementary	2625 N. Farm Road 101	376	34
Willard R-II	Willard East Elementary	518 Kime St.	358	31
Willard R-II	Willard High	515 E. Jackson St.	1350	104
Willard R-II	Willard Intermediate	407 Farmer Road	690	56
Willard R-II	Willard Middle	205 Miller Road	677	55
Willard R-II	Willard North Elementary	409 Farmer Road	332	36
Willard R-II	Willard Orchard Hills Elementary	4595 Farm Road 140	357	34
Willard R-II	Willard South Elementary	4151 W. Division St.	443	40

Source: <http://mcids.dese.mo.gov/quickfacts/pages/district-and-school-information.aspx>, 2019

Additional Information

Law enforcement is provided by the City of Willard, Greene County Sherriff Department and the City of Springfield. The Willard School District also employs three School Resource Officers who serve in cooperation with the City of Willard Police Department and the Greene County Sherriff's Department.

Medical Services is provided by the Willard School District Health Services Department comprised of 2 Registered Nurses, 5 Licensed Practical Nurses, and 2 Medical Assistants.

CAPABILITY ASSESSMENT

Personnel:

TYPE OF PERSONNEL	QUANTITY AVAILABLE
Police Officer (s)	3
Nurse(s)	9
Counselors	13
Bilingual Staff	5
Special Education	53

Equipment:

- Phones
- Internet
- Tablets
- Two-Way Radios
- District Radios
- Weather Radios
- Instant Notification System
- Security Cameras
- Motion Sensors
- Trailers
- Tractors
- Mowers
- Buses
- Buses with handicap accessibility
- Mobile Phones

2 - PLANNING AREA PROFILES AND CAPABILITIES

Back-Up Systems

The following back-up systems are available in the Willard School District:

- Generators
- Emergency Lights
- Information Systems
- Servers
- Emergency Radios

Other Capabilities

The Willard School District maintains a food supply to serve 4,300 students and staff on a daily basis. Dairy and bread products are delivered daily with produce service weekly. Dry and canned goods are stored for months at a time along with the state commodities. Bottle water and nutritious beverages are available in vending machines and extra product is stored to serve up to 700 individuals.

The following items are available in the Willard School District:

- Crisis Action Plan
- Evacuation Drills
- Storm Drills
- Fire Drills
- Relocation Plan
- Outdoor Stadium

2- PLANNING AREA PROFILES AND CAPABILITIES

Willard School District Mitigation Capabilities

CAPABILITY	WILLARD SCHOOL DISTRICT
PLANNING ELEMENTS	
Master Plan/Date	Yes
Capital Improvement Plan/Date	Yes - 2/1/2018
School Emergency Plan/Date	Yes
Weapons Policy/Date	Yes
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes
Emergency Manager	Yes- Asst. Superintendent
Grant Writer	No
Public Information Officer	Yes
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	Yes
Special Tax Bonds	Yes
Private Activities/Donations	Yes
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes- All Schools
NOAA Weather Radios	Yes- All Schools
Lock-Down Security Training	Yes
Mitigation Programs	Yes
Tornado Shelter/Saferoom	No
Campus Police	Resource Officers-3 Commissioned Officers

Source: Data Collection Questionnaire, 2019

2- PLANNING AREA PROFILES AND CAPABILITIES

2.5 HIGHER EDUCATION PROFILES AND MITIGATION CAPABILITIES

2.5.1 Drury University

Drury University is one of small private universities located in Springfield. The Springfield residential campus consists of 90 acres. Drury University offers undergraduate and graduate programs for students in both traditional day school environments and also evening and online classes for non-traditional students. The college has over 3,200 total enrolled students. Approximately 1,791 traditional undergraduate students on campus, 1,480 total enrollment in the College of Continuing Professional Studies and 239 graduate students. Drury University has locations across the Ozarks including Ava, Fort Leonard Wood, Houston, Lebanon, Monett, Rolla and Springfield.

The University also has a law enforcement academy that is hosted in Springfield. The program in a 750 hour basic training academy and is certified by the State of Missouri Department of Public Safety.



Student Population Statistics

- 8.3% international students representing 57 countries
- 18.9% ethnic origin of domestic students other than which, non-Hispanic
- 57.6% female
- 42.4% male

Drury Facts

- 13:1 student to faculty ratio
- Average class size: 19
- More than 70 majors
- 86% of full time faculty members hold the highest degree in their field.

Emergency Services

A mass notification system is in place that will notify student, faculty, staff and other individuals signed up for the service via text messages or email in the event of an emergency. In addition there is an audible siren located in the center of campus. The siren is activated by the Springfield-Greene County Office of Emergency Management.

Drury University has safety and security officers assigned to the campus 24/7. Drury also works with Springfield Police to protect their students.

Springfield Fire Station 2 is the closest station to campus and provides emergency fire services and fire protection for the university.

Drury also has a health clinic on campus with a Nurse Practitioner on duty during regular business hours. Counselors are available 24 hours a day, as well as Pastoral Services.

2 - PLANNING AREA PROFILES AND CAPABILITIES

Utilities

All utilities are coordinated and run by Facilities Service and City of Springfield. There is also a substation in operation, located on the SE side of campus. There are emergency lighting generators located strategically across the campus.

Drury University Campus Map



*Drury University is a private college and therefore cannot immediately apply for Mitigation Funding. It is included in the Greene County Multi-Jurisdictional Hazard Mitigation Plan because the university is a large part of the community.

2 - PLANNING AREA PROFILES AND CAPABILITIES

2.5.2 Missouri State University (MSU)

Missouri State University is the largest public university in Greene County. The University (Springfield Campus) has over 55 structures, administrative and academic. The University has over 20,000 students and offers a wide range of programs, activities and degrees for students. MSU has three arenas on campus used to host events. The McDonald Arena has a capacity of 1,200. The Hammons Student Center has a capacity of 8,800. The JQH Arena has a capacity of 11,000. The arenas bring many big events to the Springfield area including concerts, plays, PBR and many more.



Enrollment Figures (Race/Ethnicity) - Spring 2018

RACE	NUMBER
American Indian or Alaskan Native	111
Asian	356
Black or African American	904
Hispanic or Latino	840
More than one race	762
Native Hawaiian or Other Pacific Islander	20
External to US	166
Non-Resident Alien	1,216
Not a US Citizen	19
Unknown	357
White	18,227
Total	22,978

Enrollment Figures (Sex) - Spring 2018

GENDER	NUMBER
Female	13,549
Male	9,429

Enrollment Figures (Age) - Spring 2018

AGE	NUMBER
Under 18 Years	2,215
18-21 Years	11,594
22-24 Years	4,624
25-39 Years	3,554
40-59 Years	842
60+ Years	149

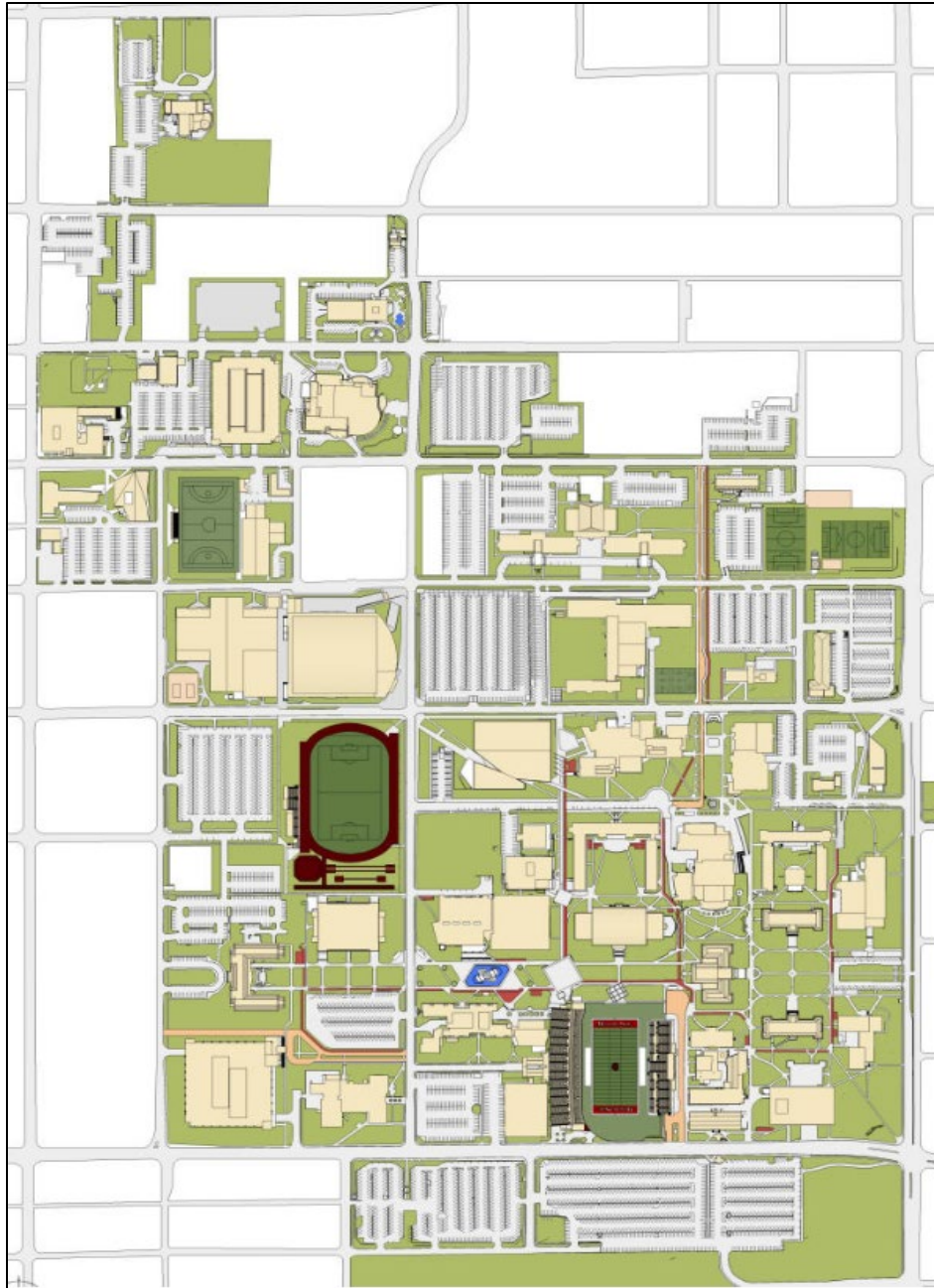
2 - PLANNING AREA PROFILES AND CAPABILITIES

Enrollment Figures (Geographic Origin) - Spring 2018

GEOGRAPHIC ORIGIN	NUMBER
Missouri	19,157
Out of State	2,408
International	1,413

The University has a Board of Governors. With the advice of the Missouri Senate, the Governor appoints all members to serve six year terms. At least one but not more than two voting members shall be appointed from each congressional district in Missouri. A non-voting member, a current Missouri State University student, also sits on the Board.

2- PLANNING AREA PROFILES AND CAPABILITIES



Missouri State University
Campus Map

Emergency Capabilities

A mass notification system is in place that will notify students, faculty, staff and other individuals signed up for the service via text messaging or e-mail in the event of an emergency. Additionally, audible sirens and voice notification devices are located strategically across the campus. Speakers are also located on campus patrol vehicles.

There is a 24/7 Dispatch Center located on campus with county-wide communication with others within the 911 system including police, fire and EMS.

2 - PLANNING AREA PROFILES AND CAPABILITIES

MSU has public safety officers assigned to campus 24/7. Additionally, MSU has a contract with the Springfield Police Department which assigned ten Springfield Police Officers to the campus for 24/7 service for the campus. They operate out of a substation located on campus.

MSU also operates a health care facility, Magers Health and Wellness Center, located on campus.

Utilities

All utilities are coordinated and run by the Facilities Management Office and Power House, located on Campus. All power is supplied by City Utilities.

Previous Property Losses - Greene County Only

INSURED NAME	ADDRESS	DATE	GROSS LOSS	CAUSE OF LOSS
Missouri State University	901 S. National Ave.	12/23/2013	\$44,547.42	Pipe Break
Missouri State University	300 South Jefferson	09/17/2014	\$62,496.81	Surface Water
Missouri State University	685 S. John Q Hammons Parkway	12/28/2015	\$293,209.25	Other
Missouri State University	901 S. National Ave.	03/13/2016	\$81,178.79	Surface Water
Missouri State University	Plaster Football Stadium	11/24/2017	\$50,000.00	Pipe Break
Missouri State University	Miss Street Warehouse	10/01/2017	\$250,000.00	Other

CAPABILITY ASSESSMENT

Equipment:

- Computers
- Text messaging service
- Land-Line phones
- Phones
- Computer Messaging
- Outside Alert System
- Audio Security System
- Emergency Phones with Alert Capabilities
- PA System
- Health Care Facility

Back-Up System

There are intrusion and fire alarms in the buildings on campus. Also, the campus has surveillance cameras located in and around the campus property.

Other Capabilities

Missouri State University does have an Emergency Response Plan and its own Emergency Management Department.

2 - PLANNING AREA PROFILES AND CAPABILITIES

Missouri State University Mitigation Capabilities

CAPABILITY	MISSOURI STATE UNIVERSITY
PLANNING ELEMENTS	
Master Plan/Date	Yes- 2018-2019 (Vision 2016-2021 Long Range Plan and Action Plan 2018-2019)
Capital Improvement Plan/Date	Yes - 2018
School Emergency Plan/Date	Yes - 2019
Weapons Policy/Date	Yes - 2019
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes - President of Missouri State University-Full Time
Emergency Manager	Yes - Emergency Preparedness Manager- Full Time
Grant Writer	Yes - Director of Grants and Foundation Accounting-Full Time
Public Information Officer	Yes - Director of University Communications
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	Yes
Special Tax Bonds	No
Private Activities/Donations	Yes
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes - Some of the campus building are equipped
NOAA Weather Radios	Yes - Each facility has a Midland WR120 radio
Lock-Down Security Training	Yes
Mitigation Programs	Yes
Tornado Shelter/Saferoom	Yes - One small FEMA Shelter in a north Res Life facility. Each facility has designated shelter locations but not FEMA standard constructed.
Campus Police	Yes - Contracted with Springfield Police Department also 24/7 Campus Safety Specialists for security needs and emergency training.

Other Mitigation Capabilities

Missouri State University has several funding resources that are integral to operations which include hazard mitigation and planning.

Alternate power sources have been signed in some parts of campus to reduce potential power loss from each feeder.

2- PLANNING AREA PROFILES AND CAPABILITIES

2.5.3 Ozarks Technical Community College

Ozarks Technical Community College (OTC) is the largest community college in the area with its main campus located in Springfield. The college offers both seated and online course for students wanting to pursue higher education. The college serves over 12,000 students across the area.



Ozarks Technical Community College provides area citizens with a variety of educational options including:

- High School juniors and seniors can participate in half-day job skill programs through OTC's area vocational-technical school.
- Specific training can be custom designed for business and industry at the work site.
- Non-credit personal and professional enrichment courses are offered at local high schools.
- English as a Second Language classes are available throughout the year.
- Adult Education and Literacy is available to adults working towards the High school equivalency test in a variety of locations throughout the Ozarks.

OTC's comprehensive mission is to, focus on job-skill training and college transfer preparation. During the 2014-15 academic year, the college served approximately 20,974 citizens with more than 14,396 enrolled in college credit classes. OTC looks to a promising and productive future as faculty, staff and community member's work together to provide the best possible educational value for all residents of the Ozarks.

Ozarks Technical Community College has campuses throughout the Ozarks including the main campus in Springfield, Nixa, Hollister, Lebanon, and Waynesville. There is an additional campus being added on in Republic. Currently, OTC doesn't offer any transportation services and no students are housed on campus. OTC partners with some area highs schools to provide specific classes for junior and senior high school students. The college partners with Springfield School District to provide "Middle College" classes to at risk juniors and seniors.

The Springfield Campus consists of 40-acres located at the corner of chestnut Expressway and National Avenue.

- The Norman K. Myers Technical Education Center houses classrooms, electronic media labs and science labs.
- The Information Commons houses the College's business office, administrative offices and the Learning Resources Center.
- The Information Commons East provides many more classrooms, faculty and administrative offices, and the Area Vocational High School Office.
- The Industry Transportation and Technology Center provides the latest technology and laboratory facilities for many of the technical degree programs.
- The Allied Health programs are located in historic Lincoln Hall along with additional technical program labs.
- Graff Hall houses the Networking and Computer Services Department, information Technology, Fire Science and Business and Marketing programs and labs, along with the Adult Education and Literacy programs.
- The Continuing Education Center is located at 800 E. Central Street, Springfield, Missouri.
- The Center for Workforce Development is located at 614 N. Washington Avenue, Springfield, Missouri.
- The campus also offers day care services in the Early Childhood Education Center located at 936 N. Hampton, Springfield, Missouri.

2- PLANNING AREA PROFILES AND CAPABILITIES

Campus Map-Springfield Campus



2018 Student Enrollment

2018 SNAP SHOT (Fall Enrollment)			
12,221	Credit Students	5,509	Full Time Enrollment
118,327	Credit Hours	6,712	Part Time Enrollment
2,412	A+ Students	7,265	Female Students
4,988	Enrolled in at Least One Online Class	4,956	Male Students
7,003	First Generation Students	20	Average Age of Full Time
928	GED Student Enrollment**	22	Average Age of Part Time
372	Students Enrolled in at Least One Developmental Course	20	Average Age of All Students
67%	Receive Financial Aid	647	Number of Veterans

**Summer 2017-Spring 2018

2- PLANNING AREA PROFILES AND CAPABILITIES

CAPABILITY ASSESSMENT

Equipment:

- Computers
- Telephones
- Security Systems
- PA System
- Mass Notification System

Back Up Systems

OTC currently does not have a back-up system for fire alarms or fire detection devices. The Springfield Campus has a generator in the event of power outages on the west side of ITTC.

Other Capabilities

There is one Early Childhood Education Center located at the Springfield Campus and it has a basement. The Springfield Campus does not currently have a designated storm shelter.

OTC does have a system wide mass media notification system that includes notification through the College Website, text messaging, voicemail, and a telephone alert system to notify employees and student of emergency situations.

2 - PLANNING AREA PROFILES AND CAPABILITIES

Ozarks Technical Community College Mitigation Capabilities

CAPABILITY	OZARK TECHNICAL COMMUNITY COLLEGE
PLANNING ELEMENTS	
Master Plan/Date	Yes - 2019
Capital Improvement Plan/Date	Yes - 2019
School Emergency Plan/Date	Yes - 2019
Weapons Policy/Date	Yes - 2019
PERSONNEL RESOURCES	
Full-Time Building Official (Principal)	Yes
Emergency Manager	Yes - Director of Safety and Security
Grant Writer	Yes - Grant Department
Public Information Officer	Yes - Communications and Marketing
FINANCIAL RESOURCES	
Capital Improvements Project Funding	Yes
Local Funds	Yes
General Obligation Bonds	No
Special Tax Bonds	No
Private Activities/Donations	Yes
State and Federal Funds/Grants	Yes
OTHER	
Public Education Programs	Yes
Privately or Self-Insured?	Privately
Fire Evacuation Training	Yes
Tornado Sheltering Exercises	Yes
Public Address/Emergency Alert System	Yes - Internal phone systems and overhead speakers
NOAA Weather Radios	Yes
Lock-Down Security Training	Yes
Mitigation Programs	Yes
Tornado Shelter/Saferoom	No
Campus Police	Yes

OTC has a full-time Safety and Security Department that has staff on-duty during the operational hours of the college and special events. Most security officers are either current or retired law enforcement officers who still hold a Missouri Department of Public Safety Peace Officer Certification.

In addition to the Springfield Campus employee, off duty Springfield Police Department officers for additional security during most operational hours of the college.

2- PLANNING AREA PROFILES AND CAPABILITIES

2.6 SUMMARY OF MITIGATION CAPABILITIES FOR EDUCATION

CAPABILITY	ASH GROVE	FAIR GROVE	REPUBLIC	SPRINGFIELD	STRAFFORD	WALNUT GROVE	WILLARD	MISSOURI STATE UNIVERSITY	OZARKS TECHNICAL COLLEGE
PLANNING ELEMENTS									
Master Plan/ Date	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capital Improvement Plan/Date	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
School Emergency Plan / Date	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weapons Policy/Date	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PERSONNEL RESOURCES									
Full-Time Building Official (Principal)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emergency Manager	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grant Writer	No	No	No	No	No	Yes	No	Yes	Yes
Public Information Officer	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FINANCIAL RESOURCES									
Capital Improvements Project Funding	Yes	Yes	Yes	Yes	No	Yes	yes	Yes	Yes
Local Funds	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
General Obligation Bonds	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Special Tax Bonds	Yes	Yes	Yes	Yes	No	No	Yes	No	No
Private Activities/Donations	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
State and Federal Funds/Grants	Yes	Yes	Yes	Yes	No	Yes	Yes	yes	Yes
OTHER									
Public Education Programs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Privately or Self- Insured?	Privately	Privately	Privately	Privately	Privately	Privately	Privately	Privately	Privately
Fire Evacuation Training	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tornado Sheltering Exercises	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Address/Emergency Alert System	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NOAA Weather Radios	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Lock-Down Security Training	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mitigation Programs	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Tornado Shelter/Saferoom	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Campus Police	No	yes	Yes	Yes	Yes	No	Yes	Yes	Yes

Source: Data Collection Questionnaire, 2019; Drury University was excluded intentionally

3 - RISK ASSESSMENT

3 RISK ASSESSMENT	3.3
3.1 Hazard Identification	3.3
3.1.1 Review of Existing Mitigation Plans	3.4
3.1.2 Review Disaster Declaration History	3.5
3.1.3 Research and Additional Resources	3.6
3.1.4 Hazards Identified	3.7
3.1.5 Multi-Jurisdictional Risk Assessment	3.9
3.2 Assets at Risk	3.9
3.2.1 Total Exposure of Population and Structures	3.9
3.2.2 Critical and Essential Facilities and Infrastructure	3.12
3.2.3 Other Assets	3.19
3.3 Land Use Development	3.24
3.3.1 Development Since Previous Plan	3.24
3.3.2 Future Land Use and Development	3.25
3.3.3 Jurisdiction Future Development	3.32
3.4 Natural Hazard Profiles, Vulnerability, and Problem Statements	3.39
3.4.1 Drought	3.39
3.4.2 Earthquake	3.50
3.4.3 Extreme Temperatures	3.58
3.4.4 Flood	3.68
3.4.5 Land Subsidence/Sinkholes	3.84
3.4.6 Severe Thunderstorms-Including High Winds, Hail and Lightning	3.91
3.4.7 Severe Winter Weather	3.111
3.4.8 Tornado	3.119
3.4.9 Wildfire	3.130
3.5 Technological Hazard Profiles, Vulnerability, and Problem Statements	3.139
3.5.1 Airplane Crash	3.139
3.5.2 Cave/Mine Collapse	3.144
3.5.3 Dam Failure	3.149
3.5.4 Hazardous Materials	3.163
3.5.5 Power Failure	3.169
3.5.6 Train Derailment	3.174
3.5.7 Urban Fire	3.178
3.6 Human Caused Hazard Profiles, Vulnerability, and Problem Statements	3.183
3.6.1 Biological	3.183
3.6.2 Chemical	3.187
3.6.3 Civil Unrest	3.193
3.6.4 Cyber	3.199
3.6.5 Explosives	3.204
3.6.6 Nuclear	3.209

3 - RISK ASSESSMENT

3.6.7 Radiological	3.215
3.6.8 Targeted Violence	3.222
3.6.9 Waste	3.228
3.7 Other Hazard Profiles, Vulnerability, and Problem Statements	3.235
3.7.1 Animal Disease	3.235
3.7.2 Communicable Disease	3.248

3 - RISK ASSESSMENT

3.1 HAZARD IDENTIFICATION

HAZARD ANALYSIS

The Greene County 2020 Hazard Mitigation participates updated the hazard profiles from the 2015 Mitigation Plan. This process included reviewing each profile, updating with new information from and adding any missing information that was unavailable or not completed in the 2015 Mitigation Plan. The 2020 Multi-Jurisdictional Hazard Mitigation Plan did not add or remove any hazards from the 2015 plan. The hazard analysis for Greene County will have three different sections of hazards including natural, technological and human caused. Each section of hazards will be explained below.

NATURAL HAZARDS

A natural hazard is a natural phenomenon that might have a negative effect on humans or the environment. In the 2020 Multi-Jurisdiction Hazard Mitigation Plan, natural hazards have been divided into two separate groups, weather related and other. Weather related events are the most likely hazards to affect the Springfield-Greene County area and include hazards like tornados, damaging wind, flood, hail, and lightening. Other natural hazards that are not weather related includes animal disease, earthquake, land subsidence, wildfires and communicable disease. More details for each natural hazard can be found in the hazard's individual profile.

TECHNOLOGICAL HAZARDS

A technological hazard can be defined has hazards originating from technological or industrial accidents, dangerous procedures, infrastructure failures or specific human activities that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. This hazard section was added for the first time in the 2015 Mitigation Plan. Some of the technological hazards listed in the 2020 Multi-Jurisdictional Hazard Mitigation Plan are airplane crash, cave/mine collapse, dam failure, hazardous materials and train derailment. More details for each technological hazard can be found in the hazard's individual profile.

HUMAN-CAUSED HAZARDS

Human-caused hazards result from the intentional actions of an adversary, such as threatened or actual attacks against a community or group of people. Some of the human-caused hazards that 2020 Multi-Jurisdiction Hazard Mitigation Plan include are biological, chemical, civil unrest, cyber, explosives, nuclear and Radiological. More details for each human-caused hazard can be found in the hazard's individual profile.

A full list of hazards included in the 2020 Multi-Jurisdictional Hazard Mitigation Plan can be found on the next page.

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Identified Hazards for Greene County

NATURAL HAZARDS	TECHNOLOGICAL HAZARDS	HUMAN-CAUSED HAZARDS
Weather: <ul style="list-style-type: none"> ● Damaging Wind ● Drought ● Extreme Cold ● Extreme Heat ● Flood ● Hail ● Ice and Snow ● Lightning ● Tornado Other: <ul style="list-style-type: none"> ● Animal Disease ● Communicable Disease ● Earthquake ● Land Subsidence (Sinkholes) ● Wildfire 	<ul style="list-style-type: none"> ● Airplane Crash ● Cave/Mine Collapse ● Dam Failure ● Hazardous Materials ● Power Failure ● Train Derailment ● Urban Fire 	<ul style="list-style-type: none"> ● Biological ● Chemical ● Civil Unrest ● Cyber ● Explosives ● Nuclear ● Radiological ● Sabotage ● Targeted Violence ● Waste

3.1.1 Review of Existing Mitigation Plans

The 2015 Multi-Jurisdictional Hazard Mitigation Plan made many changes to how the hazards were organized. One of the big changes that was made was the addition of the “Technological Hazards” section. Originally, the technological hazards were included in the human-caused hazards section of the plan. New hazards were added in 2015 including targeted violence, cyber and sabotage. Another change that was made in the 2015 Mitigation Plan was the separation of tornadoes, severe thunderstorms, hail and lightning. Originally, they were paired into one category called “Tornado, Severe Storms, Hail, and Lighting”. For the 2020 plan, the Mitigation Planning Committee (MPC) decided not to change any of the hazards or categories.

In Missouri, Local plans customarily include only natural hazards, as only natural hazards are required by federal regulations to be included. The MPC determined that it was important to include technological and human-caused hazards in the 2020 Multi-Jurisdictional Hazard Mitigation Plan because the community wants to mitigate all hazards, not just natural ones. Springfield-Greene County Office of Emergency Management is also EMAP accredited and according to Standard 4.1.1 “The Emergency management Program identifies the natural and human-caused hazards that potentially impact the jurisdiction using multiple sources. The Emergency management Program assessed the Risk and Vulnerability of people, property, the environment, and its own operations from these hazards.” In order to retain accreditation, the MPC must include human-caused hazards in the mitigation plan.

Compared to the Missouri State Hazard Mitigation Plan, Greene County included all the same hazard except for levee failure. Levee failure was excluded from the mitigation planning process as there are no mapped levees nor associated levee protected areas within or immediately upstream of Greene County.

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3.1.2 Review Disaster Declaration History

Federal disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. If the disaster is so severe that both the local and state government's capacities are exceeded; a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs of major disaster declarations. Determinations for declaration type are based on scale and type of damaged and institution or industrial sector affected.

FEMA Disaster Declarations that Included Greene County, Missouri 1965-Present

DISASTER NUMBER	DESCRIPTION	DECLARATION DATE INCIDENT PERIOD	INDIVIDUAL ASSISTANCE (IA) PUBLIC ASSISTANCE (PA)
439	Severe Storms and Flooding	06/10/1974-06/10/1974	N/A
3017	Drought	09/24/1976-09/24/1976	N/A
867	Severe Storms and Flooding	05/15/1990-05/31/1990	N/A
995	Severe Storms and Flooding	06/10/1993-10/25/1993	N/A
1412	Severe Storms, Tornadoes and Flooding	04/24/2002-06/10/2002	IA: N/A PA: \$35,299,777.93
1463	Severe Storms, Tornadoes and Flooding	05/04/2003-05/04/2003	IA: \$8,779,157.72 PA: \$19,562,866.28
3232	Hurricane Katrina Evacuation	08/29/2005-10/01/2005	N/A
1631	Severe Storms, Tornadoes and Flooding	03/08/2006-03/13/2006	IA: \$1,587,654.75 PA: \$5,542,439.50
1673	Severe Winter Storms	11/30/2006-12/02/2006	IA: N/A PA: \$6,654,375.10
1676	Severe Winter Storms and Flooding	01/12/2007-01/22/2007	IA: N/A PA: \$106,468,427.80
1728	Severe Storms and Flooding	08/19/2007-08/21/2007	IA: N/A PA: \$5,571,824.46
3281	Severe Winter Storms	12/08/2007-12/15/2007	N/A
1748	Severe Winter Storms and Flooding	02/10/2008-02/14/2008	IA: N/A PA: \$10,068,998.77
1773	Severe Storms and Flooding	06/01/2008-08/13/2008	IA: \$5,367,078.69 PA: \$28,697,245.28
1749	Severe Storms and Flooding	04/17/2008-05/09/2008	IA: \$13,924,227.09 PA: \$26,045,574.54
3303	Severe Winter Storm	01/26/2009-01/28/2009	N/A
1847	Severe Storms, Tornadoes and Flooding	05/08/2009-05/16/2009	IA: \$5,417,824.37 PA: \$27,072,334.75
3317	Severe Winter Storm	01/31/2011-02/05/2011	N/A
3374	Severe Storms, Tornadoes, Straight-Line Winds and Flooding	12/22/2015-01/09/2016	N/A
4250	Severe Storms, Tornadoes, Straight-Line Winds and Flooding	12/23/2015-01/09/2016	IA: \$13,175,523.43 PA: \$36,886,888.84

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3.1.3 Research and Additional Sources

The following list are additional sources of data on locations and past impacts of hazards in the planning area:

- Missouri Hazard Mitigation Plans (2010,2013, and 2018)
- Previously Approved planning area Hazard mitigation Plan, 2015
- Federal Emergency Management Agency (FEMA)
- Data Collection Questionnaires completed by each jurisdiction
- National Weather Service (NWS)
- State of Missouri GIS data
- National Oceanic and Atmospheric Administrations' (NOAA) National Centers of Environmental Information (NCEI)
- County and local Comprehensive Plans to the extent available
- County Emergency Management
- Missouri Department of Natural Resources
- Climate.gov
- Hazus
- Various articles and publications available on the internet. (Sources will be stated in body of the plan)
- Google Images
- SEMA Mitigation Viewer

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3.1.4 Hazards Identified

The following chart lists hazards that may affect one or all of the jurisdictions. An “x” indicates the jurisdiction is impacted by the hazard, and a “-” indicated that hazard is not applicable to that jurisdiction.

JURISDICTION	DROUGHT	EXTREME TEMPERATURES	FLOOD	HAIL	ICE AND SNOW	SEVERE THUNDERSTORMS	TORNADO	ANIMAL DISEASE	COMMUNICABLE DISEASE	EARTHQUAKE	LAND SUBSIDENCE	WILDFIRE	AIRPLANE CRASH	CAVE/MINE COLLAPSE	DAM FAILURE	HAZARDOUS MATERIALS	POWER FAILURE	TRAIN	URBAN FIRE	BIOLOGICAL	CHEMICAL	CIVIL UNREST	CYBER	EXPLOSIVES	NUCLEAR	RADIOLOGICAL	SABOTAGE	TARGETED VIOLENCE	WASTE	
Greene County	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ash Grove	X	x	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Battlefield	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Fair Grove	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Republic	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Springfield	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Strafford	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Walnut Grove	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X	X	X	X	X
Willard	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Ash Grove	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Fair Grove	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Republic	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Springfield	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Strafford	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Walnut Grove	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Willard	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X
Ash Grove	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Battlefield	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ebenezer	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fair Grove	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Logan-Rogersville	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Stafford	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Walnut Grove	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Willard	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Drury University	X	X	X	X	X	x	X	X	x	X	x	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Missouri State University	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ozarks Technical Community College	X	X	X	X	x	X	X	x	X	x	X	X	x	X		X	x	X	X	x	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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3.1.5 Multi-Jurisdictional Risk Assessment

The 2020 Greene County Multi-Jurisdictional Hazard Mitigation Plan is an update to the previously approved 2015 Multi-Jurisdictional Hazard Mitigation Plan that was approved in July of 2015. Due to the limited differences in geography, topography, climate, and infrastructure between the multiple political jurisdictions within Greene County, it was determined that there was no significant variance in the risk and vulnerability to many of the hazards that were identified. Many of the hazards therefore, were analyzed holistically in order to gain a comprehensive picture of the risk and vulnerability of the hazard. Greene County's hazard analysis' and vulnerability studies include all municipalities, fire protection districts, school districts and higher education institutions. However, all participates were asked to include their own hazard analysis and vulnerability study only if they were different than the Greene County vulnerability. The differences in vulnerabilities will be discussed in each hazard's individual profile.

3.2 ASSETS AT RISK

This section assesses the planning area population, structures, critical facilities and infrastructure, and other important assets that may be at risk to hazards.

3.2.1 Total Exposure of Population and Structures

Table 3.2 Maximum Population and Building Exposure by Jurisdiction

JURISDICTION	2017 ANNUAL POPULATION ESTIMATE	BUILDING COUNT	BUILDING EXPOSURE (\$)	CONTENTS EXPOSURE (\$)	TOTAL EXPOSURE (\$)
Ash Grove	1,607	18	\$2,326,650	\$311,600	\$2,638,250
Battlefield	5,986	Info Not Provided	\$334,750	\$173,525	\$508,275
Fair Grove	1,623	4	\$4,468,854	\$2,699,000	\$7,167,854
Republic	15,890	3	\$5,800,000	\$2,500,000	\$8,300,000
Springfield	164,785	566	\$11,758,392	\$7,208,228	\$18,966,620
Strafford	2,152	Info Not Provided	\$182,559	\$109,478	\$292,037
Walnut Grove	612	7	\$868,949	\$340,000	\$1,208,949
Willard	5,426	4	\$1,136,839	\$242,300	\$1,379,139
Unincorporated Greene County	84,013	579	\$5,933,440	\$3,102,416	\$9,035,856

Source: Data Collection Questionnaire

*Battlefield, Springfield, Strafford and Unincorporated Greene County Data was provided by SEMA MSDIS.

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3.3 Building Values/Exposure by Usage Type

JURISDICTION	RESIDENTIAL COUNTS	COMMERCIAL COUNTS	INDUSTRIAL STRUCTURES	AGRICULTURAL COUNTS	TOTALS
Ash Grove	\$96,557	\$35,653	\$2,281	\$437	\$134,928
Battlefield	\$317,751	\$12,224	\$760	\$68	\$330,803
Fair Grove	\$87,689	\$20,033	\$2,281	\$880	\$110,883
Republic	\$843,067	\$124,276	\$15,208	\$1,323	\$983,874
Springfield	\$8,881,764	\$2,125,248	\$398,452	\$1,141	\$11,306,605
Strafford	\$136,461	\$29,880	\$6,844	\$290	\$173,475
Walnut Grove	\$44,994	\$9,507	\$0	\$233	\$54,734
Willard	\$297,553	\$31,578	\$10,646	\$823	\$340,600
Unincorporated Greene County	\$5,471,726	\$263,491	\$58,551	\$83,188	5,876,956
Totals	\$16,177,562	\$2,652,890	\$495,023	\$88,383	

Source: SEMA MSDIS

Table 3.4 Building County by Usage Type

JURISDICTION	RESIDENTIAL COUNTS	COMMERCIAL COUNTS	EXEMPT STRUCTURES	AGRICULTURAL COUNTS	TOTALS
Ash Grove	567	116	26	1	710
Battlefield	2,180	46	9	4	2239
Fair Grove	568	58	32	1	1368
Republic	7,912	2,379	49	23	10363
Springfield	53,772	8,745	1,210	15	63742
Strafford	837	187	31	0	1055
Walnut Grove	280	43	21	2	346
Willard	1,864	110	30	5	2009
Unincorporated Greene County	36,838	1,247	237	933	39255
Totals	104,818	12,931	1,645	984	121,357

Source: Greene County Assessor's Office; Parcel Database

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Table 3.6 Population and Building Exposure by Jurisdiction-Public School Districts

PUBLIC SCHOOL DISTRICT	ENROLLMENT (2018)	ASSET COUNT	BUILDING EXPOSURE (\$)	CONTENTS EXPOSURE (\$)	TOTAL EXPOSURE (\$)
Ash Grove Public Schools	678	12	\$22,323,029	\$3,428,237	\$25,751,266
Fair Grove Public Schools	1,091	7	\$35,152,240	\$4,458,81	\$39,910,089
Republic Public Schools	4,790	36	\$133,275,691.20	\$27,031,799.95	\$160,307,491.20
Springfield Public Schools	24,937	Not Provided	Not Provided	Not Provided	Not Provided
Strafford Public Schools	1,186	14	\$48,774,986	\$8,353,571	\$57,128,557
Walnut Grove Public Schools	277	8	\$9,998,225.87	\$1,849,095	\$11,847,320.87
Willard Public Schools	4,523	Info not provided	Info Not Provided	Info Not Provided	Info Not Provided

Source: <http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>; Data Collection Questionnaire

Table 3.6 Building Exposure by Jurisdiction-Higher Education Facilities

BUILDING EXPOSURE	ASSET COUNT	BUILDING EXPOSURE (\$)	CONTENTS EXPOSURE (\$)	OTHER EXPOSURE (\$)	TOTAL EXPOSURE (\$)
Missouri State University	114	\$1,432,596,667.67	\$192,880,509.70	474,378,168	2,099,855,045.37
Ozark Technical Community College	15	\$97,179,662	\$18,472,607	NA	\$115,652,269

Source: Data Collection Questionnaire, 2019

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3.2.2 Critical and Essential Facilities and Infrastructure

This section will include information from the Data Collection Questionnaire and other sources concerning the vulnerability of participating jurisdictions' critical, essential, high potential loss, and transportation/lifeline facilities to identified hazards. Definitions of each of these types of facilities are provided below:

- Critical Facility: Those facilities essential in providing utility or direction either during the response to an emergency or during the recovery operation.
- Essential Facility; Those facilities that if damaged, would have devastating impacts on disaster response and/or recovery.
- High Potential Loss Facilities; those facilities that would have a high loss or impact on the community.
- Transportation and lifeline facilities: Those facilities and infrastructure critical to transportation, communications and necessary utilities.

Table 3.7 includes a summary of the inventory of critical and essential facilities and infrastructure in the planning area. The list was compiled from the Data Collection Questionnaire as well as the following sources:

- Hazard Mitigation Viewer- <http://bit.ly/MoHazardMitigationPlanViewer2018>
- Greene County Multi-Jurisdictional Hazard Mitigation Plan-2015-2020
- Online websites/resources
- Data Collection Questionnaire

For a detailed inventory of all critical facilities, please see Appendix A.

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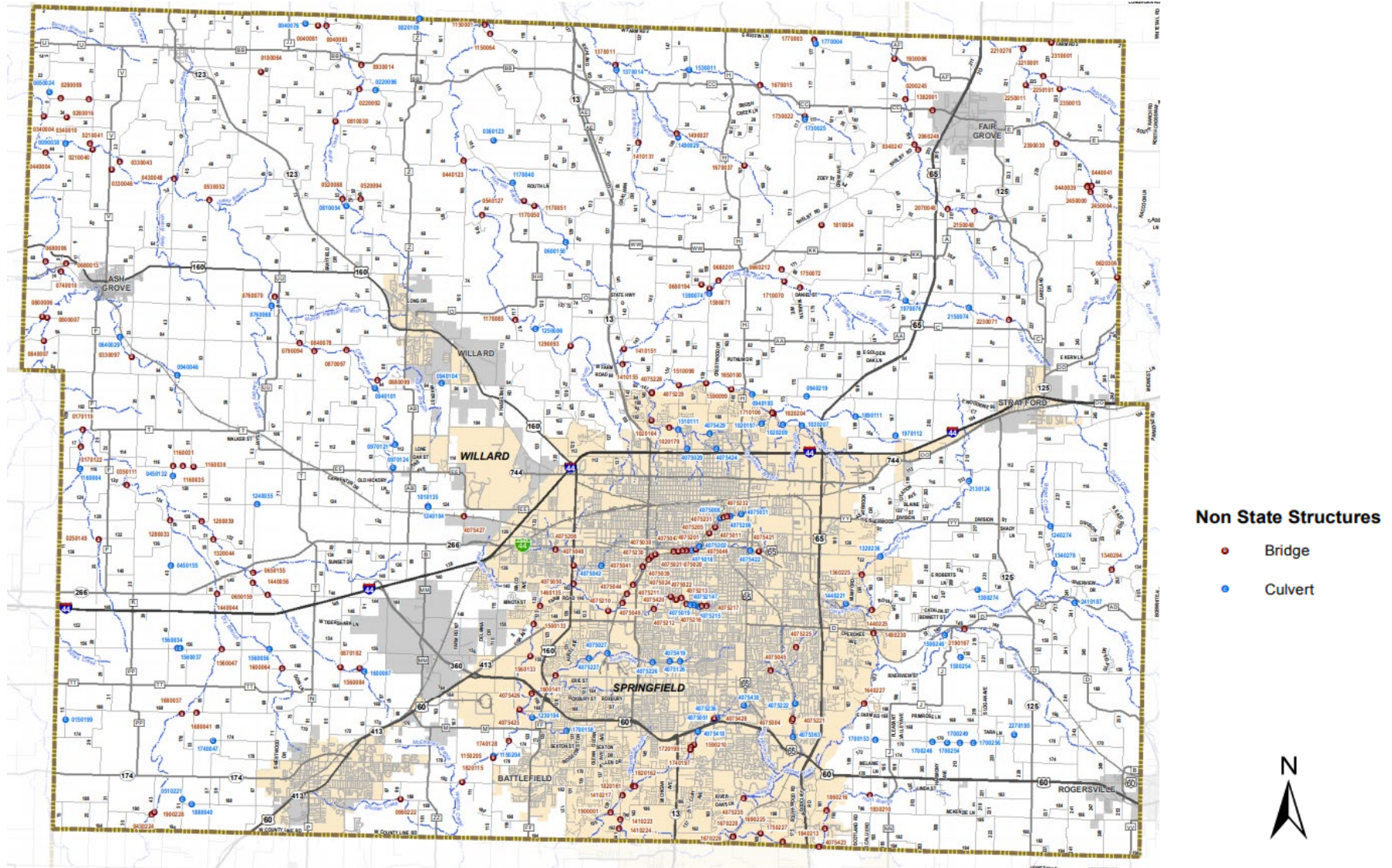
Table 3.6 Inventory of Critical/Essential Facilities and Infrastructure by Jurisdiction

JURISDICTION	AIRPORT FACILITY	BUS FACILITY	CHILDCARE FACILITY	CHURCHES	ELECTRIC POWER FACILITY	EMERGENCY COMMUNICATION	FIRE SERVICE	GOVERNMENT	HOUSING (2017 CENSUS DATA)	SHELTERS	HOSPITAL/HEALTH CARE	MILITARY	NATURAL GAS FACILITY	NURSING HOMES	POLICE STATIONS	POTABLE WATER FACILITY	RAIL	SANITARY PUP STATIONS	SCHOOL FACILITY	STORMWATER PUMP STATIONS	TIER II CHEMICAL FACILITIES	WASTEWATER	TOTAL
Ash Grove	X	X	6	10	X	X	1	1	669	1	X	X	X	1	1	X	X	1	3	X	6	X	24
Battlefield	X	X	3	6	X	X	5	1	2,375	0	X	X	X	x	1	X	X	X	X	X	3	X	12
Fair Grove	X	X	3	10	X	X	3	1	602	1	X	X	X	X	1	X	X	X	3	X	5	X	20
Republic	X	X	26	20	X	X	2	2	6,091	7	X	X	X	3	1	X	X	X	7	X	5	X	6,164
Springfield	2	1	147	210	4	1	15	53	81,045	60	13	1	2	25	3	2	2	19	91	X	302	2	82,000
Strafford	X	X	5	7	X	X	3	1	877	6	X	X	X	1	1	X	X	3	3	X	14	X	922
Walnut Grove	X	X	1	4	X	X	1	1	286	0	X	X	X	X	1	X	X	X	2	X	3	X	299
Willard	X	X	4	18	X	X	3	1	2,117	9	X	X	X	2	1	X	X	1	10	X	13	X	2,179
Greene County	X	X	X	4	X	X	8	4	130,915	N/A	X	X	X	x	1	X	X	X	X	X	43	X	130,975
Totals	2	1	195	289	4	1	41	65	224,977	84	13	1	2	32	11	2	2	24	119	X	394	2	226,261

Source: Missouri 2018 State Hazard Mitigation Plan and Hazard Mitigation Viewer; Data Collection Questionnaires; Hazus; Greene County Multi-Jurisdiction Hazard Mitigation Plan 2015-2020

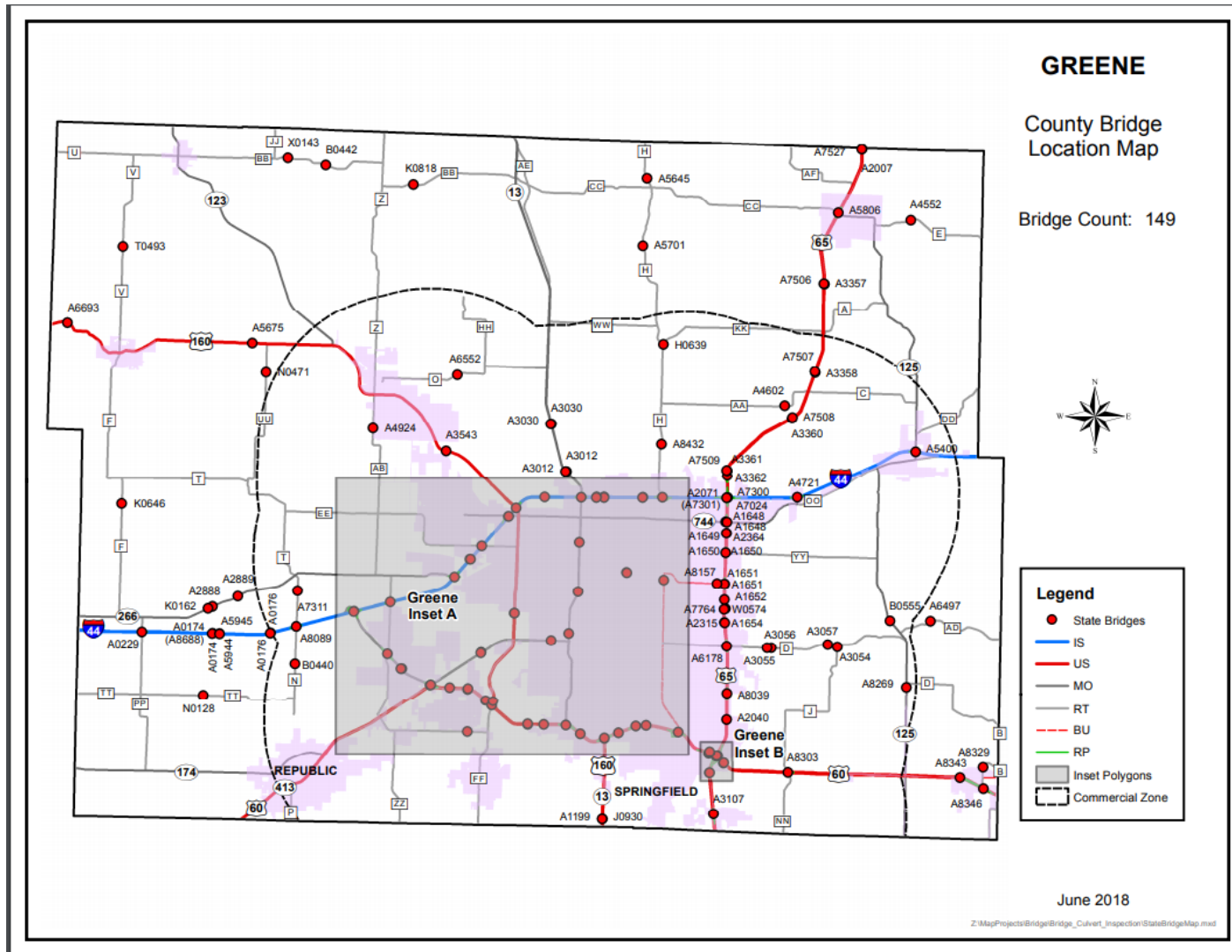
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Bridges - Non State Structures Greene County



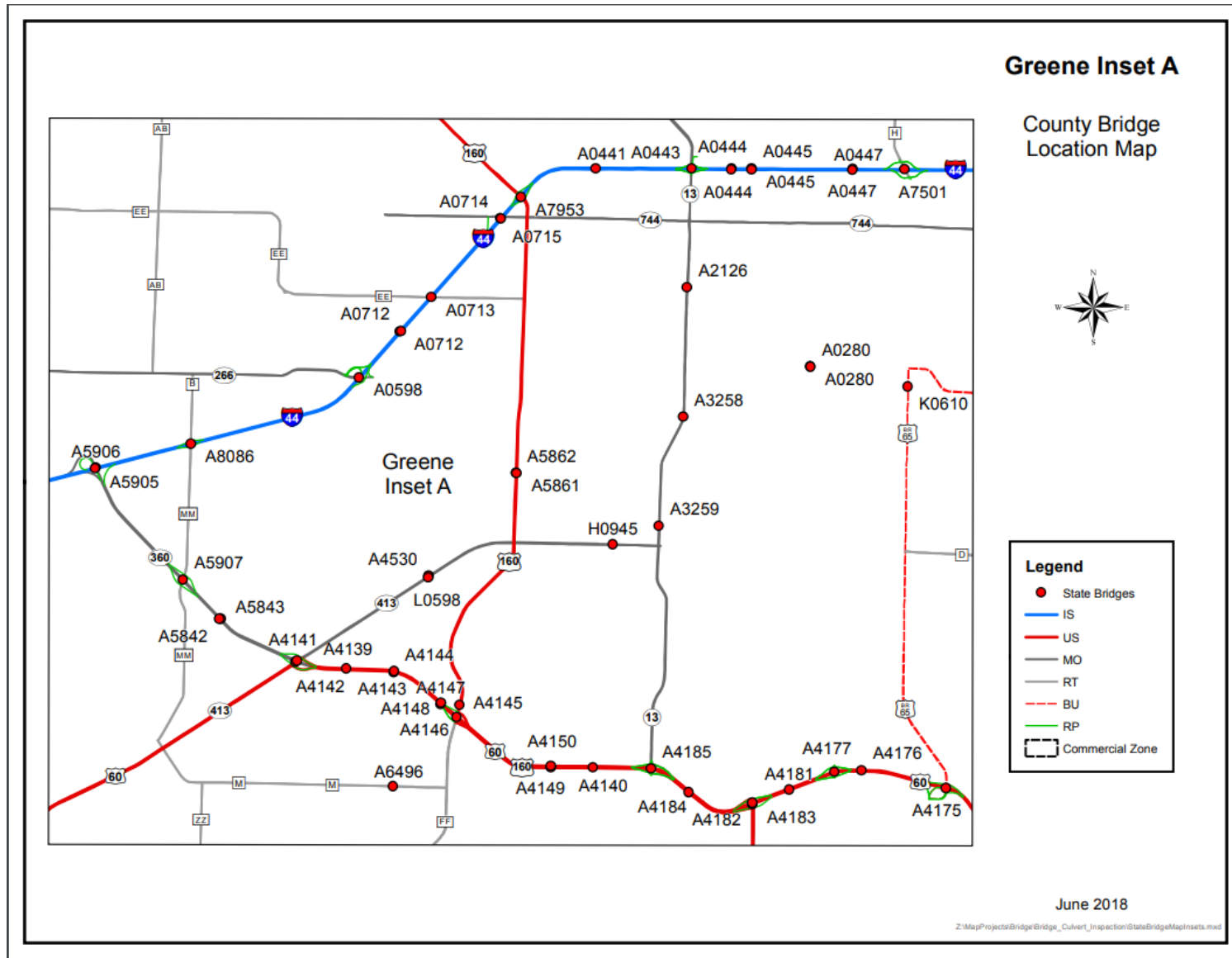
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Bridges - State Owned Greene County



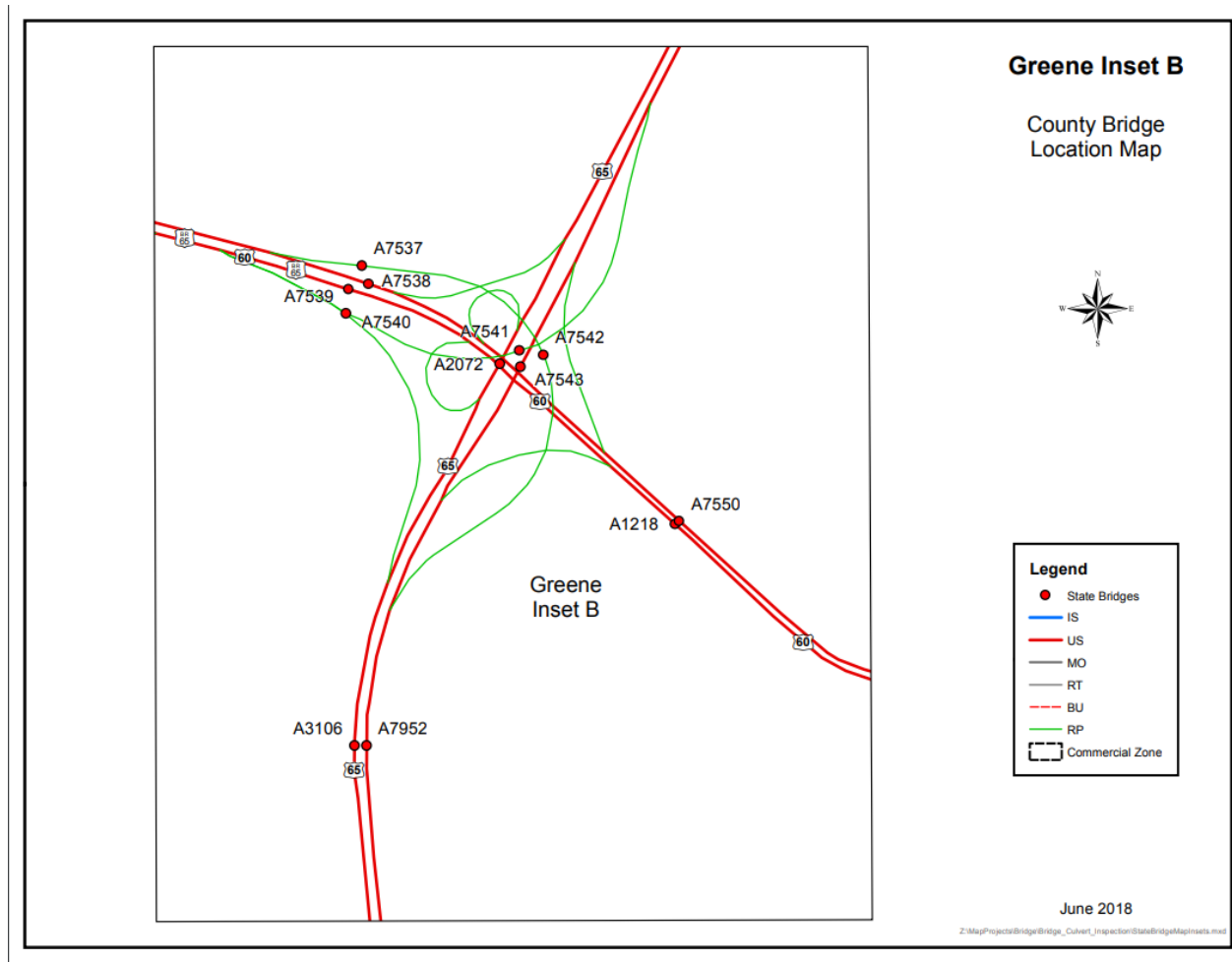
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State Owned Bridges - Greene County



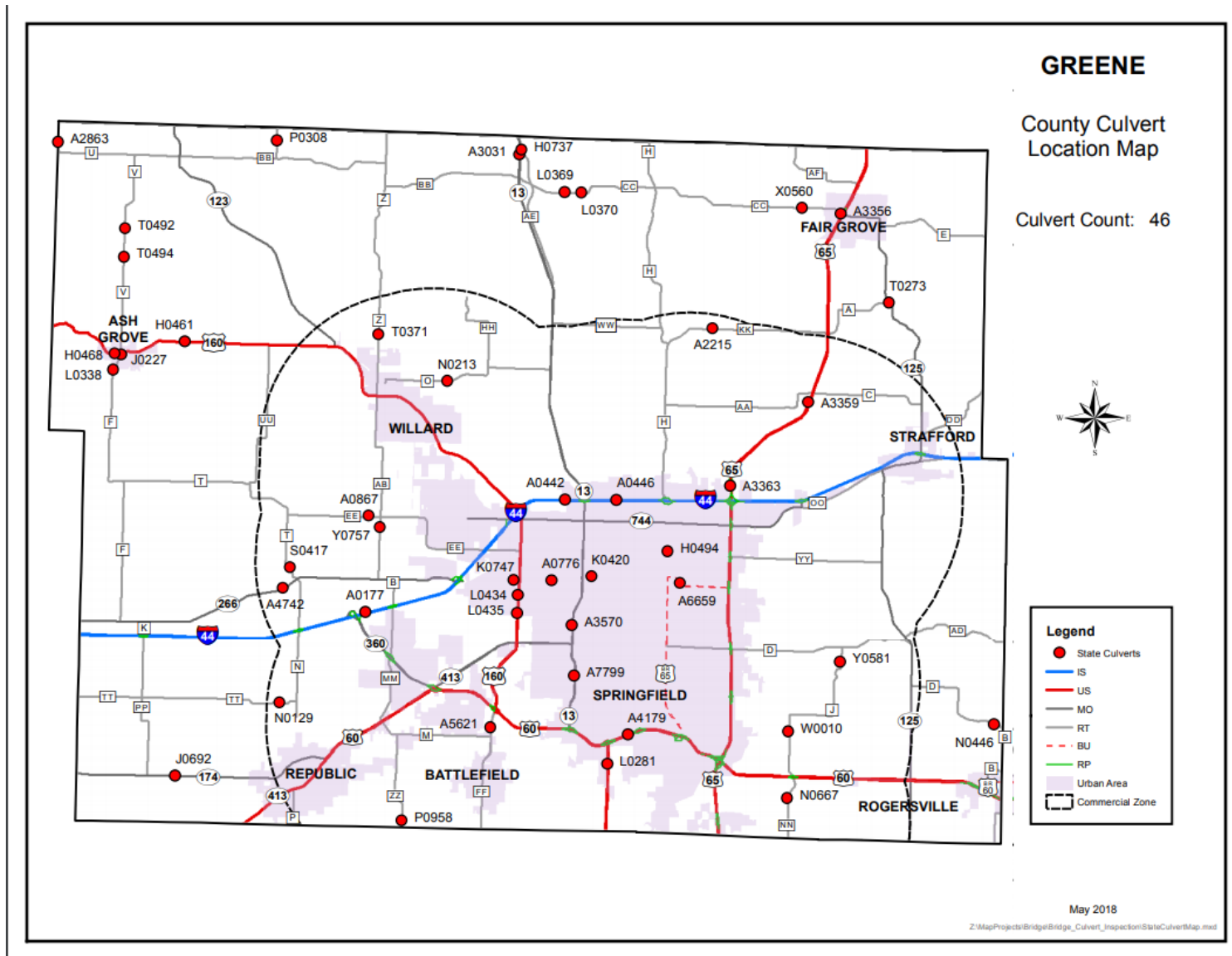
3 - RISK ASSESSMENT

State Owned Bridges - Greene County



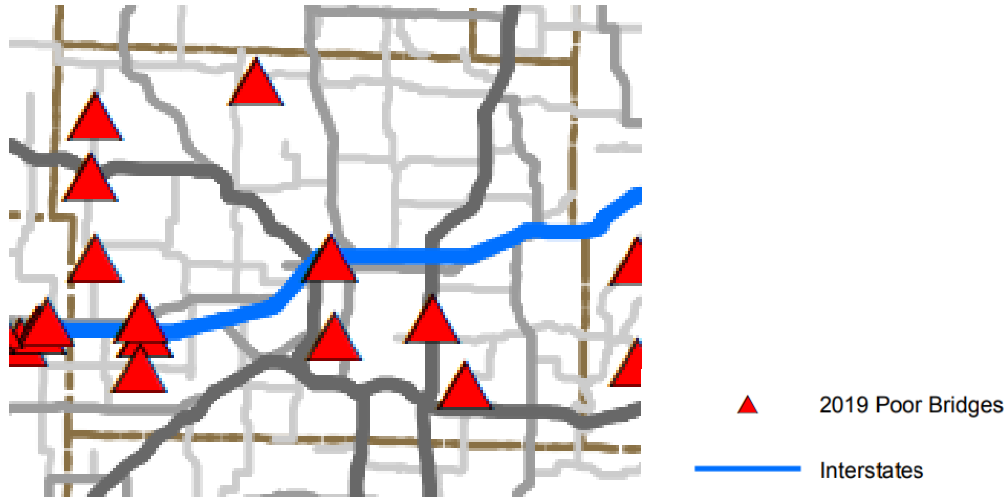
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State Owned Culverts - Greene County



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Greene County Structurally Deficient Bridges



Source: Missouri Department of Transportation

3.2.3 Other Assets

Assessing the vulnerability of the planning area to disaster also requires data on the natural, historic, cultural, and economic assets of the area. This information is important for many reasons.

- These types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- Knowing about these resources in advance allows for consideration immediately following a hazard event, which is when the potential for damages is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- The presence of natural resources can reduce the impacts of future natural hazards, such as wetlands and riparian habitats, which help absorb floodwaters.
- Losses to economic assets like these (e.g., major employers or primary economic sectors) could have severe impacts on a community and its ability to recover from disaster.

Table 3.7 Threatened and Endangered Species in Greene County

Common Name	Scientific Name	Status
Peregrine Falcon	Falco Peregrinus	Endangered
Northern Harrier	Circus Cyaneus	Endangered
Ozark Cavefish	Amblyopsis Rosae	Threatened
Eastern Spotted Skunk	Spilogale Putorius	Endangered
Gray Myotis (Gray Bat)	Myotis Grisescens	Endangered
Hellbender	Cryptobranchus Alleganiensis	Endangered
Indiana Bat	Myotis Sodalis	Endangered
Northern Long-Eared Bat	Myotis Septentrionalis	Threatened
Niangua Darter	Etheostoma Nianguae	Threatened

Source: U.S. Fish and Wildlife Service, Missouri Department of Conservation

The Missouri Department of Conservation (MDC) provides a database of land the MDC owns, leases, or manages for public use. Table 3.9 provides the names and locations of all parks and conservations areas in Greene County.

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Table 3.8 Parks in Greene County

PARK/CONSERVATION AREA	ADDRESS	CITY
Andy Dalton Shooting Range and Outdoor Education Center	4897 N Farm Road 61	Ash Grove
Ash Grove Park	450 E. Parkway St.	Ash Grove
Bois D’Arc CA		Bois D’Arc
Republic Parks and Recreation	711 E. Miller Rd.	Republic
Wilson’s Creek National Battlefield	6424 W. Farm Road 182	Republic
Jr Martin Park	E. Park St.	Republic
Miller Park	701 E. Miller Rd.	Republic
Mildred McKee Park	600 S. Mckee St.	Republic
Phenix Access	N Farm Road 33 & W Farm Road 44	Springfield
Crighton (Joe) Access	2932 Farm Road 193	Springfield
Fellows Lake	E Farm Road 66 & N Farm Road 175	Springfield
Lake Springfield	5701 S. Kissick Ave.	Springfield
Tailwaters Access	5701 S. Kissick Ave.	Springfield
Watershed Committee of the Ozarks (Valley Water Mill Lake)	2450 E. Valley Water Mill Rd.	Springfield
Rutledge-Wilson Farm Park	3825 W. Farm Road 146	Springfield
Nathanael Greene Park	2400 S. Scenic Ave.	Springfield
Jordan valley Park	635 E. Trafficway St.	Springfield
Springfield Skatepark	945 W. Meadowmere St.	Springfield
Phelps Grove Park	950 E. Bennett St.	Springfield
Sequiota Park	3500 S Lone Pine Ave.	Springfield
Grant Beach Park	1300 N. Grant Ave	Springfield
Doling Family Center	301 E. Talmage St.	Springfield
Ritter Springs Park	3683 W. Farm Road 92	Springfield
Washington Park	1600 N. Summit Ave.	Springfield
Springfield Conservation Center	4601 S. Nature Center Way.	Springfield
Founders Park	330 E. Water St.	Springfield
Jenny Lincolnd Park	300 E. Harrison St.	Springfield
Overhill Park	1117 S. Overhill Ave	Springfield
Shawness Park LP	1329 E. Lark St.	Springfield
Wild Animal Safari	124 Jungle Dr.	Strafford
Frisdco Highline Trail	11956 State Highway BB	Walnut Grove
Little Sac Woods CA	10301 N. Farm Road 115	Willard
Jackson Street Park	222 W. Jackson St.	Willard
Rocky Barrens Conservation Area	W. Farm Road 74	Willard

Source: Missouri Department of Conservation; Community Websites

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Historic Places

The National Register of Historic Places is the official list of registered cultural resources worthy of preservation. It was authorized under the National Historic Preservation Act of 1966 as part of a national program. The purpose of the program is to coordinate and support public and private efforts to identify, evaluate and protect our historic and archeological resources. The National Park Service, under the Secretary of the Interior, administers the National Register. Properties listed in the National Register include districts, sites, building structures, and objects that are significant in American history, architecture, archeology, engineering, and culture.

Disasters have taken a heavy toll on historic landmarks in the past. Many historic properties were built before modern building codes are located in areas that are prone to disasters. Protecting historic resources, structures, sites and landscapes that have been nationally registered are important for disaster resilience.

Table 3.9 Greene County Properties on the National Register of Historic Places

PROPERTY	ADDRESS	CITY	DATE LISTED
Abou Ben Adhem Shrine Mosque	601 St. Louis St.	Springfield	09/09/1982
Ambassador Apartments	1235 E. Elm St.	Springfield	10/29/2008
Anderson, Elijah Teague, House	406 N. Pine St.	Republic	11/14/1980
Bailey School	501 W. Central St.	Springfield	11/02/2016
Bentley House	603 E. Calhoun	Springfield	11/14/1980
Benton Avenue AME Church	830 N. Benton	Springfield	10/14/2001
Berry Cemetery	1431 W. Farm Road 74	Ash Grove	11/13/2004
Beverly Apartments	529 Cherry St.	Springfield	07/10/2017
Boegal and Hine Flour Mill- Wommack Mill	38 S. Main St.	Fair Grove	11/06/1986
Boone, Nathan House	7850 N. State Highway V	Ash Grove	10/01/1969
Camp Manor Apartments	423 E. Elm St.	Springfield	12/06/2005
Campbell Avenue Historic District	200 and 300 Blocks of S. Campbell Ave, and 300 Block of Park Central	Springfield	06/25/1999
Campbell Avenue Historic District Boundary Increase	318 and 322-326 S. Campbell Ave.	Springfield	12/23/2005
Christ Episcopal Church	601 E. Walnut St.	Springfield	03/26/1987
College Apartments	408 E. Walnut St.	Springfield	05/01/2003
Commercial Street Historic District	Commercial St.	Springfield	05/24/1983
Day House	614 South St.	Springfield	11/07/1976
Fallin Brothers Building	211-229 S. Market Ave.	Springfield	07/25/2012
Finkbiner Building	509-513 W. Oliver St.	Springfield	05/25/2005
Franklin Springfield Motor Co. Building	312-314 E. Olive St.	Springfield	11/15/2006
Gillioz Theater	325 Park Central E.	Springfield	07/09/1991
Gilmore Barn	US 160 3.5 Miles E. of Ash Grove	Ash Grove	04/08/1994
Gottfried Furniture Co. Building	326 Boonville Ave.	Springfield	12/18/2007
Greene County Courthouse	940 N. Boonville Ave.	Springfield	11/14/2007
Heer's Department Store	138 Park Central Square	Springfield	10/24/2002
Heercleff	6405 S. Campbell Ave.	Springfield	11/07/2016
Holland Building	205 Park Central East	Springfield	11/15/2000
Hotel Sansone	312 Park Central E.	Springfield	05/05/2000
Jefferson Street Footbridge	Jefferson Ave	Springfield	09/02/2003
Keet-McElhany House	435 E. Walnut St.	Springfield	03/22/1984

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King, J.E, Manufacturing Co.	1350 St. Louis St.	Springfield	07/27/2005
Kite,Robert B. and Vitae A Apartment Building	769-771 South Ave.	Springfield	01/28/2004
Landers Theater	311 E. Walnut St.	Springfield	08/12/1977
Lincoln School	815 N. Sherman	Springfield	05/31/2000
McDaniel building	316 Park Central E.	Springfield	10/22/2014
Marquette Hotel	400 E. Walnut St.	Springfield	05/05/2000
Marx-Hurlburt Building	311-315 E. Park Central Square	Springfield	09/02/2003
Mid-Town Historic District	Roughly bounded by Pacific, Clay, Pythian, Summit, Calhoun, Washington, Central, Benton, Division, and Jefferson	Springfield	07/13/1989
Mid-Town Historic District Boundary Increase	Roughly alone N. Robberson Ave. and N Jefferson Ave	Springfield	08/09/2002
Netter-Ullman Building	317 Park Central East	Springfield	04/18/2003
Oberman, D.M. Manufacturing Co. Building	600 N. Boonville	Springfield	04/18/2002
Old Calaboose	409 W. McDaniel St	Springfield	11/14/1980
Palace Hotel	501 College St.	Springfield	11/27/2002
Pearl Apartments and Windsor Apartments	728 and 722 S. Jefferson St.	Springfield	12/06/2005
Producers Ice and Manufacturing Company	524 W. Chase St.	Springfield	01/29/2018
Producers Produce Co. Plant	501 N. Main Ave.	Springfield	04/12/2010
Pythian home of Missouri	1451 E. Pythian St.	Springfield	10/07/2009
Rail Haven Motel	203 S. Glenstone Ave.	Springfield	05/10/2010
Rock Fountain Court Historic District	2400 W. College St.	Springfield	04/02/2003
Route 66 Steak 'N Shake	1158 E. St. Louis St.	Springfield	08/01/2010
St. John's Mercy Hospital Building	620 W. Scott st.	Springfield	09/02/2003
St. Paul Block	401 South Ave.	Springfield	01/15/2009
Schneider, Henry Building	600 College St. and 219-231 S. Main Ave.	Springfield	08/24/2006
South Avenue Commercial Historic District	Walnut and Pershing Sts. South and Robberson Aves	Springfield	06/25/1999
South-McDaniel-Patton Commercial Historic District	Roughly bounded by S. Campbell Ave, W. McDaniel St, South Ave, and W. Walnut St.	Springfield	03/07/2003
Springfield Furniture Co.	601 N. National Ave.	Springfield	07/05/2006
Springfield Grocer Co. Warehouse	323 N. Patton Ave.	Springfield	07/08/2010
Springfield National Cemetery	1702 E. Seminole St.	Springfield	08/27/1999
Springfield Public Square Historic District	149,138,137,134,127,132,124,and 122 Park central Square, 219,221 South Ave.	Springfield	05/05/2006
Springfield Public Square Historic District Boundary Increase	E. Side Public Square, Part of the 300 block Park Central E., N. Side of 200 Block of W. Olive St.	Springfield	01/13/2010
Springfield Seed Co. Office and Wholesale Building	319 N. Main Ave.	Springfield	09/14/2006
Springfield Warehouse and Industrial Historic District	E. Water, W. Mill and W. Phleps St. And Boonville Ave.	Springfield	06/25/1999
Stone Chapel	Drury College Campus, Benton and Central St.	Springfield	10/21/1982

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U.S. Customhouse and Post Office	830 Boonville Ave.	Springfield	06/27/1979
Walnut Street Historic commercial District	Walnut Street	Springfield	06/25/1999
Walnut Street Historic District	Roughly bounded by McDaniel, Walnut, Elm Sts. and Sherman Parkway	Springfield	03/21/1985
Walnut Street Historic District Boundary Decrease	Along East Elm Street	Springfield	10/19/2001
Walnut Street Historic District Boundary Increase	Roughly along E. Walnut St. From the 700 and 800 Blocks	Springfield	08/05/2002
West Walnut Street Commercial Historic District	Roughly 400-300 blocks of West Walnut Street and 300-400 block of South Campbell Ave.	Springfield	03/20/2002
Wilhoit, E.M. Building	300-330 E. Pershing St.	Springfield	01/31/2005
Wilshire Apartments	520 S. Jefferson St.	Springfield	04/10/2008
Wilson's Creek National Battlefield	6424 W. Farm Road 182	Springfield	10/15/1966
Wise Feed Co. Building	438-440 S. Campbell Ave.	Springfield	01/06/2003
Woods-Evertz Stove Co. Historic District	Bounded by N. Jefferson Ave., E Phleps St., N. Robberson Ave. and E. Tampa St.	Springfield	10/23/2003

Source: Missouri Department of Natural Resources-Missouri National Register Listings by County

Table 3.10 Major Employers in Greene County

LARGEST EMPLOYERS	INDUSTRY	NUMBER OF EMPLOYEES
CoxHealth	Healthcare	11,669
Mercy Hospital	Healthcare	10,950
Walmart	Retail	5,372
Springfield Public Schools	Education	4,100
State of Missouri	Government	4,018
Bass Pro Shops/Tracker Marine	Retail/Manufacturing	3,341
United States Government	Government	3,005

Source: Springfield Business Journal

Table 3.11 Agriculture-Related Jobs in Greene County

COUNTY	FARM EMPLOYMENT	AG-RELATED EMPLOYMENT	AGRIBUSINESS EMPLOYMENT	AGRIBUSINESS % TOTAL EMPLOYMENT
Greene	1,683	3,784	5,467	2.6%

Source: Missouri Economy

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3.3 Land Use Development

3.3.1 Development Since Previous Plan Update

Since the plan update the population of Greene County has increased steadily. As the population grows in the planning area, the risk of hazards also increases. More people and property in the planning area can lead to more injuries, death or property damage from all our identified hazards.

Table 3.12 County Population Growth 2010-2017

JURISDICTION	TOTAL POPULATION 2010	TOTAL POPULATION 2017	2010-2017 NUMBER OF CHANGE	2000-2017 PERCENT OF CHANGE
Greene County	275,174	286,759	11,585	4.21%
Ash Grove	1,680	1,607	-73	-4.35%
Battlefield	5,044	5,986	942	18.68%
Fair Grove	1,343	1,623	280	20.85%
Republic	13,772	15,890	2,118	15.80%
Rogersville	2,935	3,665	730	24.87%
Springfield	158,945	165,785	6,840	4.30%
Strafford	1,879	2,152	273	14.53%
Walnut Grove	767	612	-155	-20.21%
Willard	4,960	5,426	466	9.40%

Source: U.S. Census 2013-2017 American Community Survey, 5-year Estimates

*Population includes the portions of these cities in adjacent counties

Population growth or decline is generally accompanied by increases or decreased in the number of housing units. Table 3.14 will prove the change in numbers of housing units in Greene County from 2010-2017.

Table 3.13 Change in Housing Units, 2010-2017

JURISDICTION	TOTAL HOUSING UNITS 2010	HOUSING UNITS 2017	2010-2017 NUMBER OF CHANGE	2010-2017 PERCENT OF CHANGE
Greene County	125,387	130,915	5,528	4.41%
Ash Grove	661	669	8	1.21%
Battlefield	2,210	2,375	165	7.47%
Fair Grove	580	602	22	3.79%
Republic	6,139	6,091	-48	-0.78%
Rogersville	1,240	1,411	171	13.79%
Springfield	77,620	81,045	3,425	4.41%
Strafford	922	877	-45	-4.88%
Walnut Grove	306	286	-20	-6.54%
Willard	2,038	2,117	79	3.88%

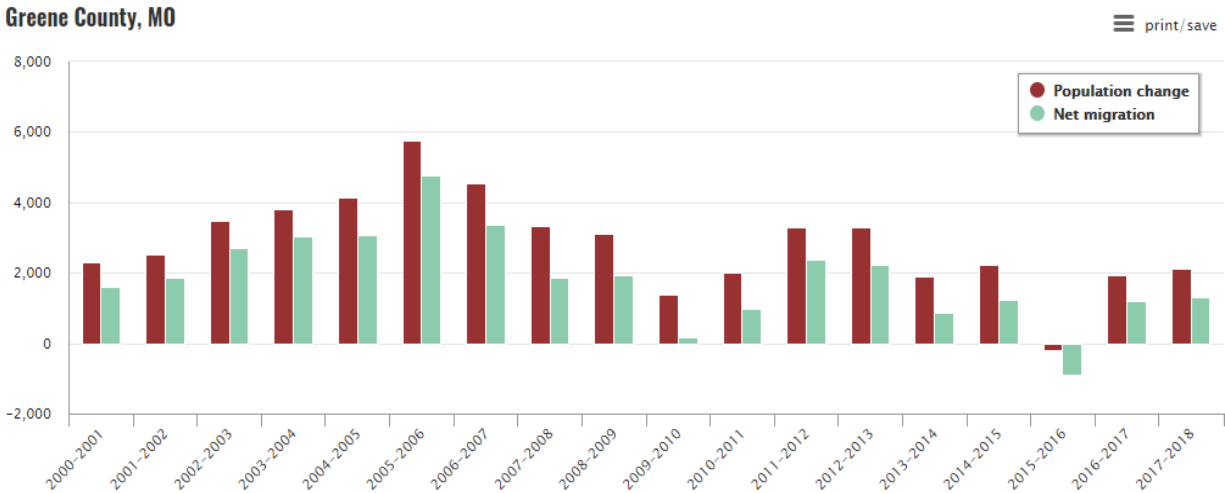
Source: U.S. Census 2013-2017 American Community Survey, 5-year Estimates

*Total Housing Units includes the portions of these cities in adjacent counties

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3.3.2 Future Land Use and Development

Greene County has seen steady growth over the last 20 years. In 2000, the projected population for the county was 241,015 the population for 2017 was 289,819. The chart below demonstrates population change and net migration for Greene County.



Current Greene County Zoning Ordinance allows for many zoning districts:

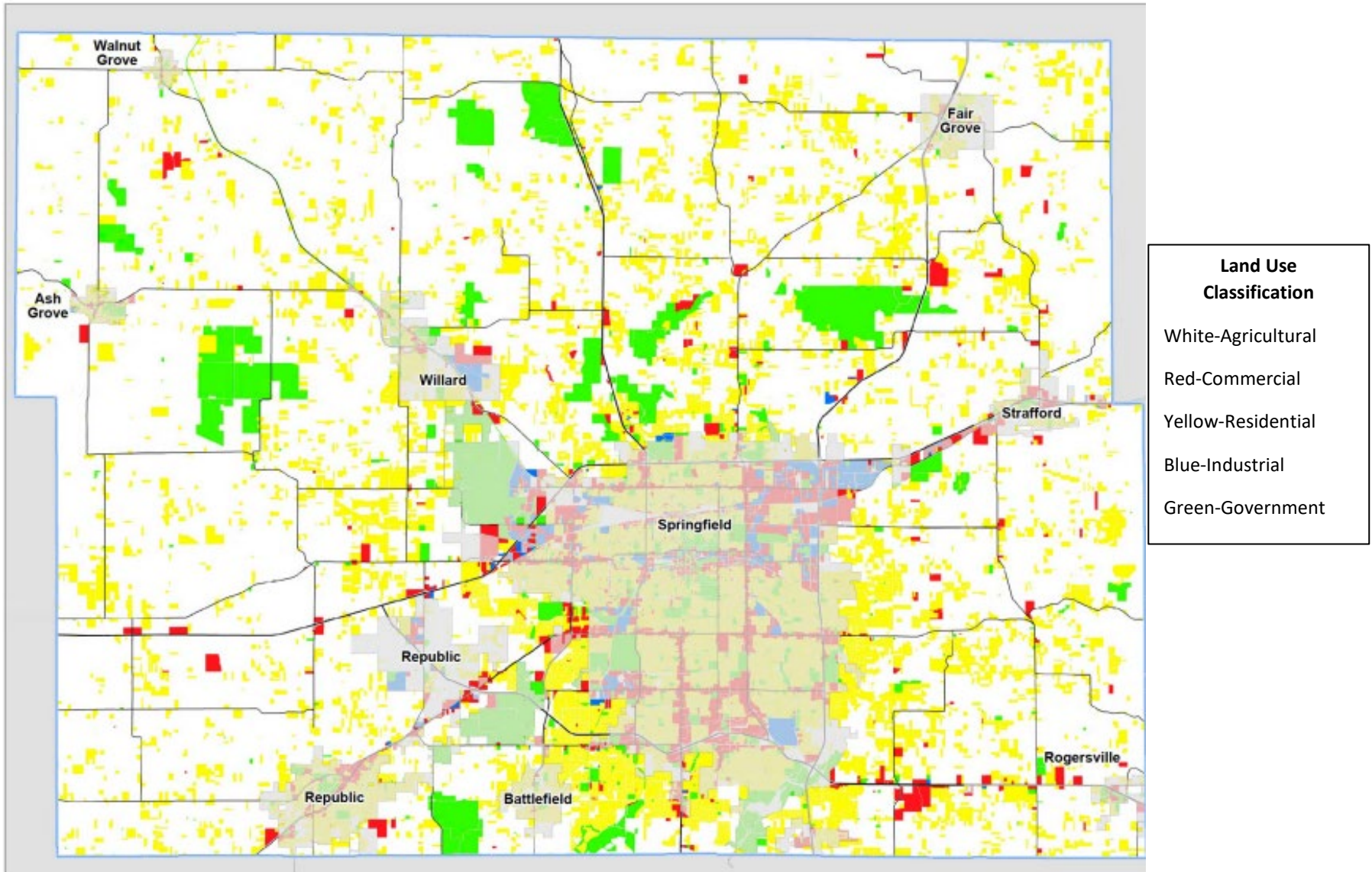
- Agriculture
- Agricultural-Residential
- Rural Residential
- Urban Residential
- One and Two Family Residential
- Multi-Family Residential
- Neighborhood commercial
- General Commercial
- Rural Commercial
- Professional Office
- General Office
- Light Manufacturing
- General Manufacturing
- General Manufacturing
- Plow Assignment District
- Conservation Development District

Each district allows differing land uses, required setback and other regulations. Additionally some “non-conforming” zoning dating from prior to the development of current zoning regulations also exists. Current zoning does not necessarily match the current land use. The Future Land Use Map depicts what zoning changes may occur in the future. The Planning Board and County Commission will use changes in zoning to achieve the land uses as specified in the Land Use Plan.

All land use information on the following pages is from the Greene County Land Use Plan from 2018. The Land Use Plan is updated every five years. This plan can be found at <https://greencountymo.gov/files/files.php?id=1567>.

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Current Land Use Map - 2018



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Urban Growth

Urban Growth Areas on the Land Use Plan are those areas which have been designated by each municipality as their desired area for future growth. Future growth in these areas will occur as public water, sewer and roads are provided. It is anticipated the municipalities will annex their respective growth areas.

The Urban Services Area around the City of Springfield is an area where extension of sewer service is planned. This area will be regulated in the same manner as the urban growth areas. The City of Springfield has also designated an urban reserve area, beyond the Urban Services Area. This was set aside for future urban growth beyond the Urban Services Area.

Rural Development Patterns

Since the adoption of the Urban Service Area in 1984, it has been the policy of Greene County Planning and Zoning to permit the subdivision of properties into three and five acre lots anywhere throughout the County. Greene County's ability to regulate subdivision is limited to a degree by State law which does not grant authority over the subdivision of properties into parcels ten acres or greater in size (RSMo. 64.211-64.295). The Land Use Plan designates areas which are recommended for residential development with a minimum of three acres as designated in the RR-1 zoning district. These areas were developed by analyzing existing patterns of land subdivision and depict areas where tracts of three and five acres were the predominant existing land use.

Environmental Goals

A few goals that the Greene County Land Use Plan identified for the environment were:

- Preservation of agriculture and farmland
- Water quality preservation
- Green space conservation and connections
- Promotion of sustainable building
- Promotion of urban infill
- Promote conservation of resources
- Community education

Future Land Use

Future Development Trends The composition of development is largely determined by the market forces of supply and demand. Greene County has many acres of open, undeveloped land, and all future development will be dependent on this supply of developable land. Land supply is restricted by the ability to provide utilities and transportation services. Current development trends have produced many residential lots of three to five acres. Many large parcels are being divided into ten acre tracts, which require no Planning and Zoning review.

Many new concepts in development are only beginning to emerge in Greene County. 'New Urbanism,' 'Neo-Traditional Development,' and 'Green Development' are growing trends. New Urbanism focuses on compact, smart development with close proximity to transit systems and encourages mixed uses. Neo-Traditional Development emphasizes a compact, connected neighborhood design. Green Development encourages sustainable living, using renewable resources, minimizing environmental impact, and maximizing efficiency.

In Greene County, these trends mean the forces of development may be much different than in the past. Greene County should remain competitive with other real estate markets by encouraging developments which are responsive to these trends. Mixed use, such as commercial and residential either shared within the same building or in close proximity, may become more common.

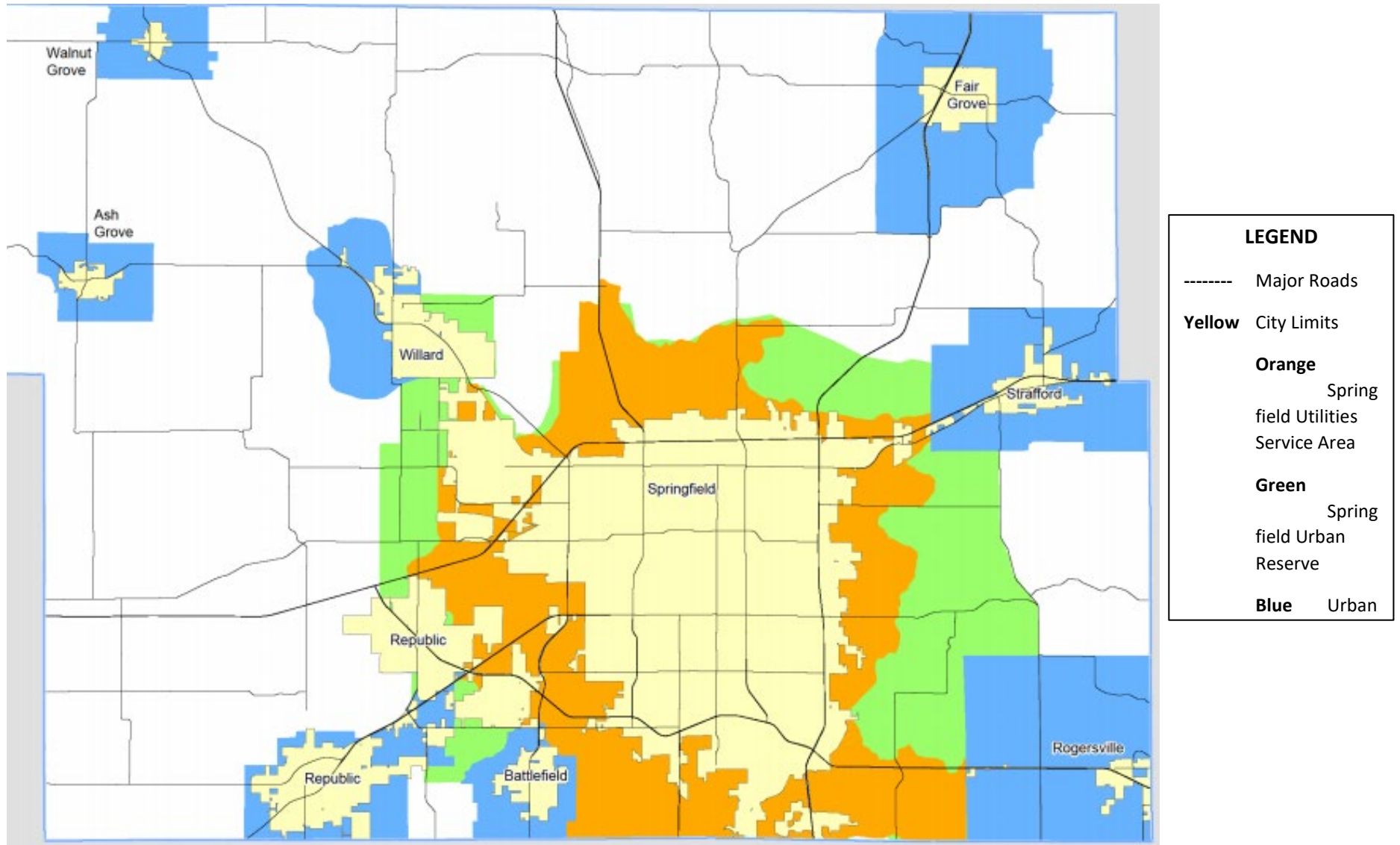
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The Future Land Use Plan is divided into a few broad land use districts:

- Urban and rural residential
- Urban and rural commercial
- Manufacturing
- Mixed use
- Agricultural
- Community and public lands
- Urban growth boundaries

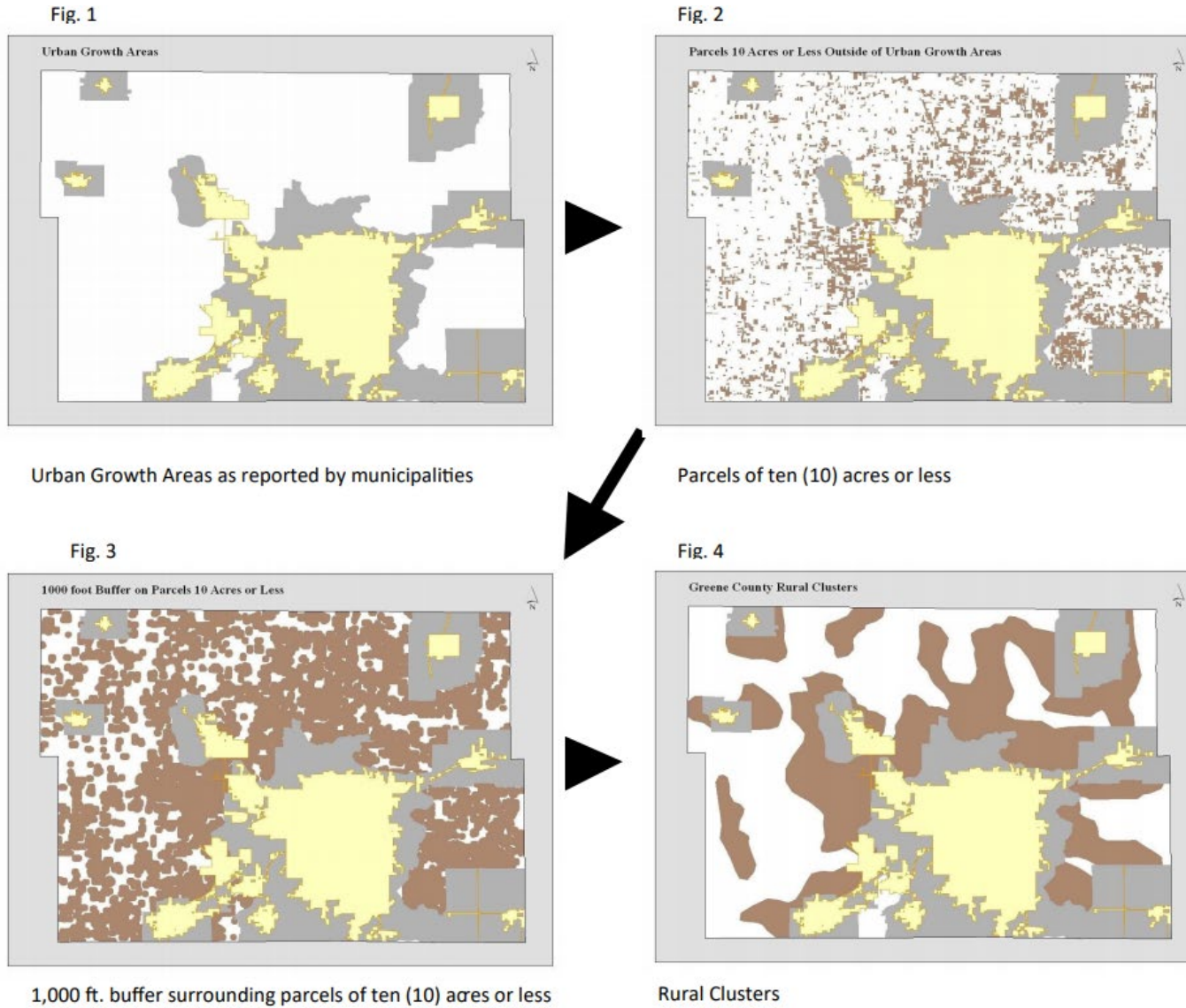
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Greene County Urban Growth Areas - 2018



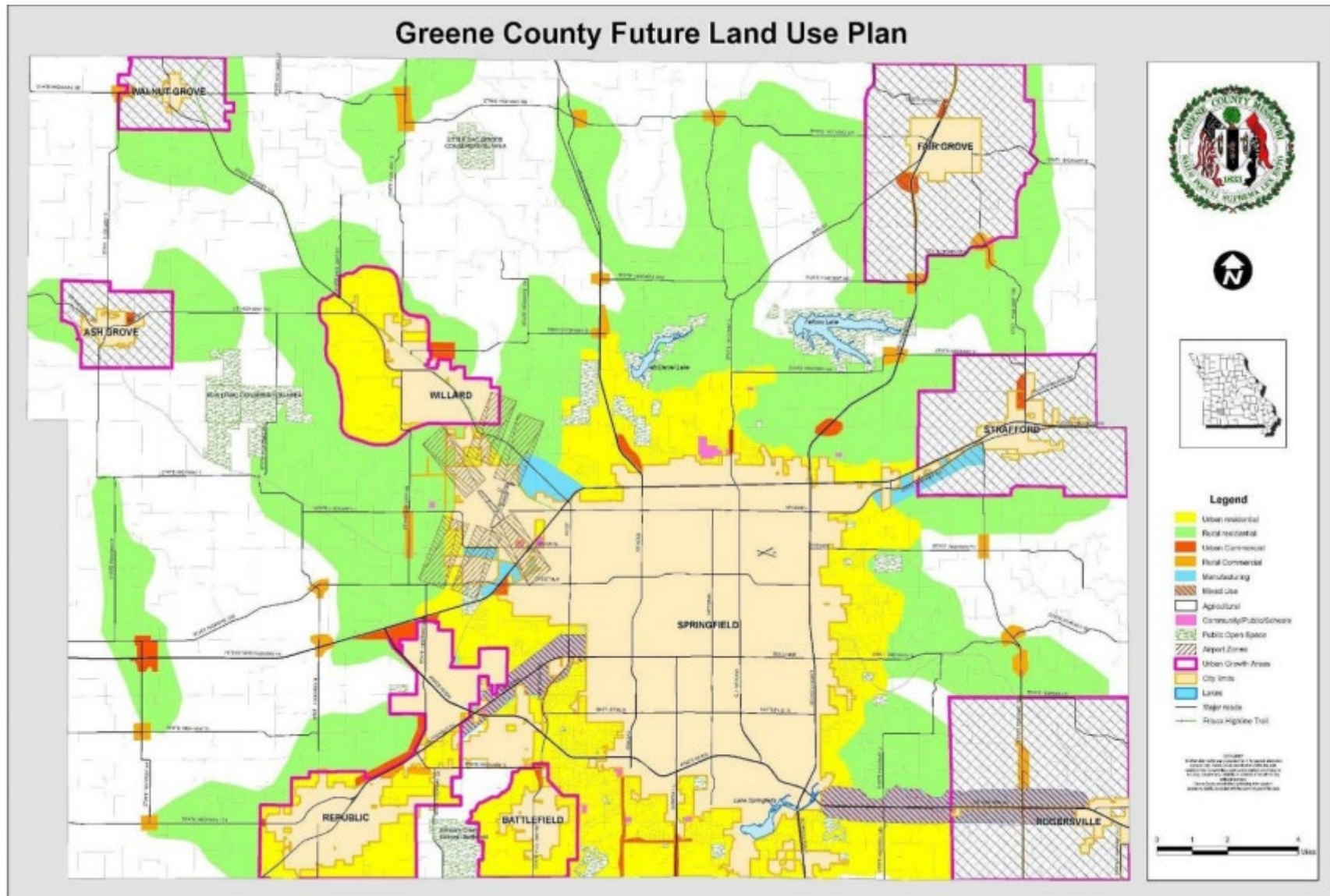
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Rural Development Patterns Map - 2018



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Future Land Use - 2018



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3.3.3 Jurisdiction Future Development

MUNICIPALITY FUTURE DEVELOPMENT

Ash Grove

The City of Ash Grove has many different available lots that could be used for future development. The City of Ash Grove is looking at a potential large residential development coming to the City. The development could bring 100+ single family homes to the area. This would greatly affect Ash Grove's economy. The development could also impact the school district by increasing the enrollment. Revitalization of Historic Main Street including a bakery, bistro, micro-distillery, shops and event menu are in various stages of preparing to open. The City also has two industrial manufacturing facilities that are seeking new contracts and adding new positions.

Replacement of a police and fire station are being discussed. Options including a joint Public Safety Building housing police, emergency management, EOC, with the possibility of adding the fire department; combined with Community Safe Room/Community Center Gym.

Battlefield

In 2018, it was announced that Russell Cellular was bringing a 40,000 square foot corporate headquarters to Battlefield. The location would be directly off Republic Road and Highway FF. The location is projected to bring 135 new jobs to the area. As of August 2019, the construction of the building was still taking place. There has not been a projected opening date.

Other future growth for the City of Battlefield comes in a residential form. The Township opened in 2019 and consists of 83 independent living, 46 assisted living, and 16 memory care apartments. The Township Apartments are located across from the future Russell Cellular on Republic Road and Highway FF.

Other residential growth that is expected to take place in Battlefield is 200+ houses coming to the city, including one gated community consisting of 7 luxurious houses.

Fair Grove

According to the Fair Grove Comprehensive Plan, there are four areas of focus which are the industrial park and surrounding area, South Orchard Boulevard, Historic Old Wommack Mill and areas directly east of the school campus. The community would also like to see economic, housing, environment community services and transportation development. The following developmental plans came from Fair Grove's Comprehensive Plan which was updated in 2017.

Industrial Park

The industrial park straddles both sides of U.S. Highway 65 without a connection between the two sides. To correct the issue, the industrial park has been consolidated on the western side of the highway, on the south side of Shelby Road in proximity to the fire station. In light of recent rezoning of parcels at the intersection of Shelby Road and Sunset Street to R-4, this area is proposed to be reclassified as multi-family with the lot directly behind the fire station maintained as open space for a potential City park. The parcels on the eastern side of the highway would be re-classified to correctly reflect the current use and in consideration of the surrounding area as single-family residential.

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South Orchard Boulevard

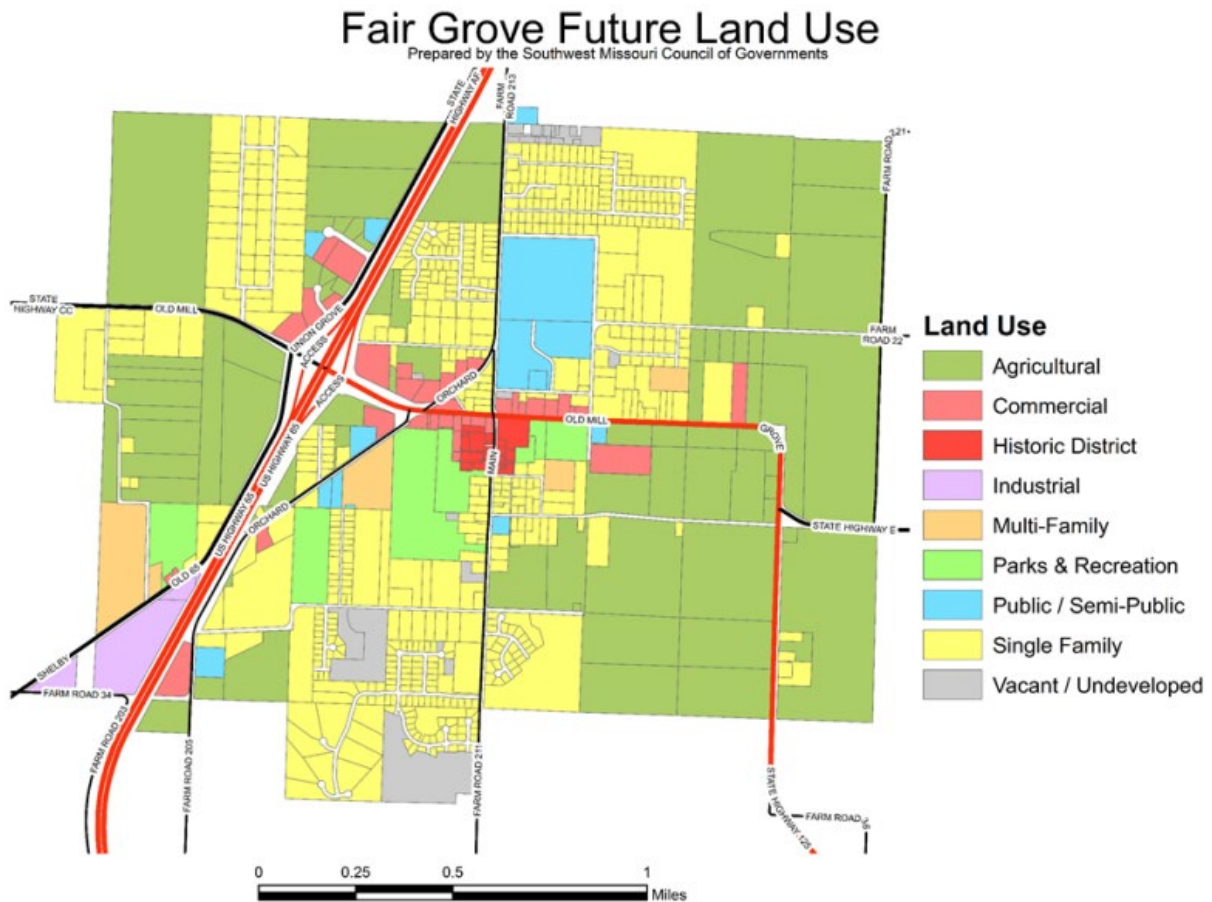
In consideration of the impending development of a senior center and the likelihood of the adjacent land owner developing more senior housing, the adjoining parcel should be reclassified to multi-family to aid in this development. The parcels located near the intersection of Highway 125 and U.S. Highway 65 are proposed to be commercial to support in-fill development, possibly attracting a fast dining-style restaurant.

Old Wommack Mill

In consideration of the intense use this area experiences during festivals, the lots surrounding the Mill should be reclassified as open space and acquired by the Historical Society to limit development and preserve open space for festival use.

Areas Directly East of School Campus

Currently agricultural/open space, this is an area of potential development immediately next to the school campus, a prime location for residential development. This residential development would provide an option for families to locate within walking distance of the schools.



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Republic

The City of Republic has been consistently growing for many years. The City is expected to have more growth over the next several years. There is potentially seven new subdivisions coming to the city with over 120 single family homes. The City is also seeing more commercial development with 23 commercial properties joining the city. A driving range golf course is currently being built across from the Republic High School, located on Republic Road.

Springfield

The City of Springfield is in process of updating their 20 year Comprehensive plan. As of September 2019, the City was just kicking off the planning process and was in phase one which is creating a detailed profile of what Springfield is currently. The Comprehensive Plan with outline land use development, economic development, housing and neighborhoods, transportation and mobility, community facilities, capital improvements and infrastructure, natural resources, resiliency, parks, open space, cultural and historic resources, public health, community character and place making. At this time of writing this plan, development information was not available. The City of Republic has several projects at pre-application stages but due to agreements between individuals and City may not be disclosed.

Strafford

The City of Strafford is in the process of developing the Delp Historic Route 66 Park. This project has been planned by the Strafford Park Committee over the past 3 years. The purpose of the park has several aspects:

- Provide a downtown park as part of the city of Strafford Parks System
- Create a focal point/photo opportunity for Route 66 tourists in Strafford
- Re-create three historic buildings that no longer exist, that were prominent in Strafford's history. Those being the Frisco Depot, Bumgarner Store and Delp Hotel
- Provide location to display historical information regarding the Strafford area.

The re-created Frisco depot will be located immediately east of City Hall. It will be equipped with restrooms and an environmentally controlled area for the display of Strafford historic information. The Bumgarner Store and Delp Hotel facades will be connected to pavilions equipped with outdoor tables.

According to the Greene County Land Use Plan 2018- areas near Strafford and many other areas in Greene County may be appropriate for urban commercial development in the future. As stated in the Greene County Land Use Plan 2018, the areas designated for manufacturing are those which are close to major roadway, air, and rail transportation systems. Areas near the Springfield/Branson National Airport and along State Highway OO (from Springfield to Strafford) are appropriate for manufacturing and industrial uses.

Walnut Grove

As of now, there are no major developments planned for Walnut Grove.

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Willard

The City of Willard and MODOT is currently working on “US Highway 160 Project by MODOT”. The project will have the following:

- Widen Route 160 to four lanes between I-44 in Springfield and Jackson Street in Willard
- Resurface the existing lanes of Route 160 between I-44 in Springfield and Route AB in Willard
- Traffic barrier all between lanes in areas
- Intersection improvements:
 - J-Turn at Farm Road 123/Westgate Avenue
 - Right-in/Right-out at Haseltine Road (Farm Road 115)
 - Roundabout at Farm Road 94 near quarry
 - Add left-turn lane at Hughes Road
 - Roundabout at Farm Road 103/Melville Road/Hunt Road
 - Add a pedestrian underpass at Hunt Road
 - Roundabout at Jackson Street
 - Add turn lanes at Greene County Route AB

The project will start construction in mid-summer 2019 and will continue until late 2020. Some traffic impacts include, lane closing at times on Route 60 and side streets closes at times for connection into new highway lanes. The image below demonstrates the Highway 160 project.



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SCHOOL DISTRICT FUTURE DEVELOPMENT

Ash Grove Public School District

In order for the Ash Grove school district to expand and grow, more housing and development needs to take place within the school district boundaries.

Fair Grove Public School District

In the City of Fair Grove's Comprehensive Plan, Goal One of Community Services Section is to continue support for local schools and parks systems. Objective two specifically mentions the Fair Grove School District. The District would like to encourage dual-enrollment programs through OTC.

The district has plans to remodel the bathrooms in the high school. The also would like to build a bus ban with a fuel take on site. Other projects include remodels to different areas of the elementary school and replacing air conditions systems on all buildings.

Republic Public School District

The school district completed a project from the previous mitigation plan to improve traffic in front of the high school on Route M. A round-a-bout was placed at one of the entrances to the high school to help the flow of traffic. The project was completed for the start of the 2019 school year. The school district is also looking to improve the intersection of Highway ZZ and Hines Street by Republic High School.

Springfield Public School District

The Springfield School District passed a tax in April of 2019 that would give the district money to complete 39 projects in the next three years. The initial wave of projects in the bond issue known as "Proposition S" includes:

- Construction on an early childhood center on the campus of Carver Middle School
- Demolition and construction of a larger, reconfigured Delaware Elementary
- Renovation and expansion of Sunshine Elementary

Other projects funded by the bond include:

- Secure entrances at 31 schools
- Construction of a new Boyd Elementary at Division Street and Sherman Avenue and a new Jarrett Middle School on the Campus of Portland Elementary.
- Renovation of Williams Elementary and addition of a preschool mini-hub
- Reconfiguration and renovation of a significant portion of Hillcrest High School

Strafford Public School District

The Strafford Public School District is planning on building a new elementary building. They also have plans to renovate the old elementary, high school and middle school building.

Walnut Grove Public School District

As of now, there are no major development plans for the Walnut Grove Public School District.

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Willard Public School District

The Willard School District has plans to build FEMA safe rooms in multiple different schools to protect both students and staff member from severe weather and tornados. No other future development plans are in place at this time. The district is projected to have a 2% annual increase in enrollment. Roadway improvements are taking place in the City of Willard that could boost traffic and development in the Willard School District area.

SPECIAL DISTRICT FUTURE DEVELOPMENT – FIRE PROTECTION DISTRICTS

Ash Grove Fire Protection District

The City of Ash Grove is looking at potentially building that would be a multi-purpose emergency response building including a police station, fire station, Emergency Operations Center, Community Gym, etc. The plans are still being discussed and no official action has been taken.

Battlefield Fire Protection District

No major development is planned for the Battlefield Fire Protection District.

Ebenezer Fire Protection District

No major development is planned for the Ebenezer Fire Protection District.

Fair Grove Fire Protection District

No major development is planned in the Fair Grove Fire Protection District

Logan-Rogersville Fire Protection District

No major development is planned in the Logan-Rogersville Fire Protection District.

Strafford Fire Protection District

No major development is planned in the Strafford Fire Protection District.

Walnut Grove Fire Protection District

No major development is planned for the Walnut Grove Fire Protection District.

Willard Fire Protection District

The Willard Fire Protection District is steadily growing at around 4% each ear. The District is stretch then as far as labor and equipment costs to provide the best the community. There is now major development planned for the district, but expansion could be needed in the future.

SPECIAL DISTRICT FUTURE DEVELOPMENT – UNIVERSITIES

Missouri State University

Over the last 5 years, Missouri State has done many renovations and construction including the Glass Hall remodel that was completed in October of 2017. Other projects included Improvement to academic facilities like Ellis Hall that was completed in September of 2017. Another addition to the campus was a new design and construction of a health and wellness center. The center is twice the size of the old facility and is located at the same site. This project was completed in March of 2018.

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The University has many planned projects including a renovation to Hill Hall that will improve access and provide modernization of the building that was built in 1924. The project will include electrical and mechanical system upgrades and improvement to lab, office and classroom space.

There are also plans for a new residence hall located near the downtown area. The facility will reflect the historical surrounding and is designed to engage the street life with the building occupants.

The University is also looking to add a multi-purpose addition to the southwest corner of the Greenwood Laboratory School near the intersection of Bear Boulevard and Hampton Street Transit way. This is currently the location of the outdoor paved basketball court. The addition is to include a new south “front” entrance, an adjacent office, a lobby supporting the school, restrooms, and a multipurpose center capable of seating eight hundred people. The existing utility building will be incorporated into the final design plan.

The University also has plans to add on to the Plaster Center. There is a necessity for a build out of approximately 30,000 square feet of unusable space within the Robert W. Plaster Center for Free Enterprise in order to accommodate the expansion of the cooperative Missouri State University and Missouri University of Science and Technology engineering program.

Some possible future projects include:

- Alumni Events Center
- Renovations to Carrington Hall
- Redesigned and modernize Cheek Hall
- Craig Hall Renovation
- Electronic Arts Building
- Intermodal Transfer Station
- Indoor Practice Facility
- Jordan Valley Innovation Center
- Renovation of Kemper Hall
- Grand Street improvements
- Renovation to McDonald Hall
- Improvements to Meyer Library
- Multicultural Center
- Ozarks Science Center
- Professional Building
- Student Union Expansion
- Renovation of Temple Hall
- Tent Theatre Pavilion
- Welcome Center-New Bookstore
- Theatre and Dance Building

Ozark Technical Community College

Ozark Technical Community College is currently building a new campus located in Republic. The campus will be located along U.S 60 highway and is projected to be finished August 2020. The \$7.29 million project is the largest and most visible result of a tax proposal approved in April 2019 to expand funding for OTC.

The College also plans to construct a Center for Advancement Manufacturing building. The college also is planning on remodeling of Lincoln hall historic building.

OTC is projected to see a 6.1% increase of enrollment in the next five years.

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3.4 HAZARD PROFILES, VULNERABILITY, AND PROBLEM STATEMENTS

Each hazard will be analyzed individually in a hazard profile. The profile will consist of a general hazard description, locations, strength/magnitude/extent, previous events, future probability, a discussion of risk variation between jurisdictions, and how anticipated development could impact the risk. At the end of each hazard profile will be a vulnerability assessment, followed by a summary problem statement.

HAZARD PROFILES

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future events.

All hazards will be profiled individually in alphabetical order by category. Greene County has three different categories of hazards: natural, technological and human-caused. For this plan, Damaging Winds, Lightning and Hail have been grouped into one hazard profile, "Severe Thunderstorms". Extreme Cold and Extreme Heat have also been grouped into one hazard profile, "Extreme Temperatures". The hazards "Ice and Snow" have been renamed in the Hazard Profile to "Severe Winter Weather". Greene County still considers these as separate hazards and will be discussed with great detail in the hazard profile. The level of information presented in the profiles will vary by hazard based on the information available. With each update of this plan, new information will be incorporated to provide better evaluation and prioritization of the hazards that affect the planning area. Detailed profiled for each identified hazard include information categorized as follows:

- **Hazard Description:** This section consists of a general description of the hazard and the types of impacts it may have on a community or school/special district.
- **Geographic Location:** This section describes the geographic areas in Greene County that are affected by the hazard. For some hazards, the entire planning area is at risk.
- **Strength/Magnitude/Extent:** This includes information about the strength, magnitude, and extent of a hazard. For some hazards, this is accomplished with description of a value on an established scientific scale or measurement system, such as an EF2 tornado on the Enhanced Fujita Scale. Strength/Magnitude/Extent defines the characteristics of the hazard regardless of the people and property it affects.
- **Previous Occurrences:** This section includes available information on historic incidents and their impacts. Historic event record help form a solid basis for probability calculations.
- **Probability of Future Occurrence:** The frequency of recorded past events is used to estimate the likelihood of future occurrences.
- **Changing Future Conditions Considerations:** In addition to the probability of future occurrence, changing future conditions should also be considered, including the effects of long-term changed in weather patterns and climate on the identified hazards.

VULNERABILITY ASSESSMENTS

Requirement §201.6(c)(2)(ii) :[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii)(A) :The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

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Requirement §201.6(c)(2)(ii)(B) :[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Requirement §201.6(c)(2)(ii): (As of October 1, 2008) [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged in floods

Following the hazard profile for each hazard will be the vulnerability assessment. The vulnerability assessment further defines and quantifies populations, buildings, critical facilities, and other community assets at risk to damages from natural hazards.

The vulnerability assessments in Greene County Multi-Jurisdictional Hazard Mitigation Plan 2020-2025 will be based on:

- Written descriptions of assets and risk provided by participating jurisdictions
- Existing plans and reports
- Personal interviews with planning committee members and other stakeholders
- Other sources as cited.

Within the Vulnerability Assessment, the following headers will be addressed:

- **Vulnerability Overview:** This section will provide an overall summary of each jurisdiction's vulnerability to the identified hazards. The overall summary of vulnerability identifies structures, systems, populations or other community assets as defined by the community that are susceptible to damage loss for hazard events.
- **Potential Losses to Existing Development:**
- **Previous and Future Development:** This section will include information on how changes in development have impacted the community's vulnerability to this hazard.
- **Hazard Summary by Jurisdiction:** This section will provide an overview of the variation and factual basis for the variation.

PROBLEM STATEMENTS

Each hazard analysis will conclude with a brief summary of the problems created by the hazard in the planning areas, and possible ways to resolve those problems.

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3.4.1 Natural Hazard: Drought

HAZARD PROFILE

Hazard Description

Droughts is generally defined as a condition of moisture levels significantly below normal for an extended period over a large area that adversely affects plants, animal life and humans. A drought period can last for months, years, or even decades. There are four types of drought conditions relevant to Missouri, according to the State Plan, which are as follows:



- Meteorological drought is defined in terms of the basis of the degree of dryness (in comparison to some “normal” or average amount) and the duration of the dry period. A meteorological drought must be considered as region-specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region.
- Hydrological drought is associated with the effects of periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply (e.g. streamflow, reservoir and lake levels, ground water). The frequency and severity of hydrological drought is often defined on a watershed or river basin scale. Although all droughts originate with a deficiency of precipitation, hydrologists are more concerned with how this deficiency plays out through the hydrologic system. Hydrological droughts are usually out of phase with or lag the occurrence of meteorological and agricultural droughts. It takes longer for precipitation deficiencies to show up in components of the hydrological system such as soil moisture, streamflow, and ground water and reservoir levels. As a result, these impacts also are out of phase with impacts in other economic sectors.
- Agricultural drought focus in on soil moisture deficiencies, differences between actual and potential evaporation, reduced ground water or reservoir levels, etc. Plant demand for water depends on prevailing weather conditions, biological characteristics of the specific plants, its stage of growth, and the physical and biological properties of the soil.
- Socioeconomic drought refers to when physical water shortage begins to affect people.

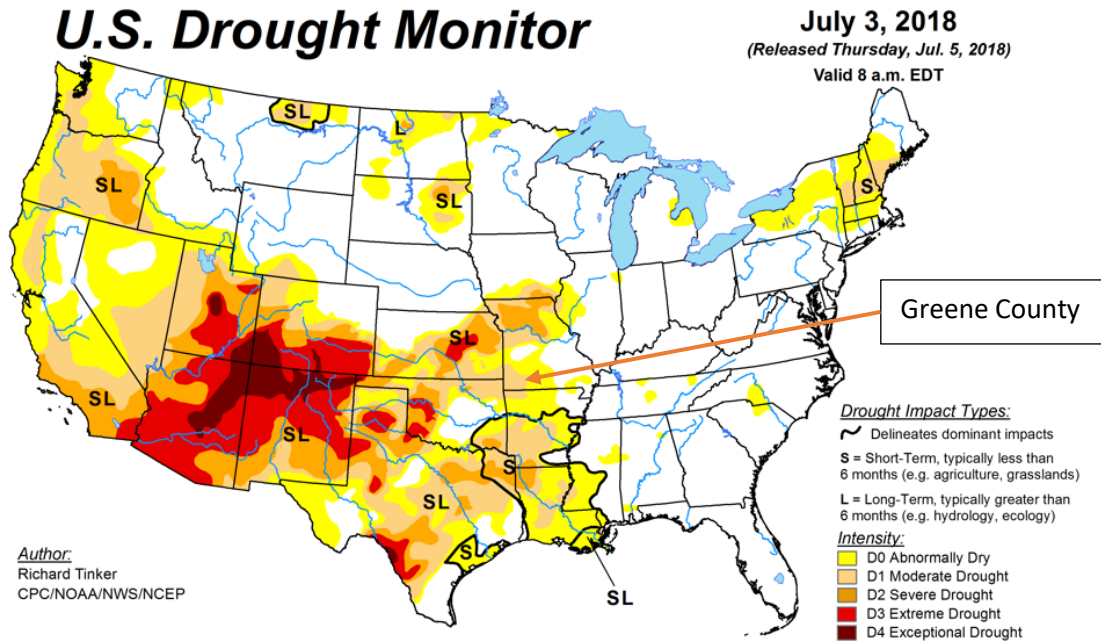
Geographic Location

The entire planning area is at risk to drought. Drought most directly impacts the agricultural sector. There are approximately 253,310 acres in Greene County that is used for farming. Farming is spread across all jurisdictions in Greene County.

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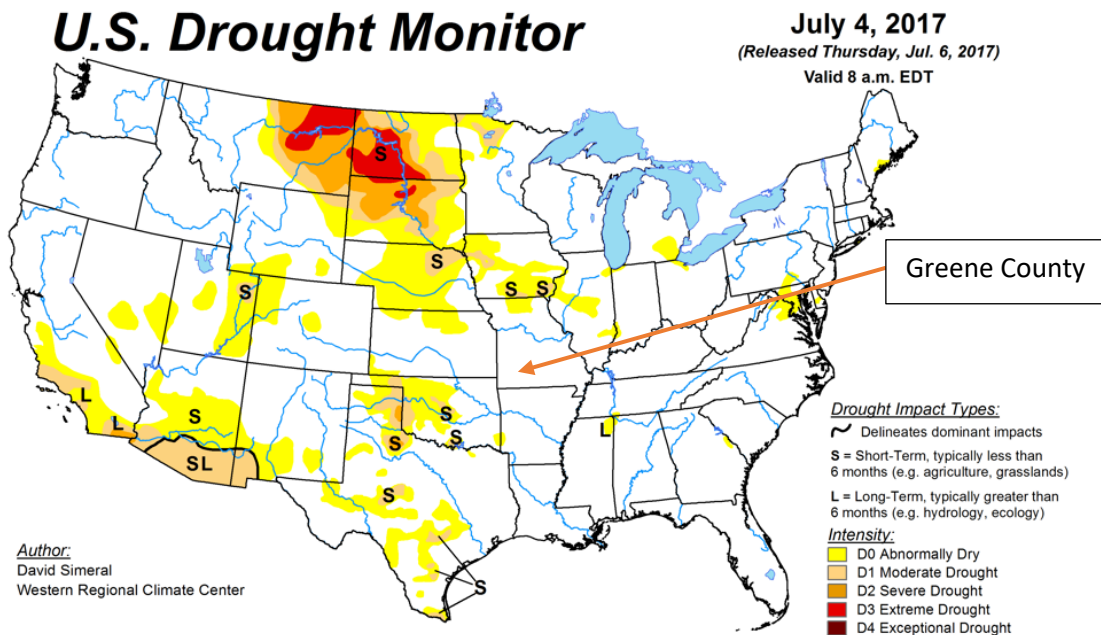
U.S. Drought Monitor Map of Missouri-Trends

July 2018



Source: <https://droughtmonitor.unl.edu/maps/maparchive.aspx>

July 2017



Source: <https://droughtmonitor.unl.edu/maps/maparchive.aspx>

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Strength/Magnitude/Extent

The Palmer Drought Indices measure dryness based on recent precipitation and temperature. The indices are based on a “supply-and-demand model” of soil moisture. Calculation of supply is relatively straightforward, using temperature and the amount of moisture in the soil. However, demand is more complicated as it depends on a variety of factors, such as evapotranspiration and recharge rates. These rates are harder to calculate. Palmer tried to overcome these difficulties by developing an algorithm that approximated these rates and based the algorithm on the most readily available data- precipitation and temperature.

The Palmer Index has proven most effective in identifying long-term drought of more than several months. However, the Palmer Index has been less effective in determining conditions over a matter of weeks.

Palmer also developed a formula for standardizing drought calculations for each individual locations based on variability of precipitation and temperature at that location. The Palmer index can therefore be applied to any site for which sufficient precipitation and temperature data is available.

Palmer Drought Severity Index

MEASURE	MEANING
Above 4.0	Extreme Moist Spell
3.0 to 3.9	Very Moist Spell
2.0 to 2.9	Unusually Moist Spell
1.0 to 1.9	Moist Spell
0.5 to 0.9	Incipient Moist Spell
0.4 to -0.4	Near Normal Conditions
-0.5 to -0.9	Incipient Drought
-1.0 to -1.9	Mild Drought
-2.0 to -2.9	Moderate Drought
-3.0 to -3.9	Severe Drought
Below -4.0	Extreme Drought

Previous Occurrences

January – April 2006

Greene County did experience drought from January to April of 2006 due to a lack of precipitation in the winter months. As spring began, Greene County began to have more events producing enough precipitation to rectify the drought conditions. There were no reports of property or crop damage during this drought.

Insured Crop Loss Payments-2018

YEAR	CROP	REASON	TOTAL AMOUNT OF LOSS
2018	Corn	Drought	\$3,547.00
2018	Corn	Drought	\$145,227.44
2018	Corn	Drought	\$105,455.13
2018	Soybeans	Drought	\$2,161.00
2018	Soybeans	Drought	\$91,461.80
2018	Soybeans	Drought	\$94,276.72
TOTAL:			\$442,129.09

Source: rma.usda.gov/data/cause.html

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Insured Crop Loss Payments-2017

YEAR	CROP	REASON	TOTAL AMOUNT OF LOSS
2017	Corn	Drought	\$3,969.00
2017	Soybeans	Drought	\$4,930.50
2017	Soybeans	Drought	\$12,517.00
Source: rma.usda.gov/data/cause.html			TOTAL: \$21,143.50

Insured Crop Loss Payments-2016

YEAR	CROP	REASON	TOTAL AMOUNT OF LOSS
2016	Corn	Drought	\$33,277.00
2016	Soybeans	Drought	\$8,168.00
Source: rma.usda.gov/data/cause.html			TOTAL: \$41,445.00

Insured Crop Loss Payments-2015

YEAR	CROP	REASON	TOTAL AMOUNT OF LOSS
2015	Soybeans	Drought	\$874.50
Source: rma.usda.gov/data/cause.html			TOTAL: \$874.50

Over the last 5 years, the amount of crops effected by drought have increased. Insurance payouts have greatly increased from 2015 to 2018. The charts above are only displaying amounts that only insured farmers have received money. It is safe to say that many more crops in the planning area have been affected by drought over the last five years.

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Previous Events 2010-2018

BEGIN DATE	END DATE	NAME OF EVENT	DESCRIPTION
06/01/2018	03/25/2019	Missouri Cattle Deaths	Drought during the summer reduced available hay and grass supplies, leaving farmers to feed questionable quality hay to their livestock. Hay that was given had large amounts of Nitrates, causes up to 200 cattle deaths across the state (including Greene County)
10/11/2018	N/A	High Nitrate Levels	Missouri Farmers were warned to test baled cornstalks before feeding because the droughty summer caused high levels of nitrates.
08/05/2018	08/05/2018	Crops Suffering	Grass was brown and crunchy, farm crops were suffering. Tree leaves were turning yellow due to lack of moisture.
04/16/2017	N/A	Toxic Fescue	All Missouri Farmers were warned that forages under stress from the winter drought and warm spring might set seed heads early.
06/01/2016	03/21/2017	Livestock Water Shortage and Grass Fires	As drought conditions worsened in SW Missouri, water sources for livestock such as streams and ponds were decreasing. Fire departments reported many grass fires effects crops.
06/15/2012	07/02/2012	Crops Struggling	Many reports of failed corn acres, cattle water supply very low, farmers buying hay from other states and starting to feed.
01/09/2013	05/16/2013	USDA Disaster Declaration	USDA declared many counties (Including Greene) as primary and secondary disaster areas related to drought in January
07/21/2011	N/A	Drought Increasing Cost of Hay	Drought has decreased the hay supply and driven up the cost of hay, making it a challenge for Greene County farmers to replace hay lost.
07/01/2011	10/18/2011	USDA Disaster Declaration	USDA declared many counties (Including Greene) as primary and secondary disaster areas related to drought from July 1- August 30.

Source: droughtreporter.unl.edu

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Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is probable for a drought to occur within the next three years in Greene County. For a full description of the CPRI for droughts, refer to Appendix B.

Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, severe drought is a natural part of Missouri and Greene County's climate. Future increases in evaporation rates due to higher temperatures may increase the intensity of naturally-occurring droughts. Although Greene County typically receives wetter weather in the spring, summer droughts are likely to be more severe. Higher evaporation and lower summer rainfall are likely to reduce river flows.

The number of heavy rainfall events is predicted to increase, yet researchers currently expect little change in total rainfall amounts, indicating that the periods between heavy rainfalls will be marked by an increasing number of dry days.

VULNERABILITY

Vulnerability Overview

The Missouri State Hazard Mitigation Plan places Greene County in Region B when looking at droughts. Region B is central and east-central Missouri. According to the plan, Region B has moderate drought susceptibility. Groundwater resources are adequate to meet domestic and municipal water needs, but due to required well depths, irrigation wells are very expensive. The topography is generally unsuitable for row-crop irrigation.

Potential Losses to Existing Development

The National Drought Monitor Center at the University of Nebraska at Lincoln summarized the potential impacts of drought as follows: Drought can create economic impacts on agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and diseases to forest and reduce growth. The incidence of forest and range fires increase substantially during extended droughts, which in turn place both human and wildlife populations at higher levels of risk. Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Finally, while drought is rarely a direct cause of death, the associated heat, dust and stress can all contribute to increased mortality.

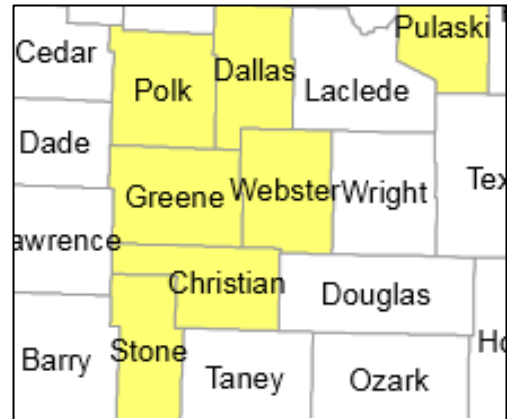
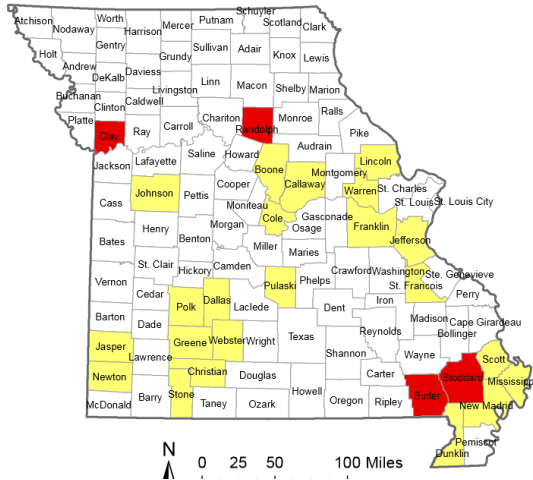
Droughts can put Greene County's agriculture and rural areas at risk. Droughts may also cause Greene County to come more susceptible to urban or wildfires. A drought accompanied by extreme heat incidents can be especially harmful and devastating.

A new analysis, performed for the Natural Resources Defense Council, examined the effects of climate change on water supply and demand in the contiguous United States. The study found that more than 1,200 counties would face higher risk for water shortages by mid-century as a result of climate change. Two of the principal reasons for the projected water constraints are shifts in precipitation and potential evapotranspiration (PET). Climate models project decreases in precipitation in many regions of the U.S., including areas that may currently be described as experiencing water shortages of some degree.

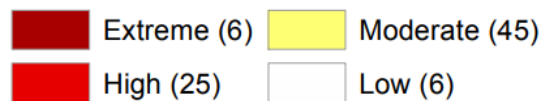
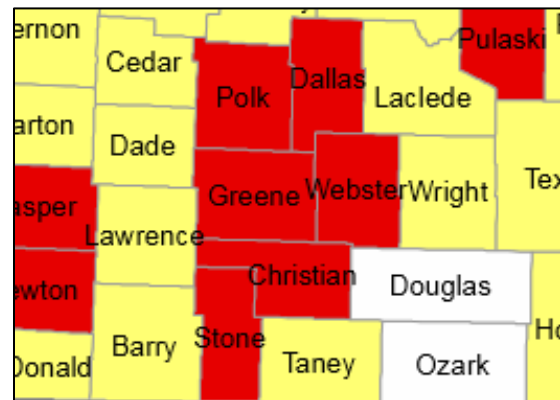
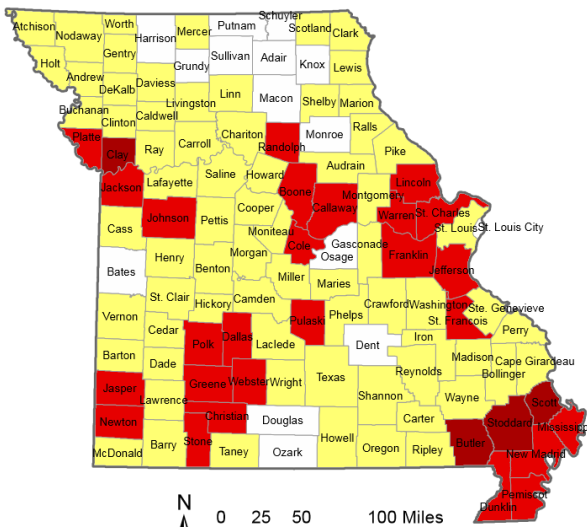
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Below is the water sustainability for Greene County with and without climate change:

Missouri Water Sustainability without Climate Change-Year 2050

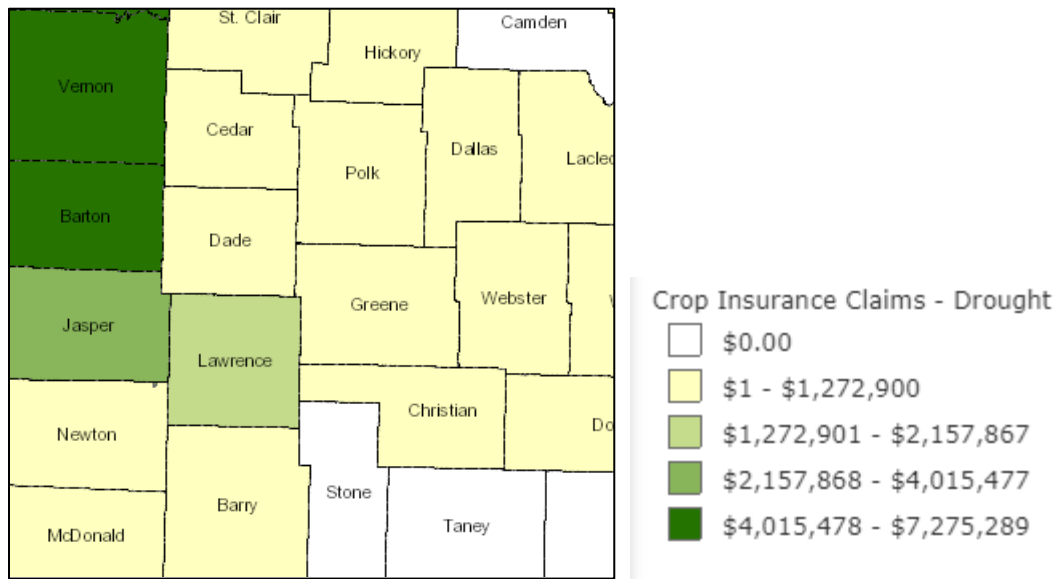


Missouri Water Sustainability with Climate Change-Year 2050



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Crop Insurance Claims-Droughts



Impact of Previous and Future Development

Greene County is a growing community. As the population of the county grows, the risk of more people being affected by drought grows as well. When the population grows in a community, so does the demand for treated water, but this can add additional strain on water supply systems. There is plenty of land in Greene County that isn't being used for anything specific at this moment, leaving room for both urban and agricultural development. Increases in acreage planted with crops could cause more agricultural losses if the planning area suffered a severe drought.

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EMAP Consequence Analysis

EMAP Impact Analysis: Drought

SUBJECT	DETRIMENTAL IMPACTS
Public	Droughts can create many safety concerns. Wildfires and urban fires are at elevated risk during droughts. Droughts can pose threats to citizens through water shortages and extreme heat that is often accompanied by droughts. Children, the elderly, and those with respiratory problems are at elevated risks. Illnesses can also come from contaminated water. These elements create multiple safety concerns.
Responders	Greene County has no reports on life threatening situations to responders or any impact to response function due to a drought. Responders can be vulnerable to fatigue and this can cause response functions to be impacted.
Continuity of Operations	There have been no reports of impact on service operations due to droughts in Greene County.
Property, Facilities, and Infrastructure	Property damage is often minor but is impacted especially when considering the issues that may arise due to a water shortage. There have been no reports of infrastructure damages due to droughts in Greene County. However, water shortage can create an impact to some infrastructure.
Environment	Significant widespread damage has occurred in Greene County due to drought incidents. The environment can take years to recover from droughts. Wildfires and wildlife is also highly affected. Water and soil contamination is also probable.
Economic Condition of Jurisdiction	Many rural areas depend on crops and livestock, while the cities needs a large amount of water to support the larger populations. Many rural homes and areas that survive off their own wells will also suffer greatly from a drought.
Public Confidence in the Jurisdiction's Governance	Public confidence can be affected if food and water supplies are scarce. This factor is heavily depended on how the crisis is handled by the government.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

All jurisdictions in Greene County could be affected by extreme droughts. In cities, the drought conditions would be the same as those experiencing drought in rural areas, but the impacts could be different. For example, areas with local gardens could be impacted more than areas without gardens. All areas could see a decrease in water supply across the areas affecting homes, businesses and schools.

PROBLEM STATEMENT

Droughts can be extreme hazards that can last months or even years. Droughts pose a threat to all areas in Greene County. Jurisdictions with agriculture are more likely to see larger impacts from droughts. Droughts can come at any given point in a year, though more susceptible during the summer months. Drought can lead to decreases in

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water supply, loss in agriculture crops and can even effect the public’s health. Mitigation actions for droughts include public education, public shelters that provide drinking water and drought monitoring. Participating Jurisdictions did not include drought mitigation projects in this Mitigation Plan.

3.4.2 Natural Hazard: Earthquake

HAZARD PROFILE

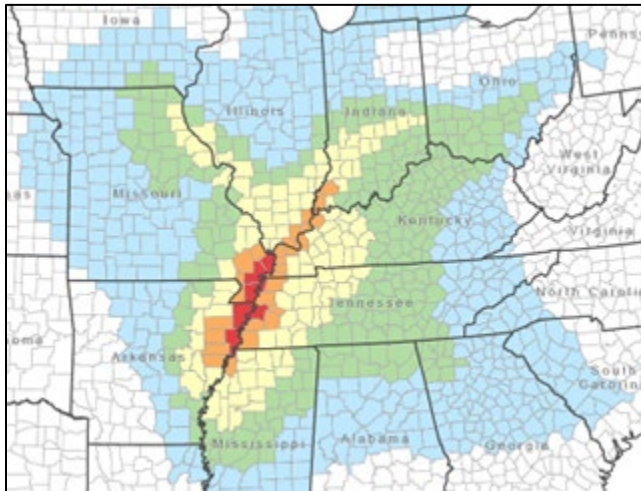
Hazard Description

An earthquake is a sudden motion or trembling that is caused by a release of energy accumulated within or along the edge of the earth’s tectonic plates. Earthquakes occur primarily along fault zones and tears in the earth’s crust. Along these faults and tears in the crust, stresses can build until one side of the fault slips, generating compressive and shear energy that produces the shaking and damage to the built environment. Heaviest damage generally occurs nearest the earth quake epicenter, which is that point on the earth’s surface directly above the point of fault movement. The composition of geologic materials between these points is a major factor in transmitting the energy to buildings and other structures on the earth’s surface.



Geographic Location

New Madrid Seismic Zone



According to The Missouri Department of Natural Resources, The New Madrid Seismic Zone (NMSZ) is the most active seismic area in the United States, east of the Rocky Mountains. The NMSZ is located in southeastern Missouri, northeastern Arkansas, western Tennessee, western Kentucky and southern Illinois. The active faults in the NMSZ are poorly understood because they are not expressed at the ground surface where they can be easily studied. The faults are hidden beneath 100-200-foot thick layers of soft river deposited soils called alluvium. Microseismic earthquakes (magnitude less than 1.0 to about 2.0), measured by seismographs but not felt by humans, occur on average every other day in the

NMSZ. A large earthquake from the New Madrid Seismic Zone would affect all of Missouri, including Greene County and potentially many other states across the country.

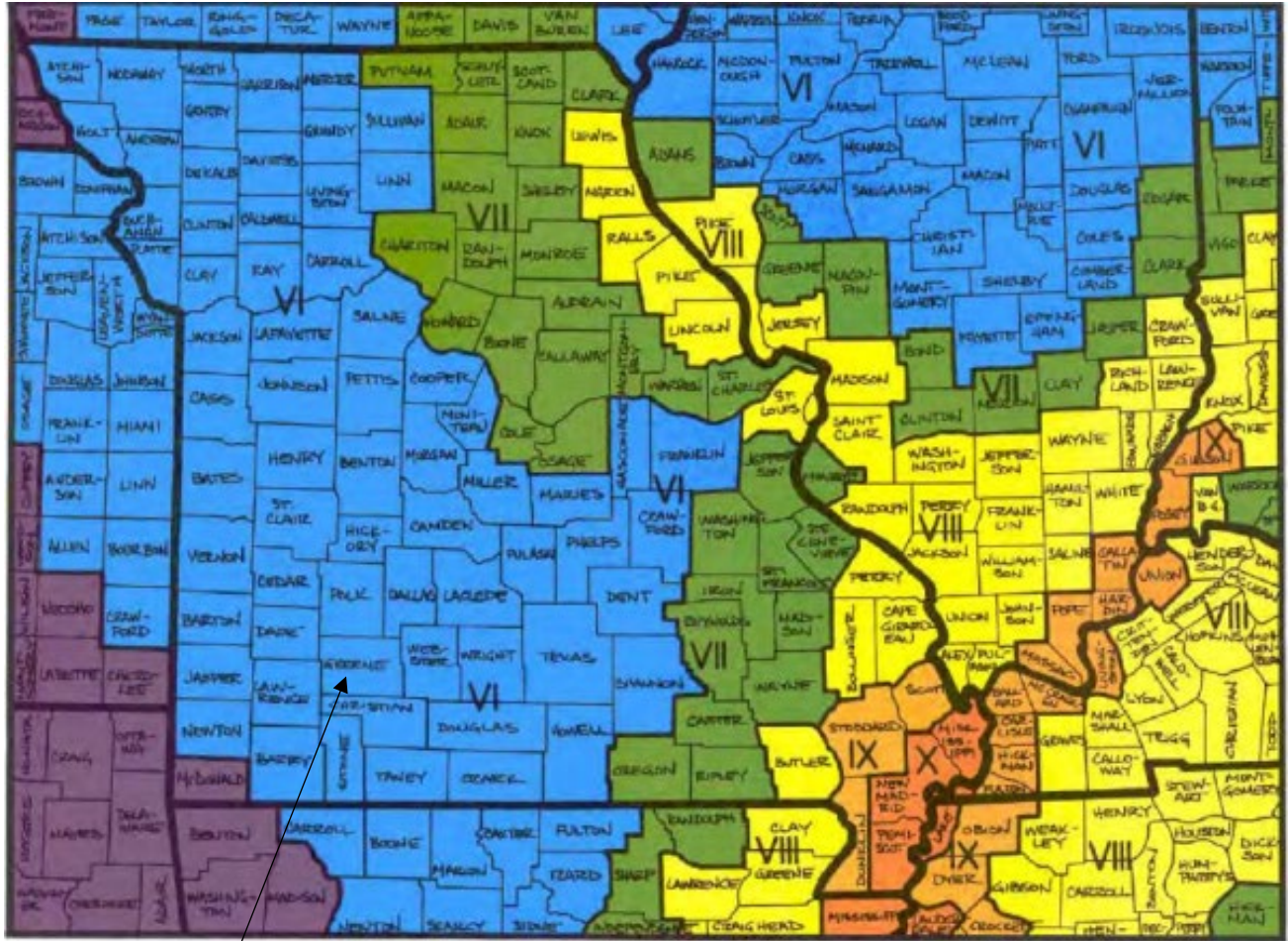
Nemaha Ridge

The Nemaha Ridge, also known as the Nemaha Uplifts, is located in the Central United States. It is a buried structural zone associated with a granite high in Pre-Cambrian basement that extends from approximately Omaha, Nebraska to Oklahoma City, Oklahoma. The ridge is associated with the seismically active Humboldt Fault zone. It

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is also associated with the Proterozoic Midcontinent Rift System, which extends into northern Kansas about fifty miles west of the Nemaha. Earthquakes produced from this area are not as severe as the New Madrid Seismic Zone.

Impact Zones for Earthquake Along the New Madrid Fault



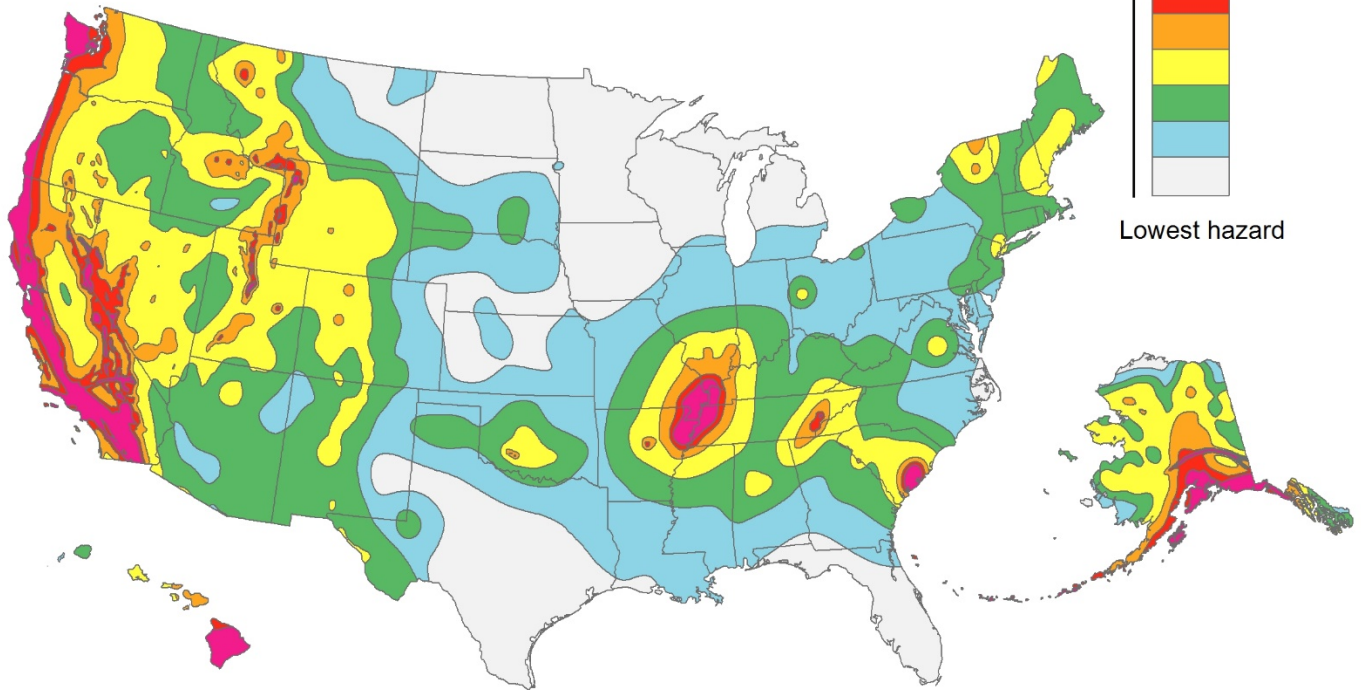
Greene County

This graphic shows the highest project Modified Mercalli intensities from a potential 7.6 earthquake whose epicenter could be anywhere along the New Madrid Seismic Zone.

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Modified Mercalli Intensity Scale			
I	Instrumental: detected only by instruments	VII	Very strong: noticed by people in autos Damage to poor construction
II	Very feeble: noticed only by people at rest	VIII	Destructive: chimneys fall, much damage in substantial buildings, heavy furniture overturned
III	Slight: felt by people at rest Like passing of a truck	IX	Ruinous: great damage to substantial structures Ground cracked, pipes broken
IV	Moderate: generally perceptible by people in motion Loose objects disturbed	X	Disastrous: many buildings destroyed
V	Rather strong: dishes broken, bells rung, pendulum clocks stopped People awakened	XI	Very disastrous: few structures left standing
VI	Strong: felt by all, some people frightened Damage slight, some plaster cracked	XII	Catastrophic: total destruction

United States Seismic Hazard Map



Sources: United States Geological Survey

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Strength/Magnitude/Extent

The extent or severity of earthquakes is generally measured in two ways: 1) The Richter Magnitude Scale is a measure of earth quake magnitude; and 2) the Modified Mercalli Intensity Scale is a measure of earthquake severity. The two scales are defined as follows.

Richter Magnitude Scale

The Richter Magnitude Scale was developed in 1935 as a device to compare the size of earthquakes. The magnitude of an earthquake is measured using a logarithm of the maximum extent of waves recorded by seismographs. Adjustments are made to reflect the variation in the distance between the various seismographs and the epicenter of the earthquakes. On the Richter scale, magnitude is expressed in whole numbers and decimal fractions. For example, comparing a 5.3 and a 6.3 earthquake shows that the 6.3 earthquake is ten times bigger in magnitude. Each whole number increase in magnitude represent a tenfold increase in measured amplitude because of the logarithm. Each whole number step in the magnitude scale represents a release of approximately 31 times more energy.

Modified Mercalli Intensity Scale

The intensity of an earthquake is measured by the effect of the earthquake on the earth's surface. The intensity scale is based on the responses to the quake, such as people awakening, movement of furniture, damage to chimneys, etc. The intensity scale currently used in the United States is the Modified Mercalli (MM) Intensity Scale. It was developed in 1931 and is composed of 12 increasing levels of intensity. They range from imperceptible shaking to catastrophic destruction, and each of the twelve levels is denoted by a Roman numeral. The scale does not have a mathematical basis, but is based on observed effects. Its use gives the laymen a more meaningful idea of the severity.

Previous Occurrences

New Madrid 1811-1812

A series of three very large earthquakes in the years 1811-1812 are generally referred to as the New Madrid earthquakes. On the basis of the large area of damage (600,000 square kilometers), the widespread area of perceptibility (5,000,000 square kilometers), and the complex physiographic changes that occurred, the New Madrid earthquakes of 1811-1812 rank as some of the largest in the United States. These earthquakes were by far the largest east of the Rocky Mountains in the U.S. and Canada. Damage associated with these earthquakes was 10 times as large as that of the damage from the 1906 San Francisco earthquake.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely for an earthquake to occur within the next 10 years in Greene County. For a full description of the CPRI for earthquakes, refer to Appendix B.

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Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, scientists are beginning to believe there may be a connection between changing climate conditions and earthquakes. Changing ice caps and sea-level redistribute weight over fault lines, which could potentially have an influence on earthquake occurrences. However, currently no studies quantify the relationship to a high level of detail, so recent earthquakes should not be linked with climate change. While not conclusive, early research suggests that more intense earthquakes and tsunamis may eventually be added to the adverse consequences that are caused by changing future conditions.

VULNERABILITY

Vulnerability Overview

The impacts and severity of earthquakes in Missouri can be significant. Counties closer to the New Madrid Fault could potentially see catastrophic damage. Greene County is placed in the “VI” portion of the Modified Mercalli Intensity Scale in the event of a 7.6 magnitude earthquake in the NMSZ. This means that the entire planning area could feel ground movement. There is a risk for poorly built buildings being damaged. Glasses and dishes could be broken. People even could have trouble walking at some points. Pictures could fall off walls and cracks may appear in the plaster in walls. Greene County would also be at risk for an influx in population as people who are closer to the fault, may evacuate to portions of Greene County.

Missouri Earthquake Insurance

Missouri is the third largest market for earthquake insurance among the states, exceeded only by California and Washington. Earthquake coverage is not included on most homeowner’s insurance policies. It must be purchased as separate coverage. Earthquake coverage pays for damage caused by the shaking and cracking that can damage homes. Earthquake insurance usually features two high deductibles; rather than dollar amounts, it’s a percentage of the cost of rebuilding the home and a separate deductible for the home’s contents. Deductibles of 10-15 percent are common. The Missouri Department of Insurance, Financial Institutions and Professional Registration (DIFP) prepared a report in August 2015 on the state of earthquake coverage in Missouri. The report notes that earthquake coverage has become less available and less affordable over the last 15 years.

Potential Losses to Existing Development

Annualized Loss Scenario- Completed in Missouri State Mitigation Plan

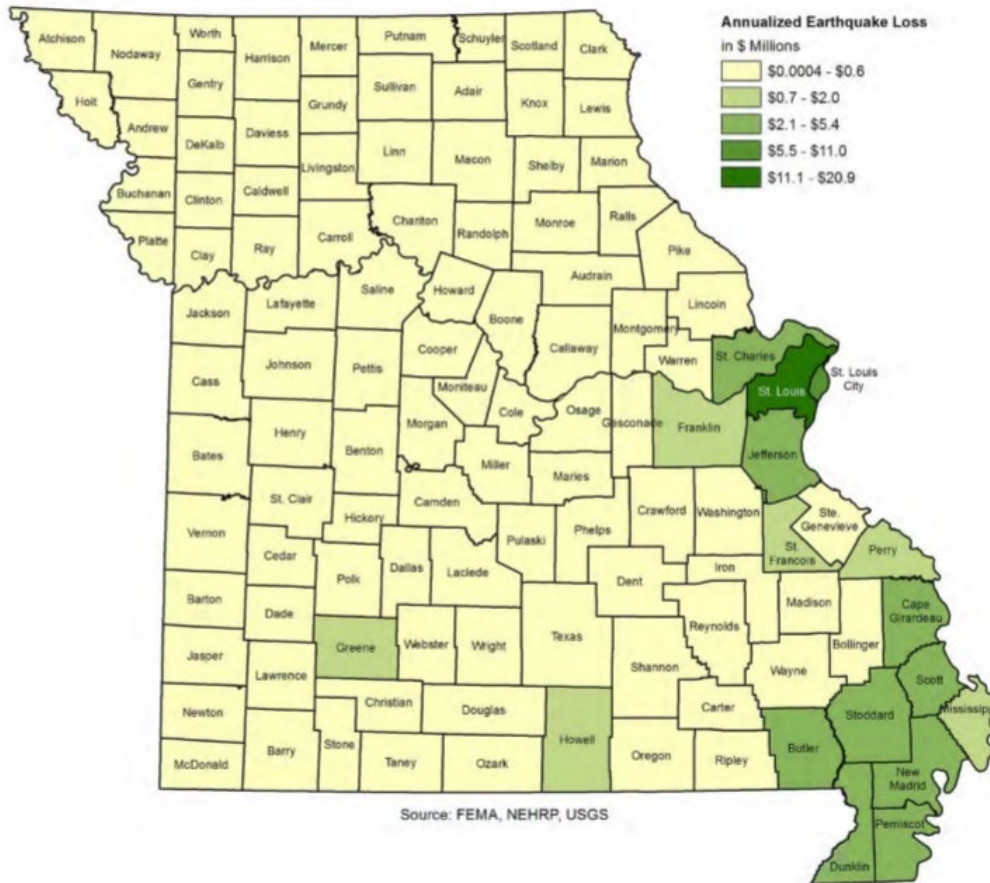
Hazus V 3.2 was used to analyze vulnerability and estimate losses to earthquakes. All Hazus analyses were run using Level 1 building inventory database comprised of updated demographic and aggregated data based on the 2010 census. An annualized loss scenario that enabled an “apples to apples” comparison of earthquake risk for each county was synthesized from a FEMA nationwide annualized loss study (FEMA 366 Hazus Estimated Annualized Earthquake Losses for the United States April 2017). The Central United States Earthquake Consortium provided state-wide National Earthquake Hazards Reduction Program (NEHRP) site classification and soil liquefaction characteristics. Furthermore, the Missouri Department of Natural Resources provided more detailed, quad-based NEHRP site classification and soil liquefaction characteristics for the areas surrounding the City of St. Louis. These data sets were used as additional, Level 2 data inputs to enhance the accuracy of earthquake hazard modeling. It should be noted that some of the National Earthquake Hazard Reduction Program (NEHRP) site classification attributes were slightly altered for incorporation into the Hazus platform. Areas that were classified as “C to D” were reattributed as “D” since in these instances Hazus does not allow the data in its original format. State

The results of the updated annualized loss scenario are shown in Figure 3.91. The map shows direct economic losses to buildings annualized over eight earthquake return periods (100, 250, 500, 750, 1,000, 1,500, 2,000, and

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2,500 years). HAZUS defines annualized loss as the expected value of loss in any one year. The software develops annualized loss estimates by aggregating the losses and their exceedance probabilities from the eight return periods. Annualized loss is the maximum potential annual dollar loss resulting from various return periods averaged on a 'per year' basis. It is the summation of all HAZUS supplied return periods multiplied by the return period probability (as a weighted calculation). This is the scenario that FEMA uses to compare relative risk from earthquakes and other hazards at the county level nationwide. The trend shows dollar losses to be most significant in the southeastern portion of the State and in the urbanized areas near St. Louis. This is consistent with the southeastern portion of the State's proximity to the New Madrid Seismic Zone and the fact that the more developed areas in the region are likely to suffer the most building losses, particularly where there are large numbers of unreinforced masonry buildings.

HAZUS-MH Earthquake Loss Estimation: Annualized Loss Scenario-Direct Economic Losses to Buildings

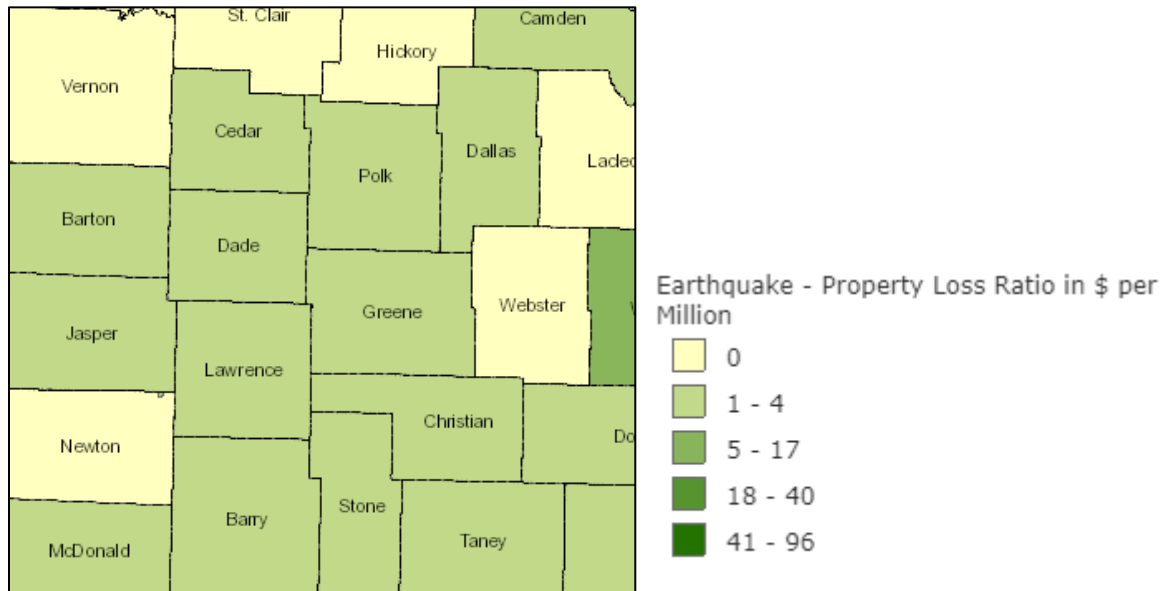


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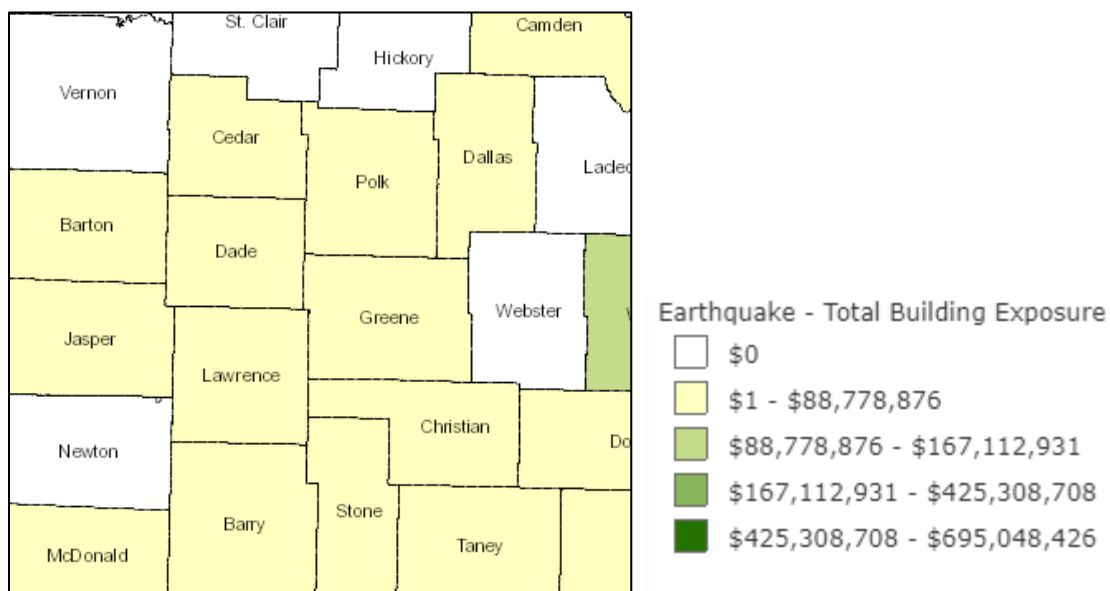
HAZUS-MH Earthquake Loss Estimation- Annualized Loss Scenario

COUNTY	TOTAL LOSSES, IN \$ THOUSANDS	LOSS PER CAPITA, IN \$ THOUSANDS	LOSS RATIO, IN \$ PER MILLION
Greene	\$1,337	\$0.0049	\$42

Earthquake-Property Loss Ratio in \$ per Million



Earthquake-Total Building Exposure



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Impact of Previous and Future Development

Future development is not expected to increase the risk other than contributing to the overall exposure of what could become damaged as a result of an event.

EMAP Consequence Analysis

EMAP Impact Analysis: Earthquakes

SUBJECT	DETRIMENTAL IMPACTS
Public	An earthquake that affected Greene County would most likely result in few minor injuries and no deaths. There would be small safety concerns for the public.
Responders	There would be little to no impacts on responders and response function in Greene County due to an earthquake.
Continuity of Operations	An earthquake would cause little to no impact on service operations.
Property, Facilities, and Infrastructure	Greene County could experience property damages to buildings that are not structurally sound or of poor quality. An earthquake could also create a minor impact to some key infrastructures such as road damage or power losses in some areas; however, it would not be widespread. Earthquakes may cause damage to weak facilities, windows could be break, and other minor isolated instances of damage.
Environment	The environment would experience little to no impact from an earthquake.
Economic Condition of Jurisdiction	Damages to property, facilities, or infrastructure will have a very minor impact on Greene County's economy.
Public Confidence in the Jurisdiction's Governance	An earthquake would result in little to no loss in public confidence in governance in Greene County.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

Earthquake intensity is not likely to vary greatly throughout the planning area causing the risk to be the same throughout the planning area. Damages could variate throughout the planning area. For example, Ash Grove has older properties that could experience more damages to homes and properties than other jurisdictions. Springfield has a larger amount of buildings, which could financially be more of an issue for Springfield than in other jurisdictions. Though the planning area is hundreds of miles away from the New Madrid Seismic Zone, Greene County is still at risk for some minor damages and an influx in population if the NMSZ does have a large event.

PROBLEM STATEMENT

The New Madrid Seismic Zone puts all of Missouri, including Greene County at risk for large earthquakes. Large earthquakes could present damage and injury to our planning area. Vulnerable populations and older homes/buildings are more at risk when looking at a large earthquake. Possible mitigation solutions for large earthquakes in Greene County would include education which is done in Greene County public school districts currently. Other solutions include education for large businesses, bolting large furniture to the wall and other individual preparation. In this Mitigation plan, no participating jurisdictions created a mitigation project for Earthquakes.

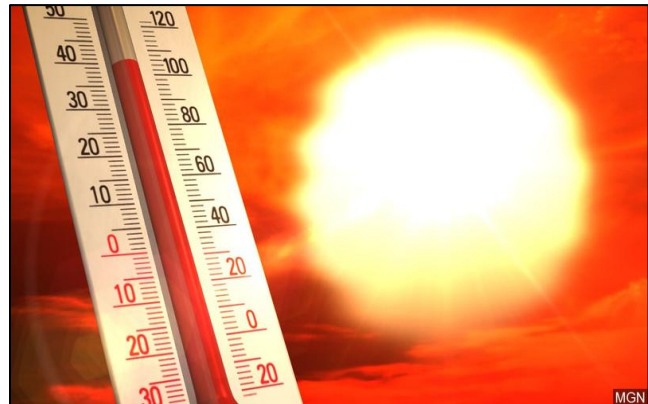
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3.4.3 Natural Hazard: Extreme Temperatures

HAZARD PROFILE

Hazard Description

Extreme temperatures events, both hot and cold, can impact human health and mortality, natural ecosystems, agriculture and other economic sectors. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and lasts for several weeks. Ambient air temperature is one component of what conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index (HI) Chart, which is shown below, uses both of these factors to produce a guide for the apparent temperature or relative intensity of health conditions.



Extreme cold often accompanies severe winter storms and can lead to hypothermia and frostbite in people without adequate clothing protection. Cold can cause fuel to congeal in storage tanks and supply lines, stopping electric generators. Cold temperatures can also overpower a building's heating system and cause water and sewer pipes to freeze and rupture. Extreme cold also increases the likelihood for ice jams on flat rivers or streams. When combined with high winds from winter storms, extreme cold becomes extreme wind chill, which is hazardous to health and safety.

The National Institute on Aging estimates that more than 2.5 million Americans are elderly and especially vulnerable to hypothermia, with the isolated elders being most at risk. About 10 percent of people over the age of 65 have some kind of bodily temperature-regulation defect, and 3-4 percent of all hospital patients over 65 are hypothermic.

Also at risk are those without shelter, those who are stranded, or those who live in a home that is poorly insulated or without heat. Other impacts of extreme cold include asphyxiation (unconsciousness or death from a lack of oxygen) from toxic fumes from emergency heaters, household fires, which can be caused by fireplaces and emergency heaters; and frozen/burst pipes.

Geographic Location

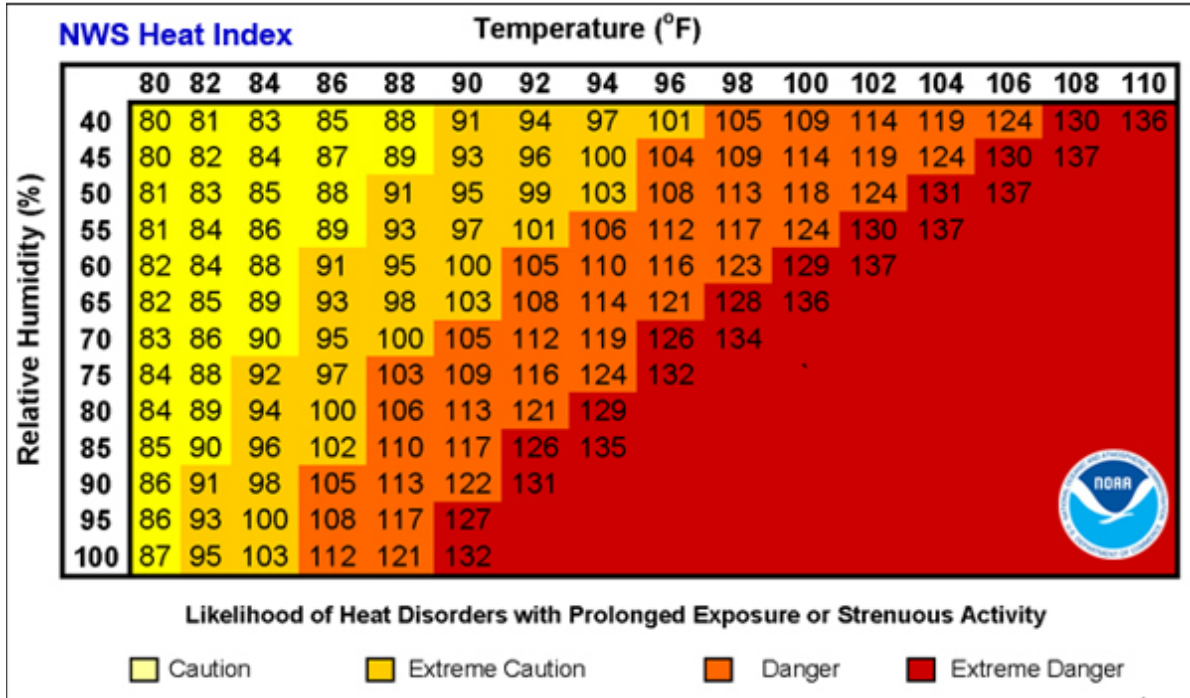
Extreme temperatures both hot and cold, are area-wide hazard events. The risk of extreme heat or extreme cold temperatures do not vary across the planning area and can affect all populations in Greene County.

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Strength/Magnitude/Extent

The National Weather Service (NWS) has an alert system in place (advisories or warnings) when the Heat Index (HI) is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for issuing excessive heat alerts is when for two or more consecutive days: (1) when the maximum daytime heat Index is expected to equal or exceed 105 degrees Fahrenheit and (2) when the night time minimum heat index is 80 degrees Fahrenheit or above. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees.

Heat Index (HI) Chart



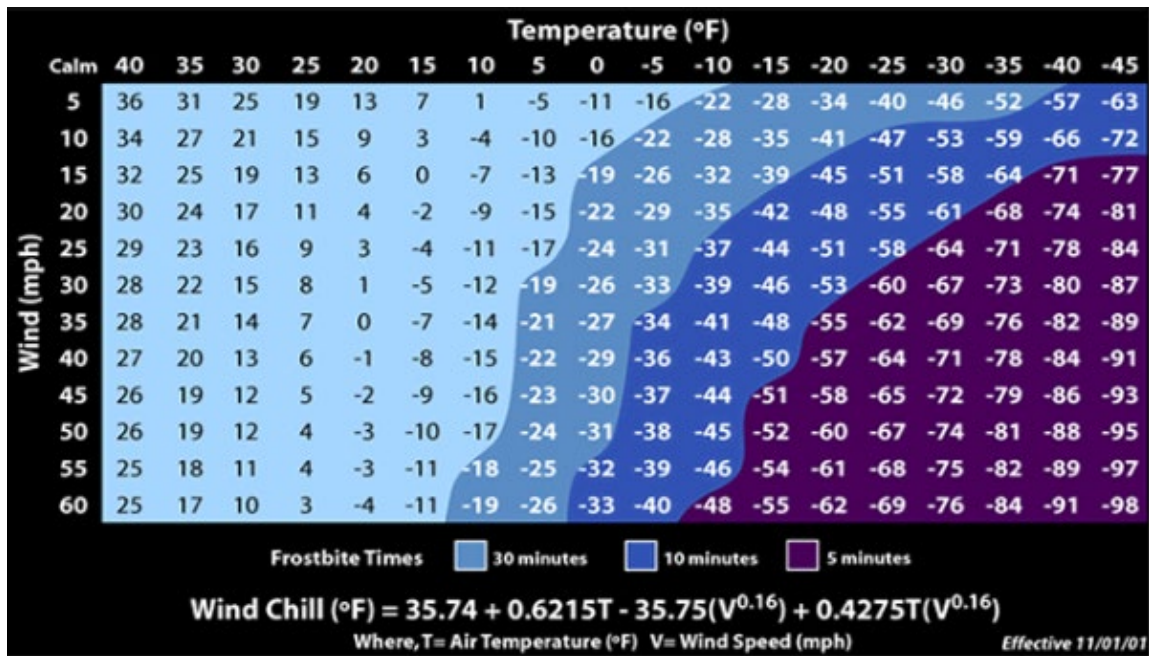
Source: National Weather Service: <https://www.weather.gov/safety/heat-index>

*Note: Exposure to direct sun can increase Heat Index (HI) values by as much as 15°F. The shaded zone above 105°F corresponds to a HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

The National Weather Service Wind Chill Temperature (WCT) index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. The figure below presents wind chill temperatures that are based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

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Wind Chill Chart



Source: National Weather Service: <https://www.weather.gov/safety/cold-wind-chill-chart>

Previous Occurrences

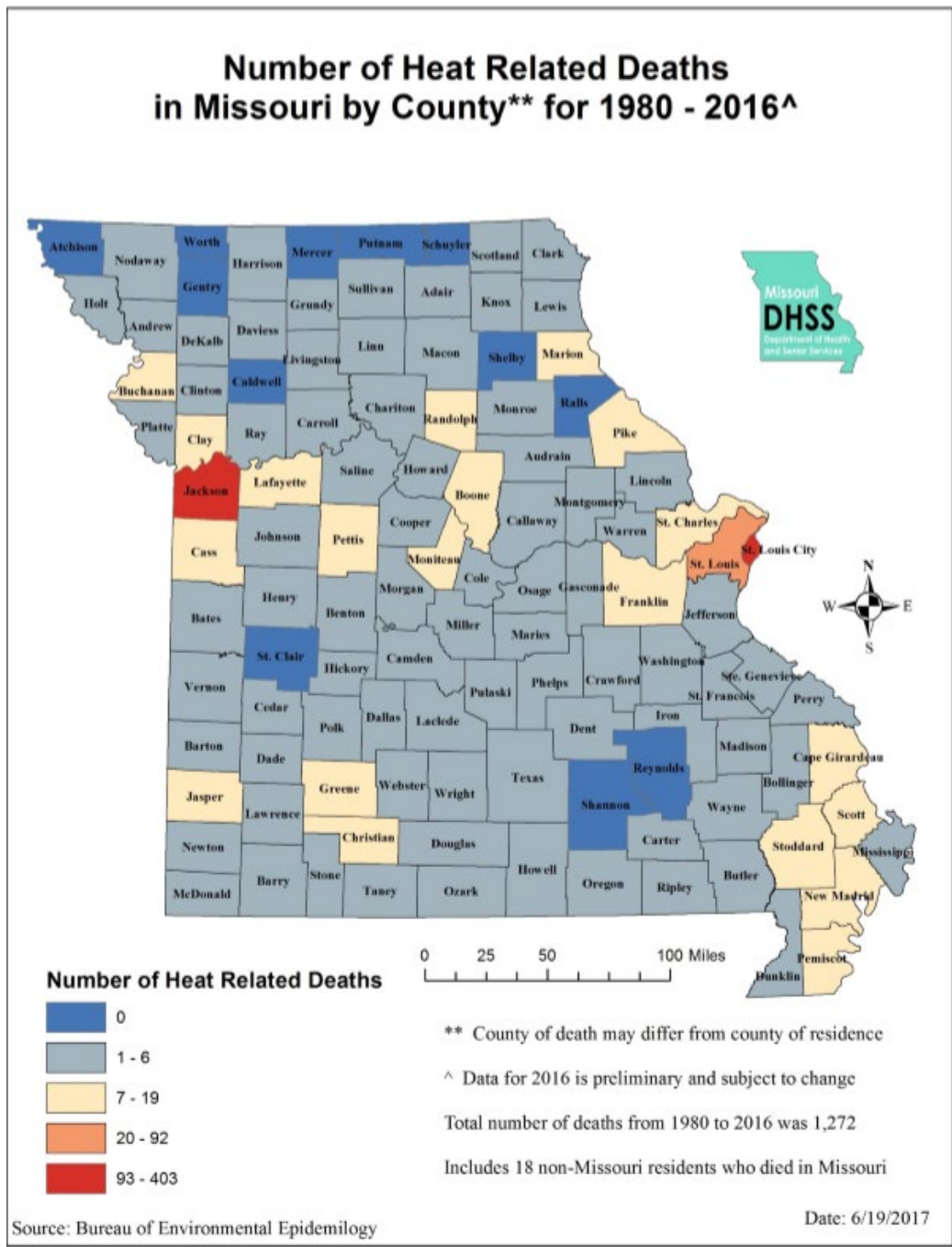
Record Temperatures-Springfield

TEMPERATURE	DEGREE FAHRENHEIT	DATE SET
Heat (High)	113	07/14/1954
Cold (Low)	-29	02/12/1899

Source: National Weather Service

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Heat Related Deaths- 1980-2016



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Extreme temperatures, including both heat and cold, can cause stress to crops and animals. According to USDA Risk Assessment Agency, Losses to insurable crops during the 10 year time period from 2008-2018 were \$120,403.34. Extreme heat can also strain electricity delivery and infrastructures can be overloaded during peak use of air conditioning during extreme heat events. Another type of infrastructure damage from extreme heat is road damage. When asphalts is exposed to prolonged, extreme heat, it can cause buckling of asphalt-paved roads, driveways and parking lots.

From 1988-2011, there were 3,496 fatalities in the U.S attributed to summer heat. This translates to an annual national average of 146 deaths. The National Weather Service stated that among natural hazards, no other natural disasters—not lightning, hurricanes, tornadoes, floods or earthquakes—caused more deaths.

Agricultural Insurance Claims Due to Extreme Temperature Events-2018

CROP	REASON	TOTAL AMOUNT OF LOSS
Wheat	Cold Wet Weather	\$501.00
Corn	Heat	\$3050.04
Corn	Cold Winter	\$1,359.00
Soybeans	Heat	\$3,121.00
Soybeans	Cold Wet Weather	\$15,249.00
TOTAL:		\$23,280.04

Agricultural Insurance Claims Due to Extreme Temperature Events-2017

CROP	REASON	TOTAL AMOUNT OF LOSS
Corn	Heat	\$6,807.00
Soybeans	Heat	\$10,408.60
TOTAL:		\$17,215.60

Agricultural Insurance Claims Due to Extreme Temperature Events-2016

CROP	REASON	TOTAL AMOUNT OF LOSS
Soybeans	Cold Wet Weather	\$220.00
TOTAL:		\$220.00

Agricultural Insurance Claims Due to Extreme Temperature Events-2015

*There were no agricultural insurance claims due to extreme temperature events in 2015.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is likely for an extreme temperature events to occur within the next three years in Greene County. For a full description of the CPRI for Extreme Temperatures, refer to Appendix B.

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Changing Future Conditions and Considerations

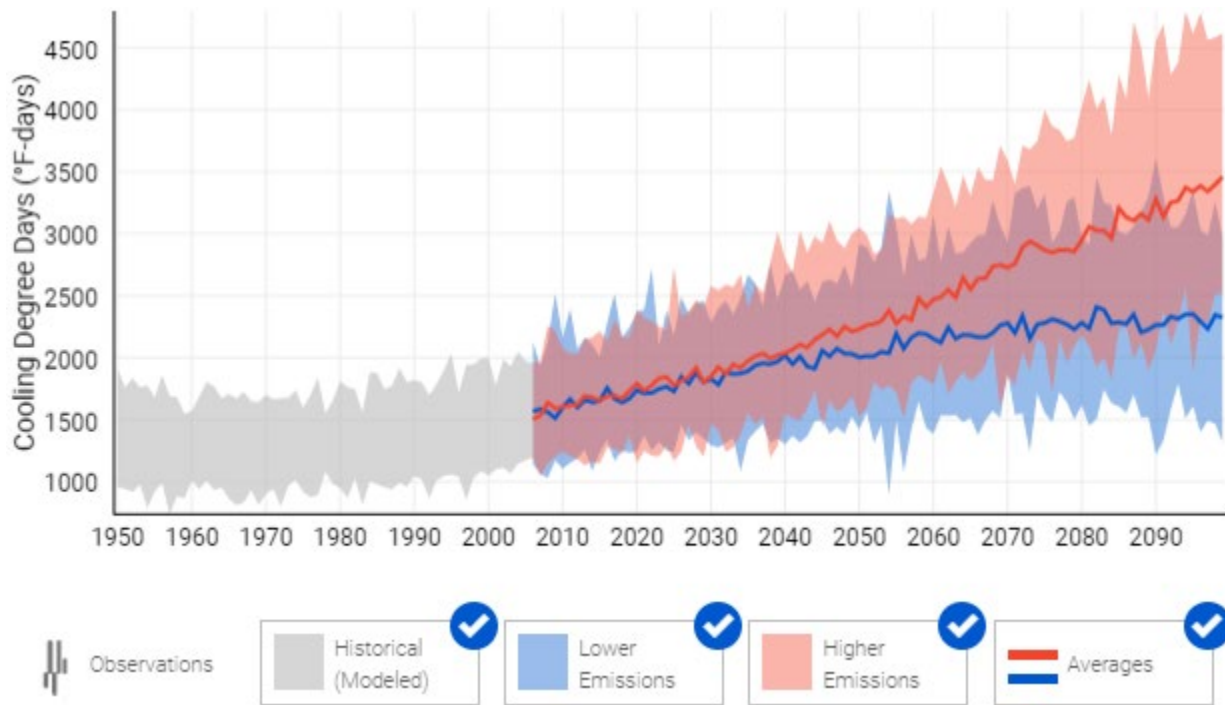
According to the Missouri State Mitigation Plan, under higher emissions pathway, historically unprecedented warming is projected by the end of the century. Even under a pathway of lower greenhouse gas emissions, average annual temperatures are projected to most likely exceed historical record levels by the middle for the 21st century. Temperature increased will cause future heat waves to be more intense, a concern for Greene County which already experiences hot and humid conditions.

The impacts of extreme temperatures are experienced most in elderly and other vulnerable populations. Extreme temperatures lead to the higher demand for electricity as people try to stay warm or cool. Greene County has a growing population and as the population of the county grows, the more of risk extreme temperatures can be.

Number of Cooling Degree Days

The number of cooling degree days at any location reflects the amount of energy people use to cool a building when it is warm outside. Higher numbers of cooling degree days indicate higher demand for energy.

Cooling Degree Days-Greene County Missouri



Source: U.S. Climate Resilience Toolkit: <https://crt-climate-explorer.nemac.org/location/?county=Greene+County&city=Greene+County,%20MO&fips=29077&lat=37.33112149999999&lon=-93.50034540000001>

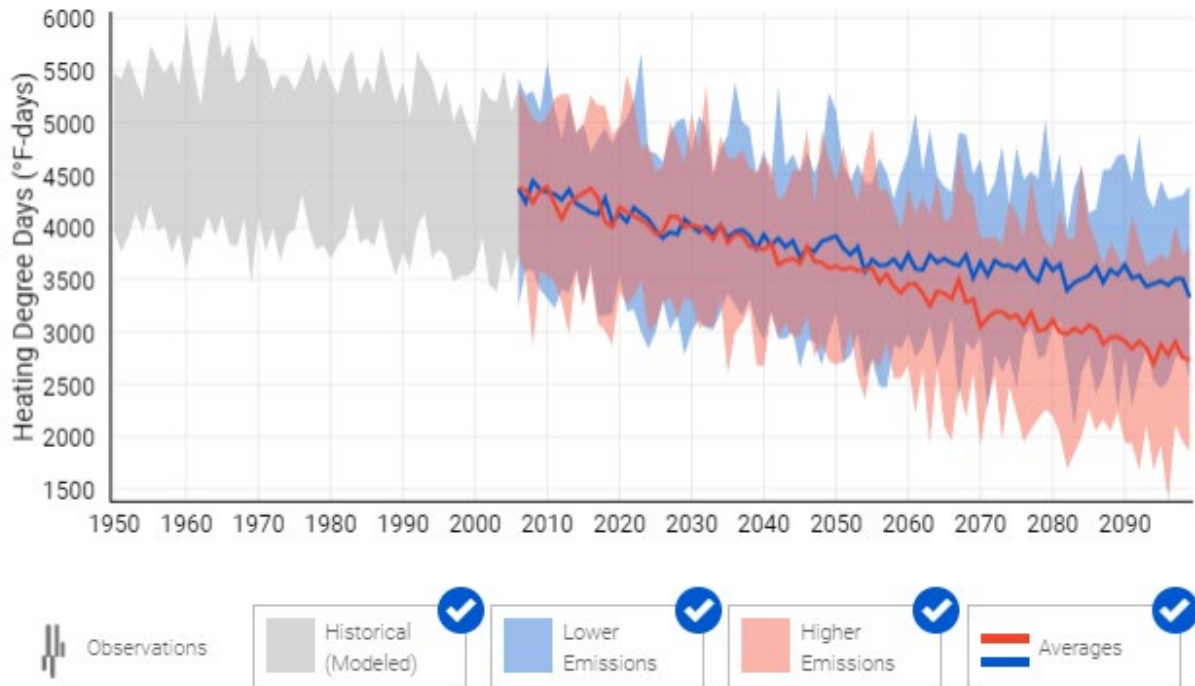
In the chart above, there is steady increase in the number of cooling degree days for the next 70 years. In those 70 years, Greene County could see an influx in population causing extreme heat to become more dangerous than it is right now.

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Heating Degree Days

The number of heating degree days at any location reflects the amount of energy people use to heat a building when it is cool outside. Lower number of heating degree days indicate lower demand for energy.

Heating Degree Days-Greene County



Source: Source: U.S. Climate Resilience Toolkit: <https://crt-climate-explorer.nemac.org/location/?county=Greene+County&city=Greene+County,%20MO&fips=29077&lat=37.33112149999999&lon=-93.50034540000001>

Both the graphs above show that it is possible in the next 70 years to see hotter days more frequently. Extreme heat can be potentially dangerous to Greene County’s vulnerable populations and can also cause a rise in energy use.

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VULNERABILITY

Vulnerability Overview

The entire planning area is at risk for experiencing extreme temperatures including both hot and cold. Those at greatest risk for heat-related illness include infants and children up to five years of age, people 65 years of age and older, people who are overweight, and people who are ill or on certain medications. However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather. In agricultural areas, the exposure of farm workers, as well as livestock to extreme temperatures is a major concern.

The table below lists typical symptoms and health impacts due to exposure to extreme heat.

Typical Health Impacts of Extreme Heat

HEAT INDEX (HI)	DISORDER
80-90°F	Fatigue possible with prolonged exposure and/or physical activity
90-105°F	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity.
105-130°F	Heatstroke/sunstroke highly likely with continued exposure.

Source: National Weather Service Heat Index Program: www.weather.gov/os/heat/index.shtml

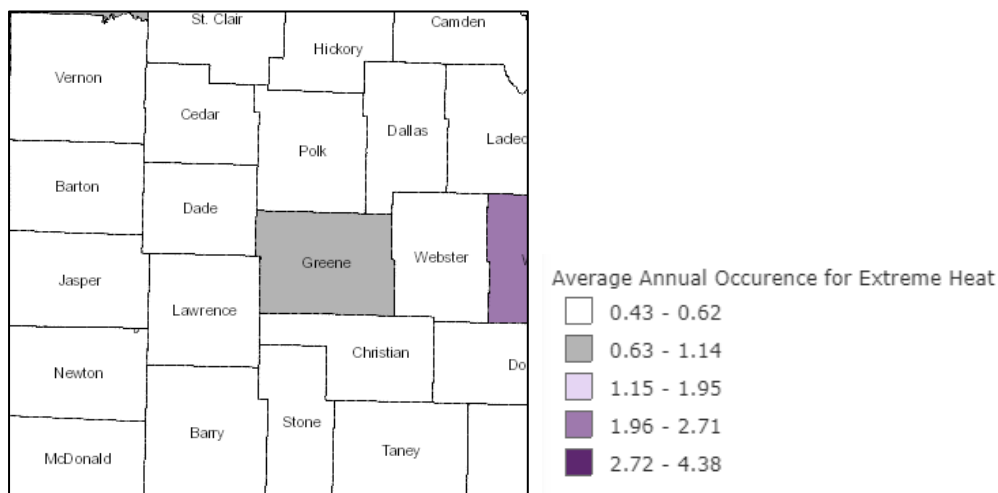
Health Impacts of Extreme Cold

- Heart Problems
- Hypothermia
- Frostbite

Hypothermia

When a body temperature sinks below 96°F, a person has hypothermia. Hypothermia can occur in temperatures as warm as 60°F. Older adults and children are at most risk. Some tips to help avoid hypothermia are: dress in layers, wrap up well when going outside in the cold, avoid breezed and drafts indoors and eat hot food and drink throughout the day.

Average Annual Occurrence for Extreme Heat



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Potential Losses to Existing Development

The planning area can expect to see more agricultural losses due to extreme temperatures, more so extreme heat. As demonstrated in the agricultural charts earlier in this section, agricultural insurance claims are continuing to increase. Temperatures are getting warmer and as temperatures get warmer, agricultural property become more at risk.

Impact of Previous and Future Development

The entire planning area, excluding Walnut Grove is experiencing population growth. Population growth can result in increased in the age-groups that are most vulnerable to extreme heat temperatures. Population growth also increases the strain on electricity infrastructure, as more electricity is needed to accommodate the growing population. The planning area is anticipating rapid growth in the next decade.

EMAP Consequence Analysis

SUBJECT	DETRIMENTAL IMPACTS
Public	Greene County has documents cases of injuries and illnesses from extreme heat incidents every year. The elderly, youth, and over or underweight populations are at increased risk for heath related illnesses. People are also extremely vulnerable to extreme heath if they work outdoors, are military personnel, or athletes. Although there have been no reports of death due to extreme cold in Greene County, deaths occur every year in Missouri. Greene County has documented cases of injuries and illnesses from extreme cold incidents.
Responders	There are no reports of life threatening issues to responders, and no reports of impact on response functions. However, extreme temperatures can create safety issues to responders.
Continuity of Operations	There have been no reports of impact on service operations in Greene County.
Property, Facilities, and Infrastructure	Extreme heat in Greene County has resulted in minor isolated instances of property damage. Extreme cold may cause frozen pipes. Greene County has experiences minor instances of infrastructure damages due to extreme heath. There have been no reports of facility damage due to extreme temperatures.
Environment	Extreme temperatures can negatively affect wildlife, plants, and trees.
Economic Condition of Jurisdiction	Extreme heath incidents in Greene County have affected the economic condition in areas throughout Greene County. Cities needs a large amount of water to keep injury and illness from growing. Many rural homes and area that service off their own wells will also suffer greatly from extreme heat if there is a lack of water. Extreme heat will also slow productivity.
Public Confidence in Jurisdiction's Governance	Public confidence can be affected. Water supplies are scare in extreme heath. The confidence in the government can rise or fall depending on how the situation is handled.

* For more details on Consequence Analysis, refer to Appendix B.

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Hazard Summary by Jurisdiction

Those at greatest risk for heat-related illness and deaths include children up to five years of age, people 65 years of age and older, people who are overweight and people who are ill or on certain medications. To determine jurisdictions within the planning area with populations more vulnerable to extreme heat, demographic data was obtained from the 2017 census on population percentages in each jurisdiction comprised of those under age 5 and over age 65. Data was not available for overweight individuals and those on medications vulnerable to extreme heat. The table below summarizes vulnerable populations in the participating jurisdictions. Note that schools and special districts are not included in the table because students and those working for the special districts are not customarily in these age groups.

Greene County Population Under age 5 and Over Age 65, 2017

JURISDICTION	POPULATION UNDER AGE 5 (PERCENT)	POPULATION OVER AGE 65 (PERCENT)
Greene County	6.11%	15.48%
Ash Grove	9.71%	18.54%
Battlefield	8.12%	15.77%
Fair Grove	11.03%	13.80%
Republic	8.74%	11.55%
Rogersville	8.87%	9.17%
Springfield	5.86%	14.87%
Strafford	6.23%	17.61%
Walnut Grove	5.40%	19.29%
Willard	6.86%	11.85%

Source: U.S. Census Bureau, 2017

*Note: Rogersville is located in multiple counties, the population data is not specific to Greene County.

PROBLEM STATEMENT

Extreme temperatures can be dangerous to the entire planning area. Extreme temperatures can cause health issues to vulnerable populations and can have a negative effect on agriculture. All jurisdictions have a larger percent of population over the age 65. This population is a greater risk for experiencing health complications from extreme temperatures. Extreme temperatures are projected to get worse over the next several years. Possible mitigation solutions include organizing outreach to the vulnerable elderly populations, including establishing and promoting accessible heating or cooling centers in the community and creating a database in coordination with the Health department to track those individuals at risk. A few projects and actions are listed in the Mitigation Strategy of this Mitigation plan that map out what our participating jurisdictions want to do to Mitigate extreme temperatures in Greene County.

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3.4.4 Natural Hazard: Flood

HAZARD PROFILE

Hazard Description

A flood is a partial or complete inundation of normally dry land areas. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice. There are several types of riverine floods, including headwater, backwater, interior drainage, and flash flooding. Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice melt. The areas adjacent to rivers and stream banks that carry excess floodwater during rapid runoff are called floodplains. A floodplain is defined as the lowland and relatively flat area adjoining a river or stream. The terms “base flood” and “100 year flood” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year. Floodplains are part of a larger entity called a basin, which is defined as all the land drained by a river and its branches.



Flash Flood



A flash flood occurs when water levels rise at an extremely fast rate as a result of intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Flash flooding can happen in Special Flood Hazard Areas (SFHAs) as delineated by the National Flood Insurance Program (NFIP) and can also happen in areas not associated with floodplains.

Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. Flash flooding is a dangerous form of flooding which can reach full peak in only a few minutes. Rapid onset allows little or no time for protective measures. Flash flood water move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings and obliterate bridges. Flash flooding can result in higher loss of life, both human and animal, than slower developing river and stream flooding.

Although flash floods are somewhat unpredictable, there are factors that can point to the likelihood of flash floods occurring. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. This, along with knowledge of the watershed characteristic, modeling techniques, monitoring and advanced warning systems has increase the warning time for flash floods.

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Ice Jam Flood

Ice jam flooding is a form of flash flooding that occurs when ice breaks up in moving waterway, and then stacks on itself where channels narrow. This creates a natural dam, often causing flooding within minutes of the dam formation.

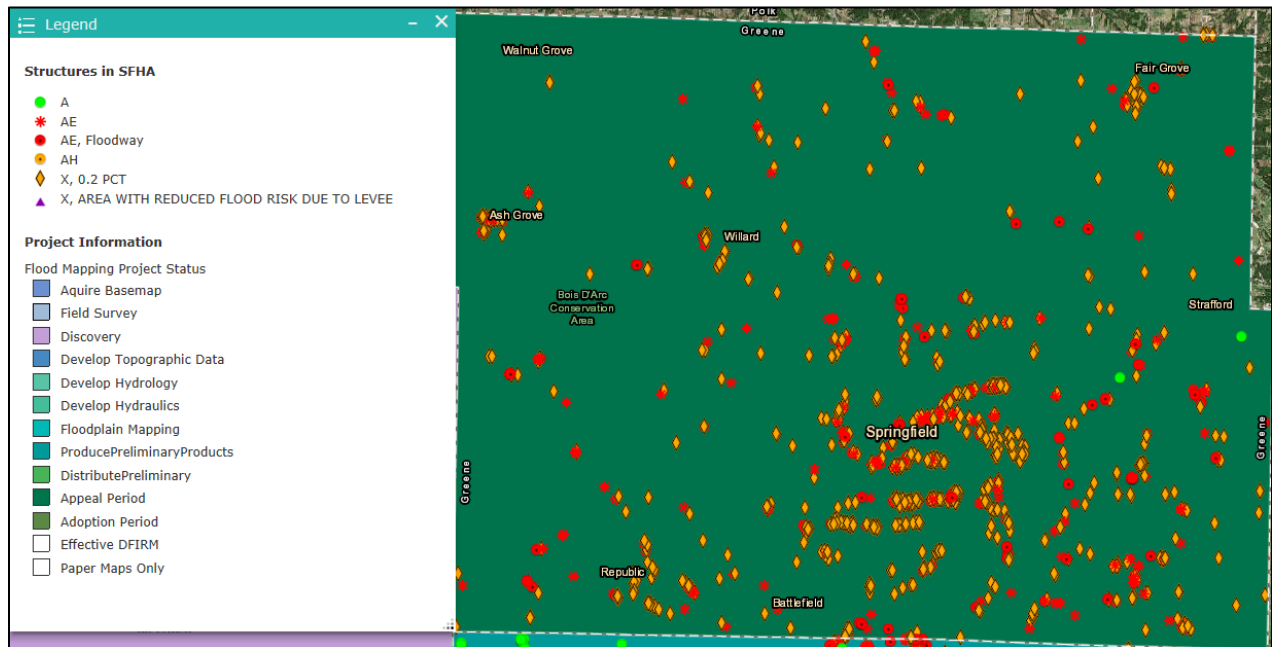
Sheet Flooding

In some cases, flooding may not be directly attributable to a river, stream or lake overflowing its banks. Rather, it may simply be the combination of excessive rainfall or snowmelt, saturated ground and inadequate drainage. With no place to go, the water will find the lowest elevations- areas that are often not in a floodplain. This type of flooding, often referred to as sheet flooding, is becoming increasingly prevalent as development outstrips the ability of the drainage infrastructure to properly carry and disburse the water flow.

In certain areas, aging storm sewer systems are not designed to carry the capacity currently needed to handle the increased storm runoff. Typically, the result is water backing into basements, which damaged mechanical systems and can create serious public health and safety concerns. This combined with rainfall trends and rainfall extremes all demonstrate the high probability, yet generally unpredictable nature of flash flooding in the planning area.

Geographic Location

Riverine flooding is most likely to occur in Special Flood Hazard Areas (SFHA). The map below comes from SEMA's Flood Mapping Project, the map maps out structures that are located in SFHAs.



As you can see, many structures are located within SFHAs throughout the entire planning area.

The Table on the next page shows flood events that have taken place in the planning area. These flood events took place between 1996-2018. These were just events that were recorded in the NCEI Database, there may be additional flood events that took place, but were not reordered.

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Greene County NCEI Flood Events by Location-1996-2018

LOCATION	TOTAL NUMBER OF EVENTS
Greene County	34 Flood Events
• Greene County (Zone) - 6 Flood Events	
• Countywide - 1 Flood Event	
• North Portion - 1 Flood Event	
• Brookline -2 Flood Events	
• Cody - 3 Flood Events	
• Elwood - 1 Flood Event	
• Galloway - 5 Flood Events	
• Hickory Barren - 2 Flood Events	
• Mumford - 1 Flood Event	
• Nichols - 2 Flood Events	
• Phenix - 1 Flood Events	
• Plano - 1 Flood Event	
• Pleasant Valley - 2 Flood Events	
• Sequiota - 2 Flood Events	
• Wildwood Estates - 4 Flood Events	
City of Ash Grove	0 Flood Events
• Ash Grove - 0 Flood Events	
City of Battlefield	1 Flood Events
• Battlefield - 1 Flood Event	
City of Fair Grove	1 Flood Events
• Fair Grove - 1 Flood Events	
City of Republic	5 Flood Events
• Republic - 4 Flood Events	
• Republic Westport AR - 1 Flood Event	
City of Springfield	14 Flood Events
• Springfield - 12 Flood Events	
• Springfield Bar H AR - 2 Flood Events	
City of Strafford	0 Flood Events
• Strafford - 0 Flood Events	
City of Walnut Grove	0 Flood Events
• Walnut Grove - 0 Flood Events	
City of Willard	0 Flood Events
• Willard - 0 Flood Events	

Flash Flooding occurs in SFHAs and those locations in the planning area that are low-lying. They also occur in areas without adequate drainage to carry away the amount of water that falls during intense rainfall events. The table located on the next page includes the number of flash flood events by location recorded in NCEI between the years 1996-2018. These are only events that were reported, there might be flash flooding events that took place within the planning area, but was not recorded in the NCEI.

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Greene County NCEI Flash Flood Events by Location, 1996-2018

LOCATION	TOTAL NUMBER OF EVENTS
Greene County	119 Flood Events
<ul style="list-style-type: none"> Greene County (Zone) - 5 Flash Flood Events 	
<ul style="list-style-type: none"> Countywide - 8 Flash Flood Events 	
<ul style="list-style-type: none"> Central Portion - 2 Flash Flood Events 	
<ul style="list-style-type: none"> North Portion - 2 Flash Flood Events 	
<ul style="list-style-type: none"> South Portion - 3 Flash Flood Events 	
<ul style="list-style-type: none"> Bois D'Arc - 3 Flash Flood Events 	
<ul style="list-style-type: none"> Brookline - 6 Flash Flood Events 	
<ul style="list-style-type: none"> Cherry Valley Estates - 3 Flash Flood Events 	
<ul style="list-style-type: none"> Cody - 8 Flash Flood Events 	
<ul style="list-style-type: none"> Ebenezer - 7 Flash Flood Events 	
<ul style="list-style-type: none"> Elwood - 4 Flash Flood Events 	
<ul style="list-style-type: none"> Galloway - 5 Flash Flood Events 	
<ul style="list-style-type: none"> Hickory Barren - 3 Flash Flood Events 	
<ul style="list-style-type: none"> Langston - 2 Flash Flood Events 	
<ul style="list-style-type: none"> Mentor - 1 Flash Flood Event 	
<ul style="list-style-type: none"> Mulroy - 2 Flash Flood Events 	
<ul style="list-style-type: none"> Mumford - 2 Flash Flood Events 	
<ul style="list-style-type: none"> Nichols - 19 Flash Flood Events 	
<ul style="list-style-type: none"> Phenix - 5 Flash Flood Events 	
<ul style="list-style-type: none"> Plano - 1 Flash Flood Event 	
<ul style="list-style-type: none"> Pleasant Valley - 1 Flash Flood Event 	
<ul style="list-style-type: none"> Sacville - 1 Flash Flood Event 	
<ul style="list-style-type: none"> Sequiota - 11 Flash Flood Events 	
<ul style="list-style-type: none"> Turners - 3 Flash Flood Events 	
<ul style="list-style-type: none"> Wildwood Estates - 2 Flash Flood Events 	
City of Ash Grove	1 Flood Event
<ul style="list-style-type: none"> Ash Grove - 1 Flash Flood Event 	
City of Battlefield	10 Flood Events
<ul style="list-style-type: none"> Battlefield - 10 Flash Flood Events 	
City of Fair Grove	10 Flood Events
<ul style="list-style-type: none"> Fair Grove - 10 Flash Flood Events 	
City of Republic	1 Flood Event
<ul style="list-style-type: none"> Republic - 0 Flash Flood Events 	
<ul style="list-style-type: none"> Republic Westport AR - 1 Flash Flood Events 	
City of Springfield	68 Flood Events
<ul style="list-style-type: none"> Springfield - 51 Flash Flood Events 	
<ul style="list-style-type: none"> Springfield Bar H AR - 6 Flash Flood Events 	
<ul style="list-style-type: none"> Springfield Downtown Airport - 7 Flash Flood Events 	
<ul style="list-style-type: none"> Springfield Airport - 4 Flood Events 	
City of Strafford	3 Flood Events
<ul style="list-style-type: none"> Strafford - 3 Flash Flood Events 	
City of Walnut Grove	8 Flood Events
<ul style="list-style-type: none"> Walnut Grove - 8 Flash Flood Events 	

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City of Willard	2 Flood Events
<ul style="list-style-type: none"> Willard - 2 Flash Flood Events 	

Strength/Magnitude/Extent

Missouri, including Greene County, has a long and active history of flooding over the past century. Floods take a heavy toll on human suffering and losses to public and private property. By contrast, flash flood events in recent years have caused a higher number of deaths and major property damage in many areas across Missouri and Greene County.

According to the U.S. Geological Survey, two critical factors affect flooding due to rainfall: rainfall duration and rain fall intensity - the rate at which it rains. These factors contribute to a flood’s height, water velocity and other properties that reveal its magnitude.

The areas adjacent to rivers and stream banks that carry excess flood water during rapid runoff are called floodplains. A flood plain is defined as the lowland and relatively flat areas adjoining rivers and streams. The term 100 year flood, or base flood, is the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year based upon historical records. Floodplains are a vital part of a larger entity called a basin. A basin is defined as all the land drained by a river and its branches.

In some cases, flooding may not necessarily be directly attributable to a river, stream or lake overflowing. Rather, it may simply be a combination of excessive rainfall and/or snowmelt, saturated ground and inadequate drainage. With no place to go, water will find the lowest elevations, areas that are not often in the “floodplain”. This type of flooding, often referred to as sheet flooding, is becoming increasingly prevalent as development outstrips the ability of the drainage infrastructure to properly carry and disburse the water flow. Flooding also occurs due to combined storm and sanitary sewers that cannot handle the tremendous flow of water that often accompanies storm events. Typically, the result is water backing up into basements, which damages mechanical systems and can create serious health and safety concerns. To reduce the impact of this problem, the Springfield Public Works Department enacted a program to provide backflow prevention valves to homeowners at a reduced cost to assist homeowners in mitigating the effects of flood backflow.

National Flood Insurance Program Participation



According to FEMA, The National Flood Insurance Program (NFIP) aims to reduce the impact of flooding on private and public structures. It does so by providing affordable insurance to property owners, renters and businesses and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socioeconomic impacts of disasters by promoting the purchase and retention of general risk insurance, but also of flood insurances, specifically.

All jurisdictions in the planning area participate in NFIP. The chart on the next page lists dates and community ID numbers for the planning area.

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NFIP Participation in Greene County

COMMUNITY ID NUMBER	COMMUNITY NAME	NFIP PARTICIPANT (Y/N/SANCTIONED)	CURRENT EFFECTIVE MAP DATE	REGULAR-EMERGENCY PROGRAM ENTRY DATE
290782	Greene County	Yes	12/17/2010	06/15/1983
290751	City of Ash Grove	Yes	12/17/2010	07/16/1980
290863	City of Battlefield	Yes	12/17/2010	05/27/2014
290591	City of Fair Grove	Yes	12/17/2010	01/30/2004
290148	City of Republic	Yes	12/17/2010	06/04/1980
290658	City of Rogersville	Yes	09/17/2010	03/30/1981
290149	City of Springfield	Yes	12/17/2010	07/03/1978
290506	City of Strafford	Yes	12/17/2010	07/30/1999
290946	City of Walnut Grove	Yes	NSFHA	02/07/2002
290653	City of Willard	Yes	12/17/2010	10/10/2003

Source: NFIP Community Status Book, 2018

*Note: NSFHA: No Special Flood Hazard Area

NFIP Policy and Claim Statistics as of 09/30/2018

COMMUNITY NAME	POLICIES IN FORCE	INSURANCE IN FORCE	WRITTEN PREMIUM-IN FORCE	TOTAL PAYMENTS
City of Ash Grove	10	\$1,659,500	\$15,908	\$1,675,408
City of Battlefield	3	\$840,000	\$1,112	\$841,112
City of Fair Grove	7	\$949,200	\$5,122	\$954,322
City of Rogersville	4	\$1,120,000	\$1,501	\$1,121,501
City of Springfield	159	\$46,221,400	\$224,953	\$46,446,353
City of Strafford	2	\$590,000	\$693	\$590,693
City of Willard	16	\$1,961,800	\$15,525	\$1,977,325
Greene County	130	\$32,781,900	\$81,389	\$32,863,289

Repetitive Loss/Severe Repetitive Loss Properties

Greene County Repetitive Loss Properties

Repetitive Loss Properties are those properties with at least two flood insurance payments of \$1,000 or more in a 10-year period. According to the Flood Insurance Administration, jurisdictions included in the planning are have a combined total of 20 repetitive loss properties.

COMMUNITY NAME	TOTAL LOSSES	PROPERTIES	TOTAL BULDING PAYMENTS	TOTAL CONTENTS VALUE	TOTAL PAYMENTS	AVERAGE PAYMENTS
Greene County	23	7	\$432,499	\$39,360	\$471,859	\$20,516
City of Springfield	29	13	\$687,071	\$470,912	\$1,157,983	\$39,930

Source: SEMA

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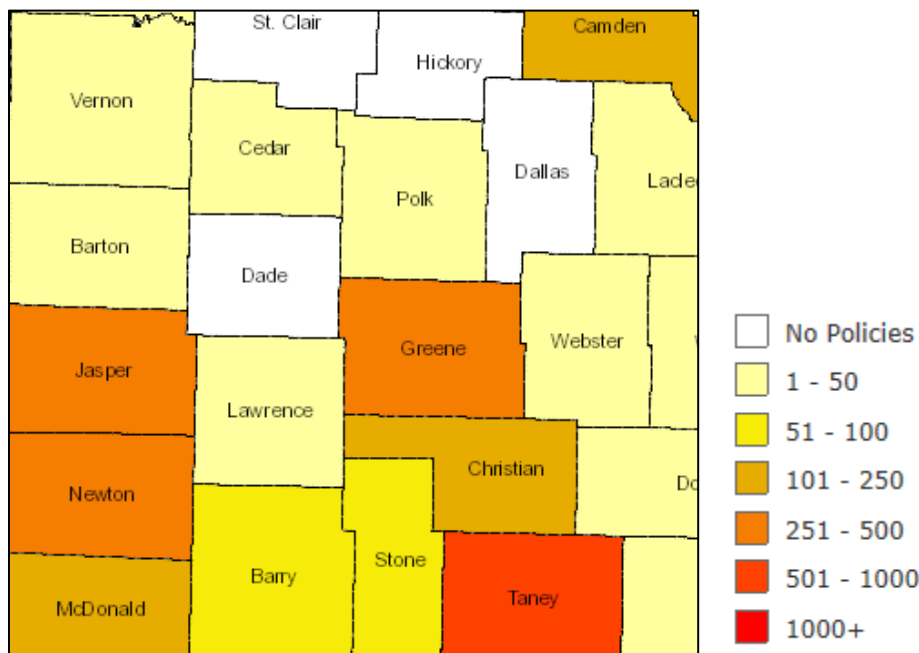
Due to Federal restrictions, this is the best available data that could be obtained by the state February 2020.

Severe Repetitive Loss

Severe Repetitive Loss (SRL): A SRL property is defined as a single family property (consisting of one-to-four residences) that is covered under flood insurance by the NFIP. The property has to have; (1) incurred flood-related damage for which four or more separate claims payments have been paid under flood insurance coverage with the amount of each claim payment exceeding \$20,000; or (2) for which at least two separate claims payments have been made with the cumulative amount of each claims exceeding the reported value of the property.

According to the State Emergency Management Plan, Greene County does not currently have any severe repetitive Loss properties.

Flood Policies



Previous Occurrences

September 1993

One of the area's most notable flood disasters was the flash flooding events in September of 1993, which caused \$50.5 million in damages in Greene County.

July 2000

Additionally, flash flooding in July of 2000 caused \$9 million in damages of which \$4 million were attributed to a local industrial plant. Much of the residential damage occurred in the Shadowwood Subdivision located immediately south of the Springfield City limits and east of Campbell Street, an area between Sunshine and Grand west of West Bypass, and a mobile home park on the corner of Scenic and Bennett.

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August 2007

Walnut Grove experienced excessive rainfall associated with the remnants of Tropical Storm Erin on August 20, 2007. Many roads and low water crossings were washed out and had to be fully repaired. A bank in Walnut Grove was damaged by the flood. Because many roads were washed out in Walnut Grove and Greene County, several water rescues occurred. The estimate of property damage for this event was \$2 million.

March 2008

On March 18, 2008, four to seven inches of rain fell across Greene County created dangerous conditions caused by flash flooding. Nearly all county roads experienced flooding, and the county lacked a supply of barricades to block all flooded areas from motorists. One death occurred in this flood when an elderly couple's vehicle was surrounded by water in a park southeast of Springfield. The couple was observing flooded areas along the James River when the river rose so quickly that it swept them into the river. The male, age 67, died from a heart attack. The female was later rescued by the Logan-Rogersville Swift Water Rescue Team. The car was almost fully submerged by the time the rescue team positioned themselves near the car. The rescue took two hours. The property damage for this flash flood event was \$1 million.

June 2008

In the middle of June 2008, Springfield received approximately 4" of rainfall perpetuating a flooding disaster due to heavily saturated land from previous storms. The flooding of Galloway Creek damaged many specialty and antique shops in the historic Galloway Village. Additionally, the flood washed away tons of rock from the railroad line to the James River Power Plant. This disrupted coal shipments for several days until workers finished the repairs. There were approximately 35 water rescues. The flood in Greene County received a Presidential Disaster Declaration.

April 2011

Multiple rounds of thunderstorms produced very heavy rainfall across the Ozarks over the course of a week in April of 2011. A persistent trough over the central plains brought multiple upper level storm systems over the region which produced intense thunderstorms with very heavy rainfall. Some areas saw storm total rainfall amounts up to a foot or more. The flooding caused \$500,000 worth of damage.

June 2013

In June of 2013, near the intersection of South Campbell Road and Republic Road, there were several roadways that were underwater up to 3 feet deep. Water flooded several businesses in that area. Several cars were stranded in high water. Numerous roadways and neighborhoods had flooding as well as several homes being affected by flood waters. Flash flooding affected some of the infrastructure like washing out communication lines and boxes in south Springfield.

June 2015

Heavy rain fall in June of 2015 lead to multiple road closures. The storm came from Tropical Storm Bill. The rate of rainfall spanned from one-fourth inches to three-fourth inches per hour. The flooding shut down major roads in Greene County and surrounding counties including MO 125. The storm flooded both Lake Springfield and The James River.

December 2015

A slow moving storm system brought several waves of heavy rainfall to the region from the early morning of December 26th into the morning of December 28th. Storm rainfall amounts of 5-12 inches were common across Greene County and Missouri Ozarks. These rainfall amounts resulted in historic flooding across the region. Major

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highways and interstates flooded at times and were closed. This storm system resulted in 14 confirmed fatalities (not all in Greene County), thousands of road closures, hundreds of swift water rescues, a record release of water out of Table Rock Dam, and many more.

October 2016

A nearly stationary front bisected southern Missouri during the day of October 19th 2016. Scattered showers and isolated thunderstorms developed in the early morning hours, and became more numerous and stronger during the afternoon as instability increased. Due to the training of the storms along the stationary front during the day and evening, some locations received 2-3 inches of rain and some flooding developed, mainly in low lying areas and near smaller creeks and streams.

April-May 2017

Major flooding across Greene County and many other surrounding counties took paly being April 28th and continued to May 3. An estimated 7-9 inches of rain fell across the county. 4-8 inches with some areas of far southern and south central Missouri receiving 10-12 inches of rain. Many bridges were destroyed. Fourteen people had to be rescued from high water. The Springfield-Greene County Office of Emergency Management recorded over 170 damage reports from Greene County citizens whose homes, properties, or businesses were affected. There were many road closures spread across the county. This flooding resulted in a federal disaster declaration. The storm across the State of Missouri caused over \$86 million in damages.

September 2018

During the late hours of September 7th, 2018 heavy rain moved into the Greene County area. Flash flooding caused road closures and dangerous weather across Greene County. Unfortunately, a Greene County Sheriff's Deputy was returning from service from a 911 call when his patrol car was swept off the road near Fair Grove. The deputy was unable to get rescued in time and died.

April-May 2019

Many storm systems spread across the area producing large amounts of rain at different times making it hard to get flooding under control in Greene County. Severe storms started moving in the area April 30th of 2019 and continued into the first few days of May. The first storm produced large amounts of rain and tornadoes across the area. Later in May, another big round of storms pushed through the area over multiple days dumping multiple inches of rain across the area. This flooding event lead to multiple road closures and water rescues throughout the area.

The tables beginning on the next page will demonstrate flash flood and flood event summaries across Greene County between 1996-2018. These are just events that were reported to the National Centers for Environmental Information (NCEI). There could be more events that are not included in these charts.

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NCEI Greene County Flash Flood Events Summary, 1996-2018

YEAR	NUMBER OF EVENTS REPORTED	NUMBER OF DEATHS REPORTED	NUMBER OF INJURIES REPORTED	PROPERTY DAMAGES REPORTED	CROP DAMAGES REPORTED
1996	4	0	1	\$0	\$0
1997	3	0	0	\$0	\$0
1998	3	0	0	\$0	\$0
1999	2	0	0	\$0	\$0
2000	7	0	0	\$8,435,000	\$0
2001	7	0	0	\$320,000	\$0
2003	5	0	0	\$0	\$0
2004	3	0	0	\$0	\$0
2005	6	0	0	\$10,000	\$0
2006	4	0	0	\$0	\$0
2007	14	0	0	\$8,000,000	\$0
2008	15	0	0	\$1,100,000	\$0
2009	14	0	0	\$0	\$0
2010	24	0	0	\$0	\$0
2011	1	0	0	\$500,000	\$0
2012	2	0	0	\$0	\$0
2013	28	0	0	\$1,000,000	\$0
2014	8	0	0	\$85,000	\$0
2015	31	0	0	\$5,810,000	\$0
2016	8	0	0	\$500,000	\$0
2017	16	1	0	\$500,000	\$0

Source: NCEI, 1996-2018 Data.

Note: Events listed above are just events that were reported to NCEI.

NCEI Greene County Flood Events Summary, 1996-2018

YEAR	NUMBER OF REPORTED EVENTS	NUMBER OF REPORTED DEATHS	NUMBER OF REPORTED INJURIES	PROPERTY DAMAGES	CROP DAMAGES
2001	1	0	0	\$0	\$0
2002	2	0	0	\$1,250,000	\$0
2005	3	0	0	\$0	\$0
2007	1	0	0	\$0	\$0
2008	2	0	0	\$0	\$0
2009	3	0	0	\$0	\$0
2010	4	0	0	\$0	\$0
2011	4	0	0	\$0	\$0
2012	5	0	0	\$0	\$0
2013	1	0	0	\$0	\$0
2014	0	0	0	\$0	\$0
2015	10	0	0	\$1,660,000	\$0
2016	3	0	0	\$1,000	\$0
2017	1	0	0	\$0	\$0
2018	4	0	0	\$5,000	\$0

Source: NCEI, 1996-2018 Data.

Note: Events listed above are just events that were reported to NCEI.

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Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is highly likely for a flooding event to occur within the next year in Greene County. For a full description of the CPRI for flooding, refer to Appendix B.

Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, over the last half century, average annual precipitation in most of the Midwest has increased by 5 to 10 percent. It is likely (66%-100% probability) that the frequency of heavy precipitation or the proportion of total rain fall from heavy falls will increase in the 21st century across the globe. More specifically, it is “very likely” (90%-100% probability) that most areas of the United States will exhibit an increase of at least 5% in the maximum 5-day precipitation by late 21st Century. As rain increases, more flooding will be likely in Greene County.

According to the Missouri State Hazard Mitigation Plan, the expected increases in rainfall frequency and intensity are likely to put additional stress on natural hydrological systems and community stormwater systems. Heavier snowfalls in the winter will lead to intensified spring flooding, and groundwater levels will remain high even in non-floodplain areas. Such changes in climate patterns can lead to the development of compounding events that interact to create extreme conditions. Flooding caused by high groundwater levels typically receded more slowly than riverine flooding, slowing the response and recovery process. Groundwater-fed rivers and streams are also likely to experience heightened flooding when groundwater levels are high.

VULNERABILITY

Vulnerability Overview

Flooding presents a danger to life and property, often resulting in injuries, and in some cases, fatalities. Floodwaters themselves can interact with hazardous materials. Hazardous materials stored in large containers could break loose or puncture as a result of flood activity. Examples are bulk propane tanks. When this happens, evacuation of citizens is necessary.

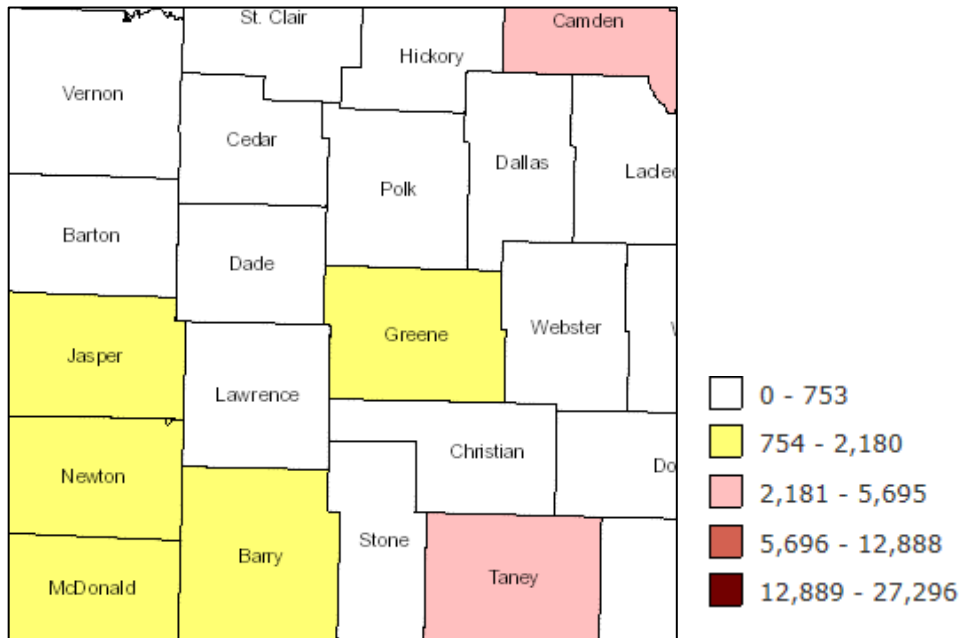
Public Health concerns may result from flooding, requiring disease and injury surveillance. Community sanitation to evaluate flood-affected food supplies may also be necessary. Private water and sewage sanitation could be impacted, and vector control (for mosquitoes and other entomology concerns) may be necessary.

When roads and bridges are inundated by water, damage can occur as the water scours materials around bridge abutments and gravel roads. Floodwaters can also cause erosion undermining road bed. In some instances, steep slopes that are saturated with water may cause mud or rock slides onto roadways. These damages can cause costly repairs for state, county and city road and bridge maintenance departments. When sewer back-up occurs, this can result in costly clean-up for home and business owners as well as present a health hazard.

All jurisdictions in Greene County can prepare for larger amounts of rain at once in the future. This increases the risk of flooding across the planning area.

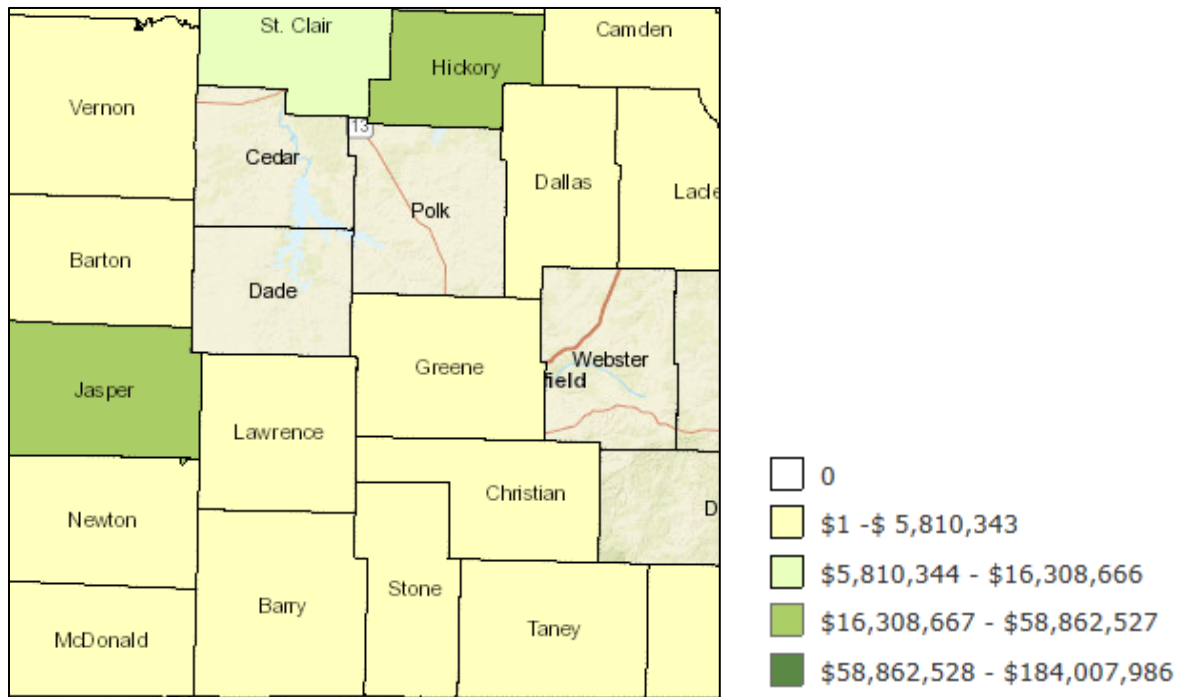
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People Affected by Flood



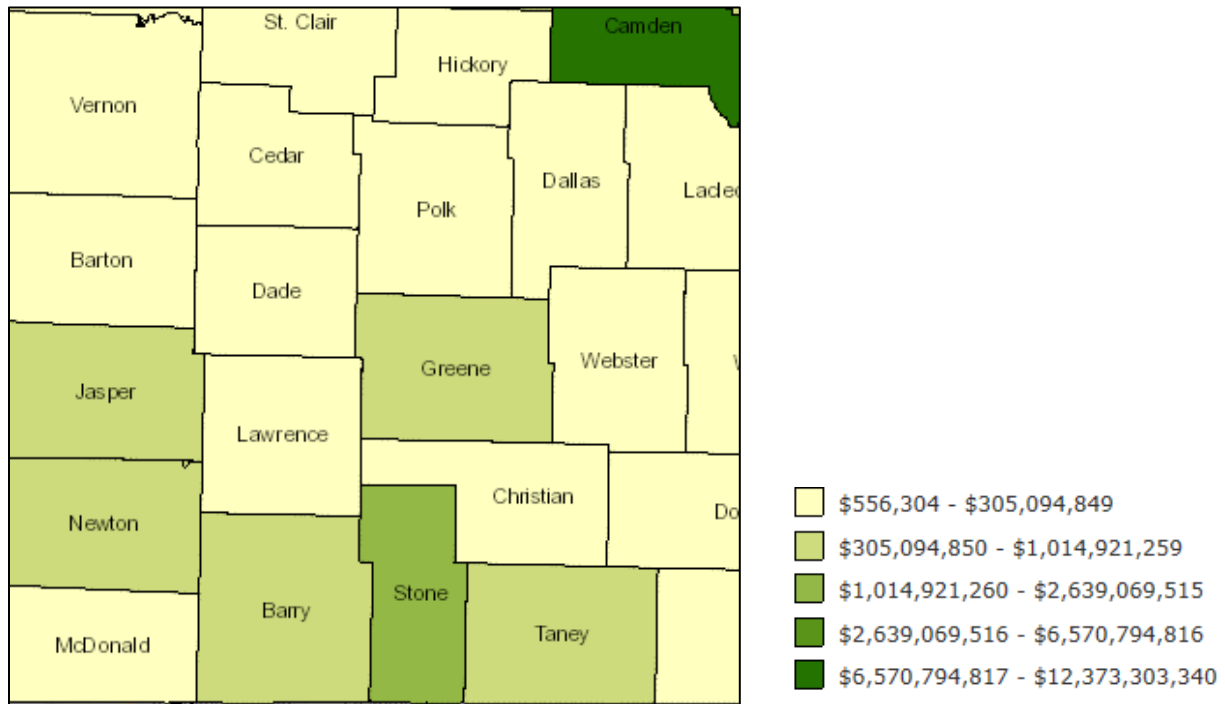
Potential Losses to Existing Development

Flood Losses by County- 1978-2018

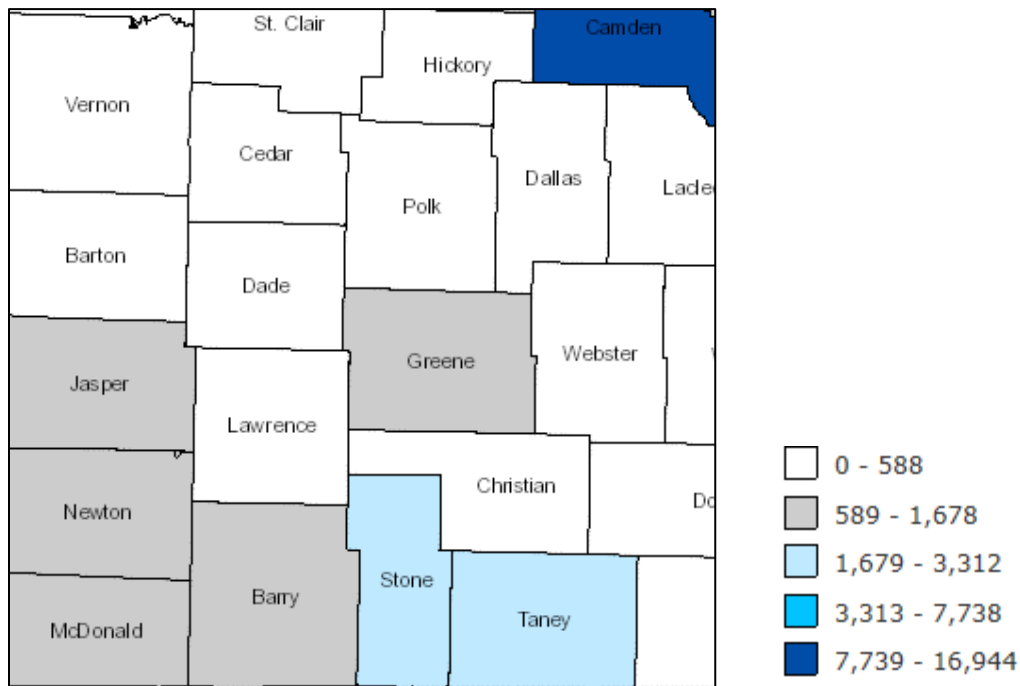


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Total Building Exposure by Flood (100 Year)

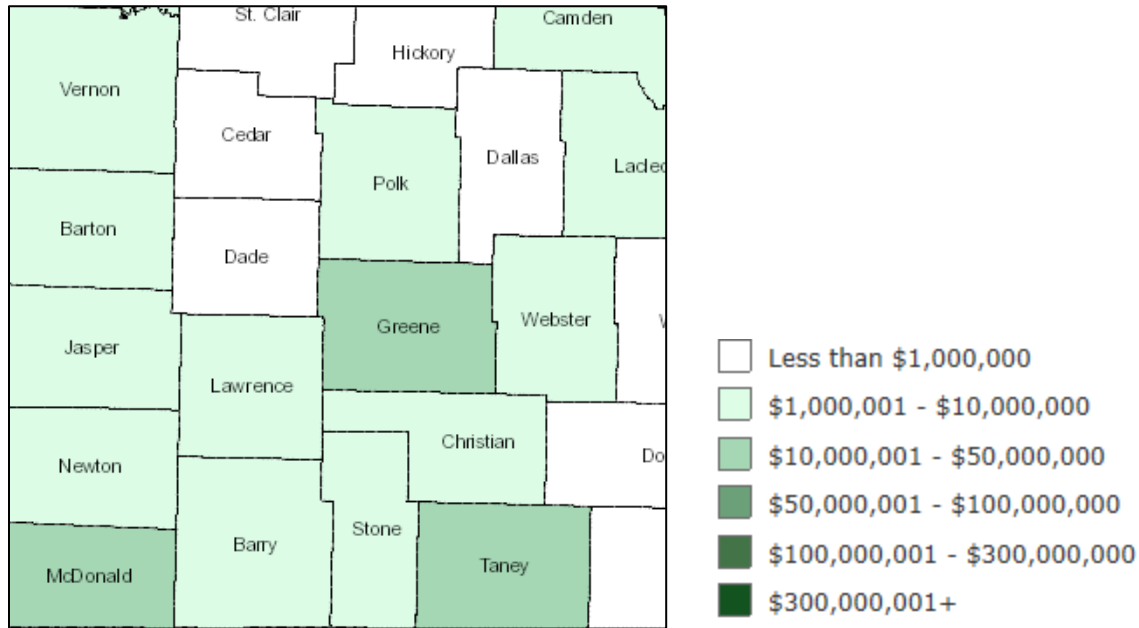


Buildings Impacted by Flood (100 Year)



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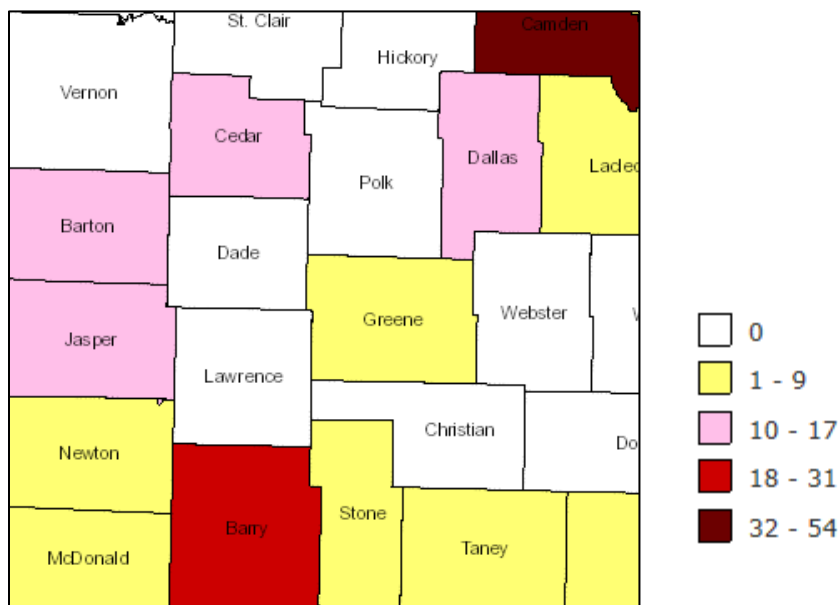
Flood Coverage



Impact of Previous and Future Development

Future development could impact flash and riverine flooding in the planning area. Development in low-lying areas near rivers and streams could be dangerous areas to expand on. Future development would also increase impervious surfaces causing additional water run-off and dragline problems during heavy rainfall events. The population of Greene County is projected to keep going for many years. An increase in population will include future development in many areas across Greene County.

State Facilities in SFHA by County



3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Flooding

SUBJECT	DETRIMENTAL IMPACTS
Public	Risk of death or injury is elevated from rising creeks, tributaries, and storm water run-off that cross a section or roadway. Floods can also create health concerns from disease, and sanitation problems.
Responders	The potential for dangerous life safety issues to responders is high in performing water rescues. Many flooding incidents in Greene County take hours to perform, impacting response functions. Flooded roads can also present a challenge in transportation for all responders.
Continuity of Operations	Multiple critical services and operations are suspended or delayed across the jurisdiction due to elements such as road safety, infrastructure damages and power outages.
Property, Facilities, and Infrastructure	Numerous neighborhoods and businesses have had damages from flooding in Greene County. There have been multiple instances of significant widespread property damage. Flooding in Greene County has washed out many roadways. Roads that are not permanently damaged are often impacted and typically experience a dangerous amount of water flowing over them. Critical infrastructures including banks, railroads, power lines, and power plants have also been affected by flooding. Infrastructure damages include multiple areas throughout the jurisdiction. Flooding can also result in widespread minor damaged or sometime significant damages to facilities.
Environment	Flooding can negatively affect soil make-up and wildlife.
Economic Condition of Jurisdiction	During floods, roads, bridges, houses and automobiles either become unsafe or are destroyed. Additionally, the government deploys firemen, police and other emergency apparatus to help the affected. Businesses can also be damaged or completely destroyed and unable to return to normalcy until repairs are done. This can greatly impact the economic condition throughout Greene County.
Public Confidence in Jurisdiction's Governance	Flooding has had little to no impact on public confidence in the governance.

*For more details on Consequence Analysis, refer to Appendix B.

3 - RISK ASSESSMENT

Hazard Summary by Jurisdiction

All areas within Greene County experience flooding. Some areas may see more flooding than others due to design of roads and amount of low water crossings. Areas that have many low water crossings may experience more transportation issues than other jurisdictions. Areas that have SFHA's are also more likely to flood. Some areas in Greene County that have SFHA's are the City of Willard, City of Ash Grove, some parts of City of Strafford, many areas in City of Fair Grove, some parts of City of Republic, many different areas in City of Springfield and large areas in unincorporated Greene County. All of the Fire Protection Districts cover areas in Greene County have some SFHA's. The Springfield Public School District currently has a middle school that floods majorly when the city receives large amounts of rain. They created a project to relocate their school and is actively working on moving it because there have been times where the parking lot was not accessible.

The list of SFHA's are located on this website of Greene County.

<http://cosmo.maps.arcgis.com/apps/webappviewer/index.html?id=4a085ab96e4e4a83891f07289820fd77>

PROBLEM STATEMENT

Flooding has been, and will continue to be a serious issue in Greene County. There are some areas in the county that may suffer more than others, but all areas are at risk. Flooding can also come with other risks such as severe thunderstorms or tornadoes which also pose a large risk to the planning area. Flooding can cause road and property damage and can even lead to public health concerns. Researching years' worth of data and studying the patterns of floods in the planning area, the best mitigation solution is to continue with the flood buyout program in Greene County. Mitigation efforts that would also be beneficial to the Greene County area are stormwater management projects and road retrofitting. These projects have been listed in the Mitigation Strategy section of this Hazard Mitigation Plan.

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3.4.5 Natural Hazard: Land Subsidence/Sinkholes

HAZARD PROFILE

Hazard Description

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that naturally can be dissolved by ground water circulation through them. As the rock dissolves, spaces and caverns develop underground. The sudden collapse of the land surface above them can be dramatic and range in size from broad, regional lowering of the land surface to localized collapse. However, the primary causes of most subsidence are human activities; underground mining of coal, groundwater or petroleum withdraw, and drainage of organic soils. In addition, sinkholes can develop as a result of subsurface void spaces created over time due to the erosion of subsurface limestone (karst).

Land subsidence occurs slowly and continuously over time, as a general rule. On occasion, it can occur abruptly, as in the sudden formation of sinkholes. Sinkhole formation can be aggravated by flooding.

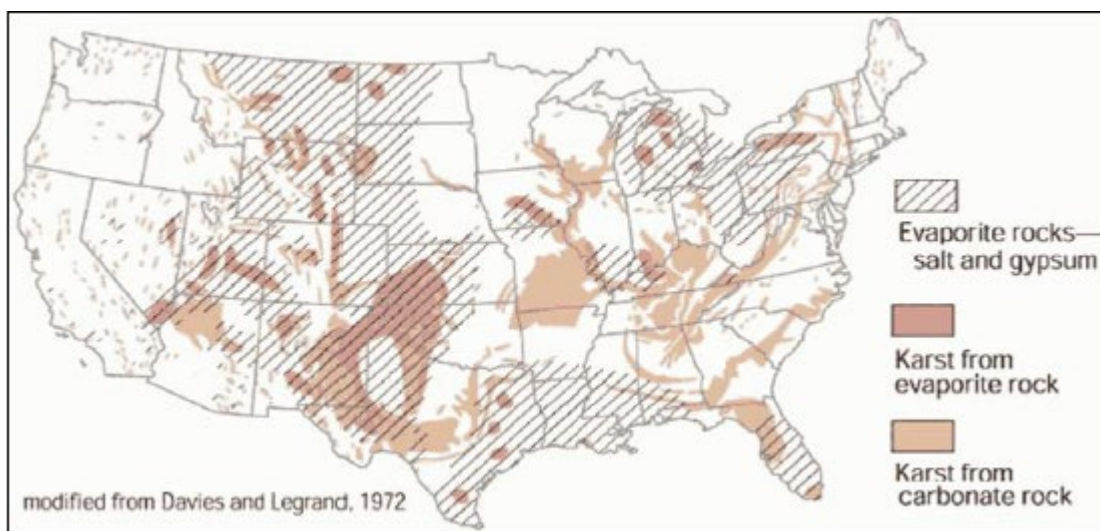
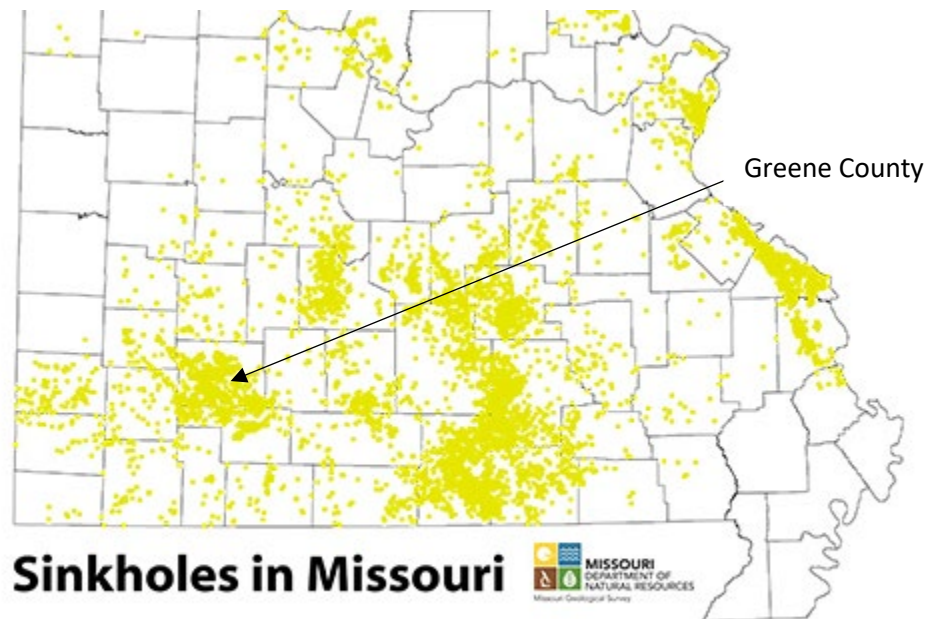
In the case of sinkholes, the rock below the surface is rock that has been dissolving by circulating groundwater. As the rock dissolves, spaces and caverns form, and ultimately the land above the spaces collapse. In Missouri, sinkhole problems are usually a result of surface materials above openings into bedrock caves eroding and collapsing into the cave opening. These collapses are called “cover collapses” and geologic information can be applied to predict the general regions where collapse will occur. Sinkholes range in size from several square yards to hundreds of acres and may be quite shallow or hundreds of feet deep.



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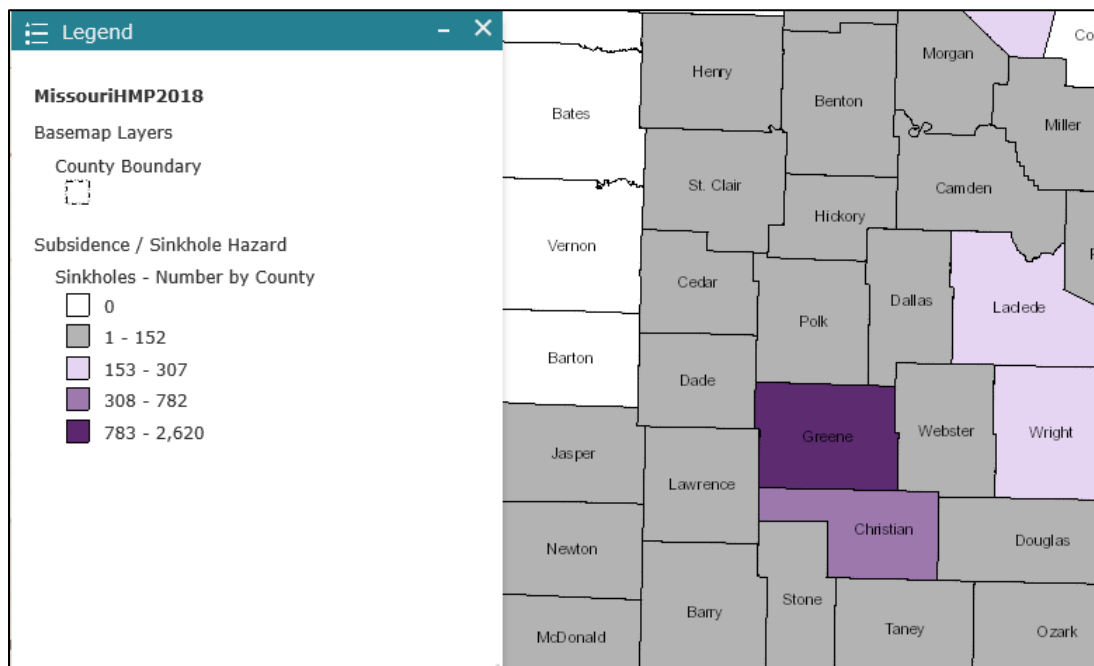
Geographic Location

Sinkholes are very popular in Greene County. According to the Missouri State Hazard Mitigation Plan written in 2018, there are 1292 sinkholes and 359 mines in Greene County. While sinkholes have not caused significant property damage or loss of life to date, they have, on numerous occasions, caused minor property damage, mainly to roadways after the sinkhole breaches to top soil.



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Number of Sinkholes by County



Strength/Magnitude/Extent

Sinkholes vary in size and location, and these variances will determine the impact of the hazard. A sinkhole could result in the loss of a personal vehicle, a building collapse, or damage to infrastructure such as roads, water, or sewer lines. Groundwater contamination is also possible from a sinkhole. Because of the relationship of sinkholes to groundwater, pollutants captured or dumped in sinkholes could affect a community's ground water system. Large earthquakes could trigger sinkhole collapse. Sinkholes located in floodplains can absorb floodwaters but make detailed flood hazard studies difficult to model.

Previous Occurrences

August 2013

The City of Springfield Utility crews discovered a 50 feet wide and 25 feet deep sinkhole near Walnut Lawn at Cox while installing water mains.

August 2012

A sinkhole caused a road to collapse near the Springfield-Branson National Airport. A water main snapped when the concrete collapsed. The hole likely formed after heavy rains.

June 2009

A sinkhole approximately 70 foot wide and 30 foot deep was located at the bottom of a rain runoff area in Battlefield had to be patched as it threatened a city sewer lift station.

March 2009

A sinkhole 15 foot wide and 15 foot deep was found near McBride Elementary School in Springfield. The hole was across the street from the school. Officials examined the sinkhole and were able to fill it safely.

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Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is very likely for a sinkhole event to occur within the next three years in Greene County. For a full description of the CPRI for land subsidence/sinkholes, refer to Appendix B.

Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, direct effects from changing climate conditions such as an increase in droughts could contribute to an increase in sinkholes. These changes raise the likelihood of extreme weather, meaning the torrential rain and flooding conditions which often lead to the exposure of sinkhole are likely to become increasingly common. Certain events such as heavy precipitation following a period of drought can trigger a sinkhole due to low levels of groundwater combined with heavy influx of rain.

VULNERABILITY

Vulnerability Overview

Sinkholes vary in size and location. These factors will determine the impact of the hazard, which could manifest as the loss of a personal vehicle, a building collapse or damage to infrastructure such as roads, water or sewer lines. Groundwater contamination is also a possible impact of a sinkhole because of the relationship of sinkholes to groundwater.

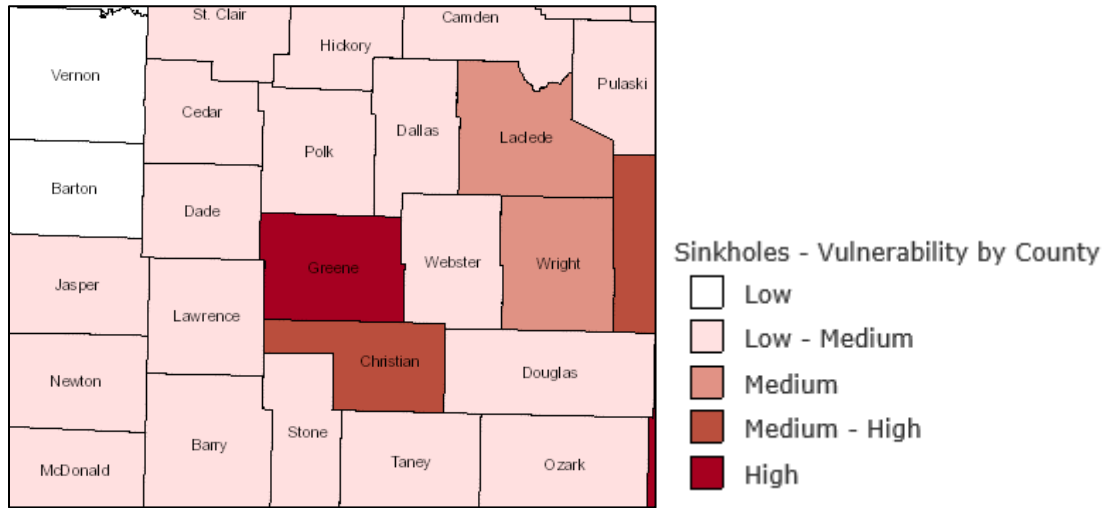
Using the Missouri Hazard Mitigation Viewer, the sinkhole hazard layer was used in conjunction with the MSDIS structure file to determine structures that fall within sinkhole areas as well as structures that are within a buffered distance of 50 feet of sinkholes. The number of mines per county was reported as available from the Department of Natural Resources. Based on natural breaks in the data, a rating value of 1 through 5 was assigned with the designations shown below.

Sinkhole Rating Values

FACTOR	1 (LOW)	2 (LOW-MEDIUM)	3 (MEDIUM)	4 (MEDIUM-HIGH)	5 (HIGH)
Sinkholes per County	0	1-200	201-400	401-800	801+
Mines Per County	0-100	101-250	251-500	501-750	751+

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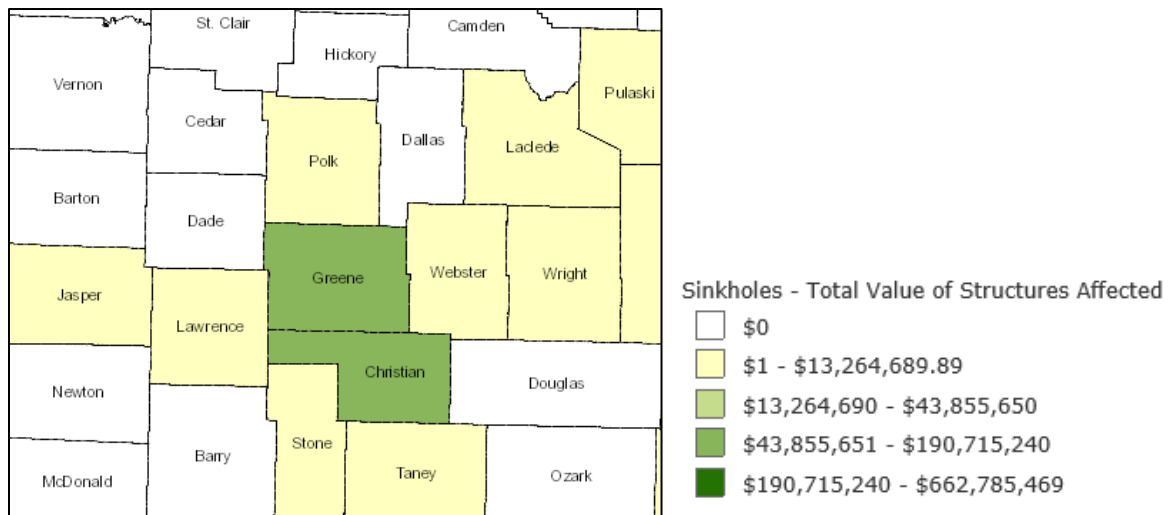
Sinkhole Rating Value - Greene County



Potential Losses to Existing Development

From GIS data collected the figures below show the potential for losses due to sinkholes. The first table shows the potential for losses due to sinkholes. The next two tables show the number of structures, the value of the structures and the population potentially impacted by sinkholes.

Ranking of Structures Potentially Impacted by Sinkholes - Greene County

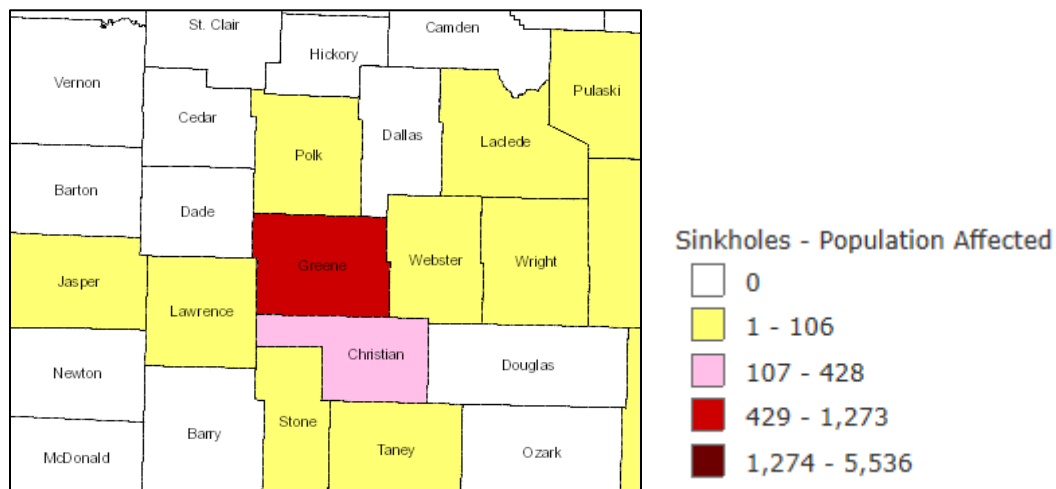


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Number and Value of Structures with Population Potentially Impacted- Greene County

COUNTY	NUMBER OF STRUCTURES	VALUE OF STRUCTURES	POPULATION
Greene	676 (Total)	\$190,715,240.29 (Total)	1,272.8
• Agriculture	86	\$21,835,375,.36	
• Commercial	37	\$31,752,303.08	
• Industrial	2	\$1,666,747.47	
• Residential	551	\$135,460,814.37	

Ranking of Population Potentially Impacted by Sinkholes-Greene County



Impact of Previous and Future Development

Greene County was listed as one of the top 10 counties with housing unit gains between 2010-2015. The population of Greene County is anticipated to keep growing. With population growth and increased development could cause and increase in exposure. Greene County does have building regulations that restrict building on areas where a sinkhole is located. It also limits how close properties can be built around sinkholes.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

Impact Analysis: Land Subsidence/Sinkholes

SUBJECT	DETRIMENTAL IMPACTS
Public	Land subsidence can be very dangerous and creates many safety concerns for residential or commercial areas.
Responders	There would be little to no impact on responders and response functions in Greene County due to land subsidence.
Continuity of Operations	Land subsidence has little to no impact on service operations.
Property, Facilities, and Infrastructure	Greene County could experience minor isolated instances of property damage in forms such as building and home foundations. Sinkholes have caused destruction on roadways, and must be filled in to repair road or continue construction on new roadways. This has happened in multiple areas in Greene County. Greene County has experienced little to no impact on facilities due to land subsidence.
Environment	Sinkholes create a direct link to the water supply, and depending on the location of the sinkholes, can directly contaminate drinking water. Contamination in the form of litter or trash, as well as chemicals from roadways can be washed into an open sinkhole especially if near a road or busy commercial area.
Economic Condition of Jurisdiction	Sinkholes can cause damage when expanding. Greene County has repaired multiple roadways in which a sinkhole caused damage. Land subsidence has a minor economic impact.
Public Confidence in the Jurisdiction's Governance	Land subsidence causes little to no loss of public confidence in governance in Greene County.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

The entire area is at risk for experiencing complications from sinkholes. There isn't enough data to say that one area located within Greene County is more at risk than another. There are over 1,000 sinkholes spread across the county that we know of. There could be many more that have not been discovered yet.

PROBLEM STATEMENT

Sinkholes vary in size and location and cause an extreme amount of damage and property loss. Sinkholes can even cause injury or death. The entire planning area is at risk for experiencing damage from a sinkhole. Population growth and climate change can cause more sinkholes in the planning area over the next several years. Though there are not certain areas that are more at risk, all jurisdictions in the planning area should mitigate against this hazard. According to the Missouri State Mitigation Plan, Greene County is one of the counties listed as most likely area to be affected by sinkhole damage. Mitigation efforts include increasing knowledge and provide education, determining the risk and planning before a sink hole appears. There have been other large scale projects done in other parts of the country that involve relocating homes in the areas of known sinkholes. No participating jurisdiction created a Mitigation project involving sinkhole mitigation for this Mitigation Plan.

3 - RISK ASSESSMENT

3.4.6 Natural Hazard: Severe Thunderstorms - Including High Winds, Hail, and Lightning

HAZARD PROFILE

Hazard Description

Thunderstorms

A thunderstorm is defined as a storm that contains lightning and thunder, which is caused by unstable atmospheric conditions. When cold upper air sinks and warm moist air rises, storm clouds or 'thunderheads' develop resulting in thunderstorms. This can occur singularly as well as in clusters or lines. The National Weather Service defines a thunderstorm as "severe" if it includes hail that is one inch or more, or wind gust that are 58 miles per hour or higher. At any given moment across the world, there are about 1,800 thunderstorms occurring. Severe thunderstorms most often occur in Missouri in the spring and summer, during the afternoon and evenings, but can occur at any time. Other hazards associated with thunderstorms are heavy rains resulting in flooding (discussed separately in Section 3.4.4) and tornadoes (discussed separately in Section 3.4.8)



High Winds



A severe thunderstorm can produce winds causing as much damage as a weak tornado. The damaging winds of thunderstorms include downbursts, microbursts, and straight-line winds. Downbursts are localized currents of air blasting down from a thunderstorm, which induce an outward burst of damaging wind on or near the ground. Microbursts are minimized downbursts covering an area of less than 2.5 miles across. They include a strong wind shear (a rapid change in the direction of wind over a short distance) near the surface. Microbursts may or may not include precipitation and can produce winds

at speeds of more than 150 miles per hour. Damaging straight-line winds are high winds across a wide area that can reach speeds of 140 miles per hour.

Lightning

All thunderstorms produce lightning, which can strike outside of the area where it is raining and it has been known to fall more than 10 miles away from the rainfall area. Thunder is simply the sound that lightning makes. Lightning is a huge discharge of electricity that shoots through the air causing vibrations and creating the sound of thunder.

3 - RISK ASSESSMENT

Hail



According to the National Oceanic and Atmospheric Administration (NOAA), hail is precipitation that is formed when thunderstorm updrafts carry raindrops upward into extremely cold atmosphere causing them to freeze. The raindrops form into small frozen droplets. They continue to grow as they come into contact with super-cooled water which will freeze on contact with the frozen rain droplet. This frozen droplet can continue to grow and form hail. As long as the updraft forces can support or suspend the weight of the hailstone, hail can continue to grow before it hits the earth.

At the time when the updraft can no longer support the hailstone, it will fall down to the earth. For example, a $\frac{1}{4}$ inch diameter or pea-sized hail requires updrafts of 24 miles per hour, while a $2\frac{3}{4}$ inches diameter or baseball-sized hail requires an updraft of 81 miles per hour. According to NOAA, the largest hailstone in diameter recorded in the United States was found in Vivian, South Dakota on July 23, 2010. It was eight inches in diameter, almost the size of a soccer ball. Soccer-ball-sized hail is the exception, but even small pea-sized hail can do damage.

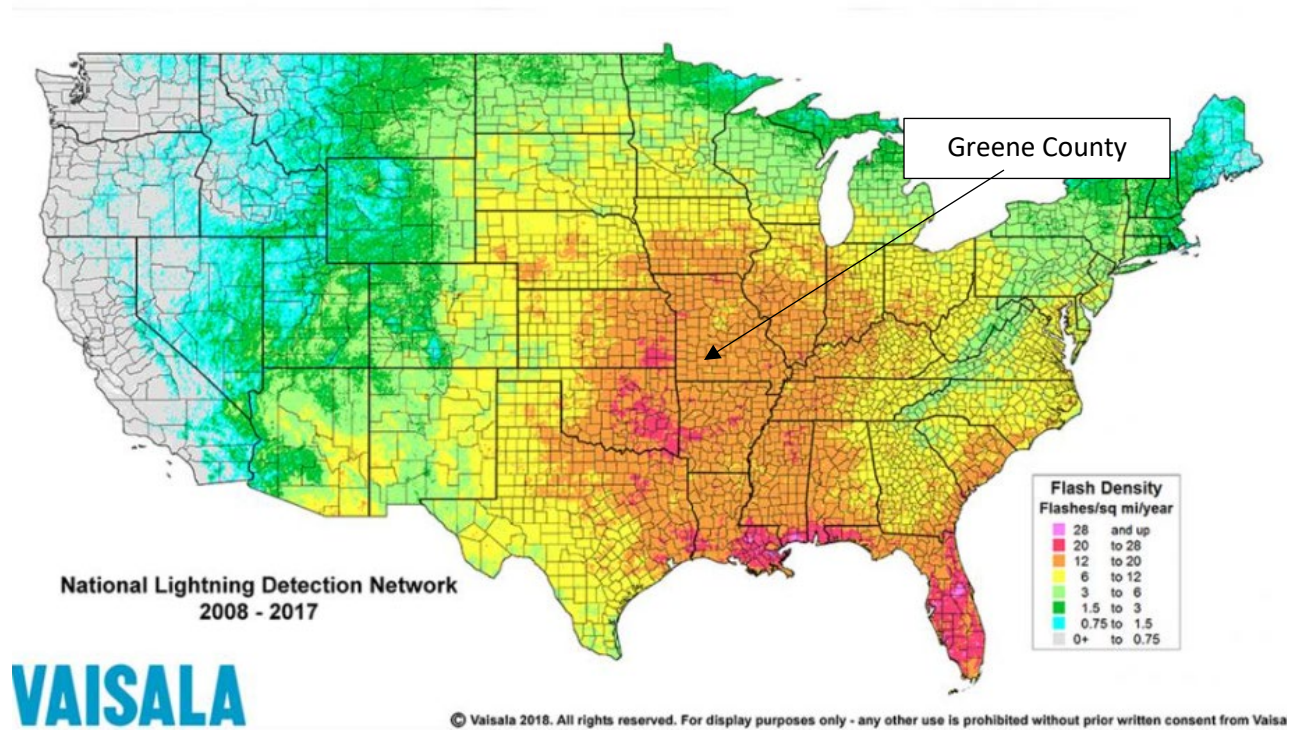
Geographic Location

Thunderstorms, high winds, hail and lightning are area wide hazards that can happen anywhere in Greene County. Although these events occur similarly though out the planning area, damages are more likely to occur in more densely developed urban areas.

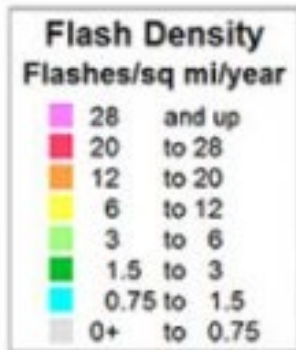
The following page has a map of lightning frequency in the United States.

3 - RISK ASSESSMENT

Location and Frequency of Lightning

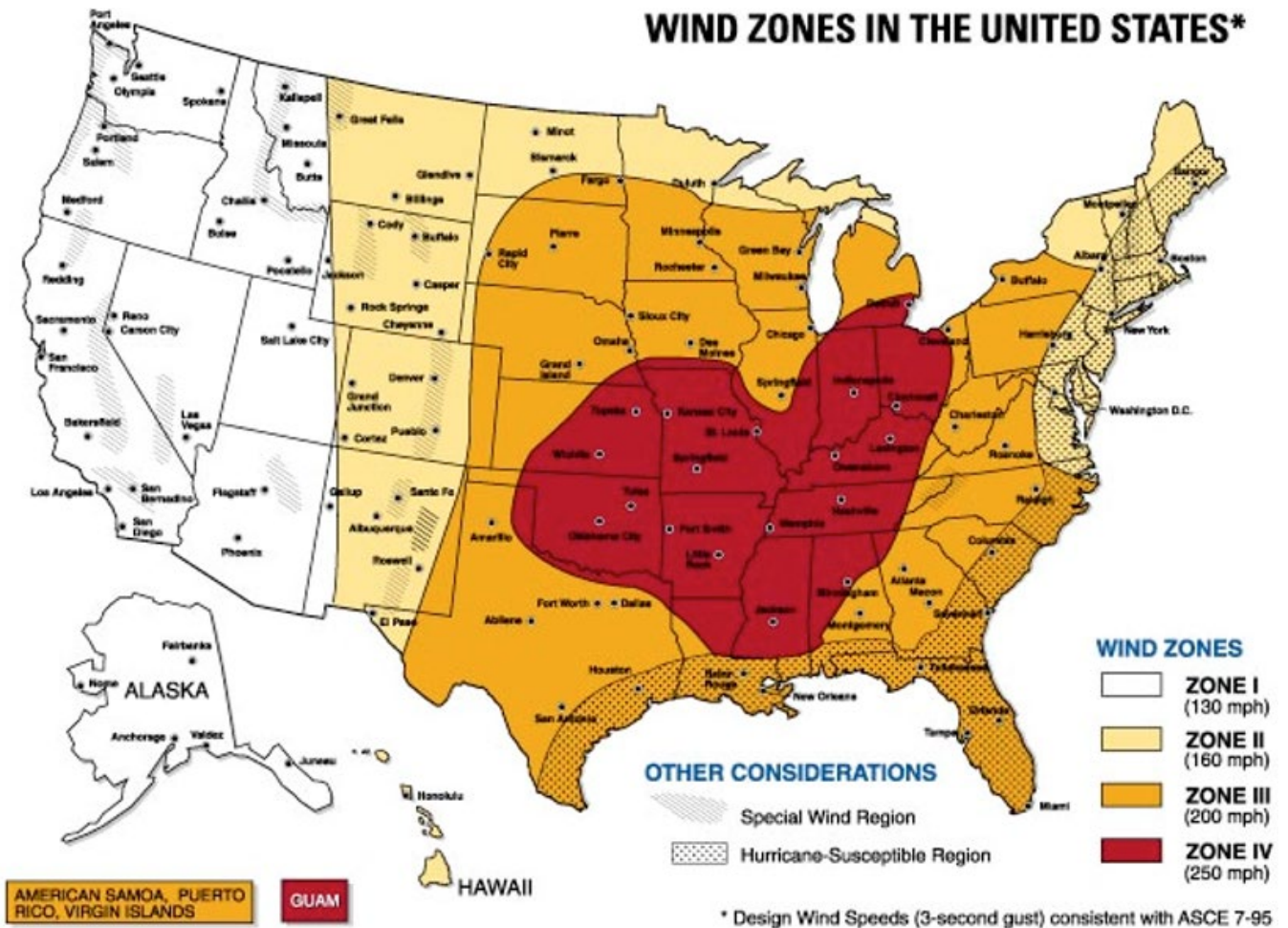


Source: <https://www.vaisala.com/en/products/data-subscriptions-and-reports/data-sets/nldn>



3 - RISK ASSESSMENT

Wind Zones in the United States



Source: Taking Shelter from the Storm, 3rd Edition, https://www.fema.gov/pdf/library/ism2_s1.pdf

Greene County is located within Wind Zone IV. This is zone is high risk. During high winds, it is recommended to take shelter as a protection.

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Strength/Magnitude/Extent

Hail

Based on information provided by the Tornado and Storm Research Organization (TORRO), the table below describes typical damaged impacts of the various sizes of hail. In addition to hail diameter, factors including number and density of hailstones hail fall speed and surface wind speeds affect severity.

INTENSITY CATEGORY	DIAMETER (MM)	DIAMETER (INCHES)	SIZE DESCRIPTION	TYPICAL DAMAGE IMPACTS
Hard Hail	2-9 mm	0.2-0.4 in	Pea	No Damage
Potentially Damaging	10-15 mm	0.4-0.6 in	Mothball	Slight General Damage to plants and crops
Significant	16-20 mm	0.6-0.8 in	Marble, Grape	Significant damage to fruit, crops and vegetation
Severe	21-30 mm	0.8-1.2 in	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	31-40 mm	1.2-1.6 in	Pigeon's egg > Squash Ball	Widespread glass damage, vehicle bodywork damage
Destructive	41-50 mm	1.6-2.0 in	Golf Ball > Pullet's Egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	51-60 mm	2.0-2.4 in	Hen's Egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	61-75 mm	2.4-3.0 in	Tennis Ball > Cricket Ball	Severe roof damage, risk of serious injuries
Destructive	76-90 mm	3.0-3.5 in	Large Orange > Softball	Severed damage to aircraft bodywork
Super Hailstorms	91-100 mm	3.6-3.9 in	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100 mm	4.0+ in.	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: Tornado and Storm Research Organization (TORRO), Department of Geography, Oxford Brookes University

Winds

Straight-line winds are defined as any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 miles per hour, which represent the most common type of severe weather. They are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks like tornadoes, the associated wind damage can be extensive and affect entire and multiple counties. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed. Roofs, windows and homes can also be damaged as wind speeds increase.

3 - RISK ASSESSMENT

Lightning

The onset of thunderstorms with lightning, high wind and hail is generally rapid. Duration is less than six hours and warning time is generally six to twelve hours. Nationwide, lightning kills 75 to 100 people each year. Lightning strikes can also start structural and wildland fires, as well as damage electrical systems and equipment.

Previous Occurrences

NCEI Reported Hail Events with Hail Size 1 Inch or Larger - 2008-2018

LOCATION	DATE	SIZE OF HAIL	INJURIES	DEATHS	PROPERTY DAMAGE
Springfield/Republic/Fair Grove/Unincorporated Greene County	01/07/2008	1.0-3.0in	0	0	\$300,000
Republic	01/08/2008	1.75in	0	0	\$0
Unincorporated Greene County	02/04/2008	1.0in	0	0	\$0
Willard/ Springfield/ Battlefield/Unincorporated Greene County	06/15/2008	1.0-1.75in	0	0	\$0
Springfield/Unincorporated Greene County	06/19/2008	1.0-2.75in	0	0	\$0
Springfield/Unincorporated Greene County	06/21/2008	1.0-1.25in	0	0	\$0
Willard	06/28/2008	1.0in	0	0	\$0
Springfield	11/06/2008	1.0in	0	0	\$0
Republic	04/09/2009	1.75in	0	0	\$0
Springfield	04/23/2010	1.0in	0	0	\$0
Unincorporated Greene County	04/30/2010	1.0in	0	0	\$0
Springfield	06/19/2010	1.0in	0	0	\$0
Willard	07/11/2010	1.0in	0	0	\$0
Republic	09/02/2010	1.0in	0	0	\$0
Springfield	11/22/2010	1.50-1.75in	0	0	\$0
Willard/Springfield/Strafford/Unincorporated Greene County	11/24/2010	1.0-1.75in	0	0	\$0
Unincorporated Greene County	12/31/2010	1.0in	0	0	\$0
Springfield/Strafford/Walnut Grove	04/22/2011	1.0-1.75in	0	0	\$0
Republic/ Unincorporated Greene County	04/23/2011	1.0in	0	0	\$0
Ash Grove/Springfield/Fair Grove/ Unincorporated Greene County	05/25/2011	1.0in-2.75in	0	0	\$160,000
Unincorporated Greene County	07/02/2011	1.75in	0	0	\$0
Springfield	07/03/2011	1.0-1.75in	0	0	\$0
Fair Grove	04/27/2012	1.0in	0	0	\$0
Willard	05/20/2012	1.0in	0	0	\$0
Republic	06/11/2012	1.0in	0	0	\$0
Battlefield/Unincorporated Greene County	08/16/2012	1.0in	0	0	\$0
Springfield/Unincorporated Greene County	09/21/2012	1.0in	0	0	\$0
Republic	10/12/2012	1.0in	0	0	\$0
Springfield	03/17/2013	1.0in	0	0	\$0

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Unincorporated Greene County	06/15/2013	1.0-2.0in	0	0	\$0
Republic	06/28/2013	1.0in	0	0	\$0
Unincorporated Greene County	07/03/2013	1.0in	0	0	\$0
Unincorporated Greene County	07/04/2013	1.0in	0	0	\$0
Unincorporated Greene County	08/05/2013	1.0in	0	0	\$0
Unincorporated Greene County	03/27/2014	1.0in	0	0	\$0
Battlefield/Springfield/ Unincorporated Greene County	04/24/2014	1.0-1.25in	0	0	\$0
Ash Grove/Unincorporated Greene County	06/06/2014	1.0-2.5in	0	0	\$0
Unincorporated Greene County	03/24/2015	1.0in	0	0	\$0
Springfield/ Unincorporated Greene County	03/25/2015	1.0-1.75in	0	0	\$0
Unincorporated Greene County	04/01/2015	1.0in	0	0	\$0
Republic	04/21/2015	1.0in	0	0	\$0
Battlefield	03/13/2016	1.0in	0	0	\$0
Fair Grove	04/26/2016	1.0in	0	0	\$0
Battlefield/Fair Grove	03/01/2016	1.0in	0	0	\$0
Walnut Grove/Fair Grove/Strafford/Springfield/ Unincorporated Greene County	03/09/2017	1.0-1.5in	0	0	\$0
Unincorporated Greene County	04/04/2017	1.5in	0	0	\$0
Fair Grove/ Unincorporated Greene County	05/10/2017	1.0in	0	0	\$0
Republic	05/19/2017	1.25in	0	0	\$0
Willard/ Springfield/ Walnut Grove/ Strafford/ Unincorporated Greene County	05/27/2017	1.0in-1.75in	0	0	\$0
Unincorporated Greene County	06/01/2017	1.0in	0	0	\$0
Unincorporated Greene County	05/16/2018	1.0in	0	0	\$0
Strafford	05/19/2018	1.0in	0	0	\$0
Battlefield/ Springfield/ Unincorporated Greene County	06/14/2018	1.0-1.75in	0	0	\$5,000
Fair Grove	07/20/2018	1.0in	0	0	\$0
Springfield	08/10/2018	1.0-1.75in	0	0	\$2,000
Springfield	08/30/2018	1.0in	0	0	\$0
Total					\$467,000

Source: National Centers for Environmental Information

*Note: The events listed are only events that were reported to National Centers for Environmental Information (NCEI).

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NCEI Reported Thunderstorm Wind Events - 2008-2018

LOCATION	DATE	KTS (KNOTS)	MPH (MILES PER HOUR)	INJURIES	DEATHS	PROPERTY DAMAGE
Republic/ Springfield/ Strafford/ Unincorporated Greene County	01/07/2008	52-61 KTS	59-70 MPH	0	0	\$35,000
Battlefield/ Springfield	01/08/2008	52-87 KTS	59-100 MPH	0	0	\$20,000
Springfield	03/31/2008	50-69 KTS	57-79 MPH	0	0	0
Ash Grove	04/23/2008	50 KTS	57 MPH	0	0	\$1,000
Springfield	05/02/2008	56 KTS	64 MPH	0	0	0
Willard	05/10/2008	50 KTS	57 MPH	0	0	0
Willard	06/03/2008	50 KTS	57 MPH	0	0	0
Springfield	06/15/2008	50-56 KTS	57-64 MPH	0	0	0
Springfield/ Unincorporated Greene County	06/19/2008	50-70 KTS	57-80 MPH	0	0	\$335,000
Battlefield	06/28/2008	52 KTS	59 MPH	0	0	0
Battlefield	07/08/2008	50 KTS	57 MPH	0	0	0
Battlefield/ Springfield	07/22/2008	50-52 KTS	57-59 MPH	0	0	\$1,000
Battlefield/ Springfield	07/26/2008	50-54 KTS	57-62 MPH	0	0	0
Unincorporated Greene County	08/06/2008	50 KTS	57 MPH	0	0	0
Springfield	08/14/2008	50 KTS	57 MPH	0	0	0
Republic/ Springfield/ Unincorporated Greene County	11/06/2008	50-56 KTS	57-64 MPH	0	0	0
Springfield	12/27/2008	50 KTS	57 MPH	0	0	0
Willard/ Fair Grove/ Unincorporated Greene County	03/08/2009	56-74 KTS	64-85 MPH	0	0	\$20,000
Republic/ Willard	03/24/2009	52 KTS	59 MPH	0	0	0
Republic/ Springfield/ Walnut Grove/ Unincorporated Greene County	04/09/2009	50-70 KTS	57 MPH	0	0	\$2,000
Unincorporated Greene County	05/08/2009	78 KTS	89 MPH	0	4	\$15,000,000
Springfield/ Unincorporated Greene County	05/13/2009	50-57 KTS	57-65 MPH	0	0	\$5,000
Strafford	06/10/2009	52 KTS	59 MPH	0	0	0
Willard/ Walnut Grove/ Springfield	06/16/2009	52-61 KTS	59-70 MPH	0	0	\$2,100

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Battlefield/ Republic	06/23/2009	61-70 KTS	70-80 MPH	0	0	\$27,000
Springfield/ Unincorporated Greene County	06/24/2009	52 KTS	59 MPH	0	0	0
Unincorporated Greene County	07/29/2009	50 KTS	57 MPH	0	0	0
Springfield/ Unincorporated Greene County	08/19/2009	52 KTS	59 MPH	0	0	0
Springfield	04/24/2010	54 KTS	62 MPH	0	0	0
Unincorporated Greene County	05/13/2010	52 KTS	59 MPH	0	0	0
Springfield/ Battlefield/ Fair Grove/ Unincorporated Greene County	06/16/2010	52-61 KTS	59-70 MPH	0	0	\$27,000
Springfield	06/19/2010	52 KTS	59 MPH	0	0	\$6,000
Springfield	07/16/2010	52 KTS	59 MPH	0	0	0
Ash Grove	08/13/2010	52 KTS	59 MPH	0	0	\$5,000
Strafford/ Fair Grove	08/15/2010	52 KTS	59 MPH	0	0	\$1,000
Unincorporated Greene County	09/02/2010	50 KTS	57 MPH	0	0	\$0
Unincorporated Greene County	09/15/2010	52-74 KTS	59-85 MPH	0	0	\$40,000
Unincorporated Greene County	10/26/2010	52 KTS	59 MPH	0	0	\$2,000
Springfield/ Unincorporated Greene County	11/22/2010	52-56 KTS	59-64 MPH	0	0	\$5,000
Springfield	11/24/2010	52 KTS	59 MPH	0	0	\$1,000
Unincorporated Greene County	04/10/2011	52 KTS	59 MPH	0	0	\$25,000
Republic	05/12/2011	52-53 KTS	59-60 MPH	0	0	\$7,000
Unincorporated Greene County	05/25/2011	52 KTS	59 MPH	0	0	0
Republic/ Springfield	06/14/2011	52 KTS	59 MPH	0	0	0
Ash Grove/ Walnut Grove/ Fair Grove/ Springfield/ Unincorporated Greene County	06/18/2011	52-61 KTS	59-70 MPH	0	0	\$10,000
Unincorporated Greene County	07/23/2011	52 KTS	59 MPH	0	0	\$10,000
Springfield/ Battlefield	07/24/2011	59-61 KTS	67-70 MPH	0	0	\$2,000
Springfield	07/30/2011	52 KTS	59 MPH	0	0	\$5,000
Strafford	08/07/2011	52 KTS	59 MPH	0	0	\$5,000
Republic	02/29/2012	52-56 KTS	59-64 MPH	0	0	\$1,000
Republic	05/01/2012	52 KTS	59 MPH	0	0	\$0

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Ash Grove/ Springfield	06/11/2012	52-61 KTS	59-70 MPH	0	0	\$112,000
Springfield/ Unincorporated Greene County	07/07/2012	52 KTS	59 MPH	0	0	\$29,000
Ash Grove/ Springfield/ Strafford/ Republic/ Unincorporated Greene County	08/04/2012	50-61 KTS	57-70 MPH	0	0	\$3,000
Republic/ Springfield/ Unincorporated Greene County	08/08/2012	51-54 KTS	58-62 MPH	0	0	\$10,000
Battlefield	08/16/2012	52 KTS	59 MPH	0	0	0
Springfield/ Walnut Grove/ Fair Grove/ Unincorporated Greene County	09/07/2012	52-61 KTS	59-70 MPH	0	0	\$5,000
Republic/ Unincorporated Greene County	10/13/2012	52-61 KTS	59-70 MPH	0	0	\$20,000
Ash Grove/ Walnut Grove/ Unincorporated Greene County	10/17/2012	52-61 KTS	59-71 MPH	0	0	\$9,000
Springfield/ Unincorporated Greene County	01/29/2013	52 KTS	59 MPH	0	0	\$10,000
Battlefield/ Unincorporated Greene County	05/20/2013	50-52 KTS	57-59 MPH	0	0	\$1,000
Battlefield/ Unincorporated Greene County	06/15/2013	52 KTS	59 MPH	0	0	0
Republic/ Battlefield/ Springfield/ Republic	06/28/2013	52-61 KTS	59-70 MPH	0	0	\$250,000
Willard/ Unincorporated Greene County	08/03/2013	52 KTS	59 MPH	0	0	0
Unincorporated Greene County	04/03/2014	52 KTS	59 MPH	0	0	0
Unincorporated Greene County	05/26/2014	52 KTS	59 MPH	0	0	\$1,000
Battlefield/ Springfield	06/05/2014	52 KTS	59 MPH	0	0	\$2,000
Walnut Grove	07/07/2014	52 KTS	59 MPH	0	0	\$1,000
Walnut Grove/ Ash Grove/ Republic/ Springfield/ Battlefield/	07/08/2014	51-52 KTS	58-59 MPH	0	1	\$56,000

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Unincorporated Greene County						
Springfield/ Unincorporated Greene County	09/01/2014	52 KTS	59 MPH	0	0	\$40,000
Ash Grove/ Fair Grove/ Unincorporated Greene County	10/02/2014	52 KTS	59 MPH	0	0	\$1,000
Unincorporated Greene County	04/21/2015	52 KTS	59 MPH	0	0	0
Republic/ Springfield/ Willard	05/17/2015	52-56 KTS	59-64 MPH	0	0	\$32,000
Ash Grove/ Willard/ Unincorporated Greene County	05/29/2015	52 KTS	59 MPH	0	0	\$15,000
Unincorporated Greene County	06/13/2015	52 KTS	59 MPH	0	0	\$5,000
Willard/ Fair Grove/ Unincorporated Greene County	07/14/2015	52 KTS	59 MPH	0	0	\$1,000
Fair Grove	07/15/2015	52 KTS	59 MPH	0	0	\$5,000
Springfield/ Unincorporated Greene County	07/24/2015	52 KTS	59 MPH	0	0	\$5,000
Ash Grove/ Walnut Grove	08/10/2015	52 KTS	59 MPH	0	0	0
Springfield	08/23/2015	52 KTS	59 MPH	0	0	\$5,000
Republic/ Battlefield	04/27/2016	52-61 KTS	59-70 MPH	0	0	\$210,000
Battlefield/ Unincorporated Greene County	06/23/2016	52-56 KTS	59-64 MPH	0	0	\$3,000
Springfield	06/30/2016	52 KTS	59 MPH	0	0	\$0
Republic	07/08/2016	52 KTS	59 MPH	0	0	\$0
Walnut Grove/ Unincorporated Greene County	08/25/2016	52 KTS	59 MPH	0	0	\$1,000
Ash Grove	10/19/2016	52 KTS	59 MPH	0	0	\$2,000
Fair Grove	03/01/2017	52 KTS	59 MPH	0	0	0
Springfield/ Unincorporated Greene County	03/06/2017	52-56 KTS	59-64 MPH	0	0	\$65,000
Springfield	03/09/2017	52 KTS	59 MPH	0	0	\$1,000
Willard/ Unincorporated Greene County	04/04/2017	52 KTS	59 MPH	0	0	\$5,000
Springfield	04/26/2017	52 KTS	59 MPH	0	0	\$0
Battlefield/ Unincorporated Greene County	05/19/2017	52 KTS	59 MPH	0	0	0
Fair Grove/ Republic/ Battlefield	05/27/2017	52-60 KTS	59-69 MPH	0	0	0

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Springfield/ Unincorporated Greene County	06/01/2017	52 KTS	59 MPH	0	0	\$1,000
Springfield	06/17/2017	52 KTS	59 MPH	0	0	0
Springfield	06/22/2017	61 KTS	70 MPH	0	0	\$25,000
Battlefield, Springfield, Unincorporated Greene County	06/23/2017	51-52 KTS	58-59 MPH	0	0	\$1,000
Springfield	06/30/2017	52-61 KTS	59-70 MPH	0	0	\$10,000
Ash Grove	08/05/2017	52 KTS	59 MPH	0	0	\$1,000
Springfield/ Unincorporated Greene County	10/21/2017	52 KTS	59 MPH	0	0	\$6,000
Fair Grove	10/22/2017	53 KTS	60 MPH	0	0	\$0
Willard/ Springfield	12/04/2017	52-70 KTS	59-80 MPH	0	0	\$14,000
Unincorporated Greene County	05/03/2018	52 KTS	59 MPH	0	0	\$5,000
Unincorporated Greene County	05/25/2018	52 KTS	59 MPH	0	0	0
Battlefield	06/14/2018	52 KTS	59 MPH	0	0	\$4,000
Springfield/ Republic/ Unincorporated Greene County	06/26/2018	52-58 KTS	59-66 MPH	0	0	\$4,000
Battlefield/ Republic/ Springfield/ unincorporated Greene County	07/19/2018	52-61 KTS	59-70 MPH	0	0	\$50,000
Ash Grove	08/09/2018	52 KTS	59 MPH	0	0	0
Battlefield/ Springfield/ Willard/ Unincorporated Greene County	08/10/2018	52 KTS	59 MPH	0	0	\$46,000
Republic	08/19/2018	52 KTS	59 MPH	0	0	\$1,000
Willard	09/20/2018	52 KTS	59 MPH	0	0	0
Battlefield/ Republic/ Fair Grove/ Springfield/ Unincorporated Greene County	12/01/2018	52-72 KTS	59-82 MPH	0	0	\$234,000
Total						\$17,021,000

Source: National Centers for Environmental Information

*Note: The events listed are only events that were reported to the National Centers for Environmental Information (NCEI).

3 - RISK ASSESSMENT

NCEI Reported Lightning Events with Injuries or Property Damage- 2008-2018

LOCATION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE
Springfield	005/01/2009	0	0	\$10,000
Unincorporated Greene County	06/24/2009	1	0	\$0
Unincorporated Greene County	07/06/2011	0	0	\$5,000
Unincorporated Greene County	02/25/22013	0	0	\$300,000
Fair Grove	04/23/2013	0	0	\$50,000
Fair Grove	05/31/2013	0	2	\$0
Unincorporated Greene County	07/03/2013	0	0	\$50,000
Springfield	03/25/2015	0	0	\$2,000
Republic	05/10/2015	0	0	\$300,000
Unincorporated Greene County	03/30/2016	0	0	\$5,000
Unincorporated Greene County	03/21/2017	0	0	\$30,000
Total				\$752,000

Source: National Centers for Environmental Information

*Note: The events listed are only events that were reported to National Centers for Environmental Information (NCEI).

The only data what was available on the National Centers for Environmental Information about lightning was data that included injuries or property loss. Greene County experiences a lot more lightning strikes throughout the year.

Crop Insurance Claims

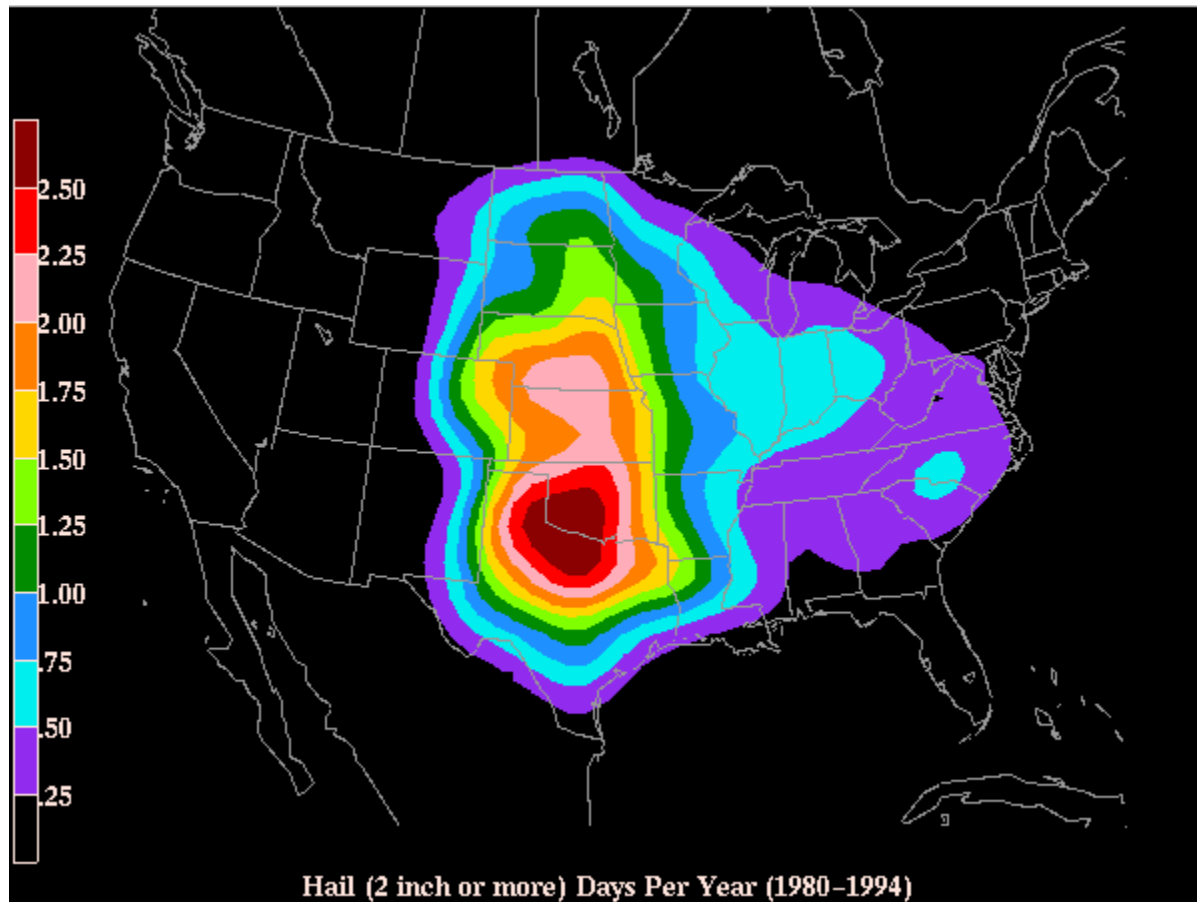
Severe storms that include high winds, hail and lightning can also cause damages to crops and farmland. Over the last 5 years, there have been very few insurance claims that have been paid out because of hail, winds and lightning. Majority of the insurance payouts were due to excess moisture because of heavy rainfall. There were a few insurance payouts from lightning and high winds, which totaled to be \$48,769.40.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is highly likely for a severe thunderstorm to occur within the next year in Greene County. For a full description of the CPRI for severe thunderstorms, refer to Appendix B.

3 - RISK ASSESSMENT

Annual Hailstorm Probability (2" diameter or larger), U.S 1980-1994



Source: https://www.nssl.noaa.gov/users/brooks/public_html/bighail.gif

Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, NASA's Earth Observatory provides an analysis on how climate change could, theoretically, increase potential storm energy by warming the surface and putting more moisture in the air through evaporation. The presence of warm, moist air near the surface is a key ingredient for summer storms that meteorologists have termed "convective available potential energy", or CAPE. With an increase in CAPE, there is a greater potential for cumulus clouds to form. The study also counters this theory with the theory that warming in the Arctic could lead to less wind shear in the mid-latitude areas prone to summer storms, making the storms less likely.

The Missouri State Hazard Mitigation Plan also states that predicted increases in temperature could help create atmospheric conditions that are fertile breeding grounds for severe thunderstorms and tornadoes in Missouri. As the population of Greene County continues to grow, the chance for more impact to housing, life, and property in both the public and private sectors increases. In the future, it is predicted that many areas, including Greene County, will see more severe weather.

3 - RISK ASSESSMENT

VULNERABILITY

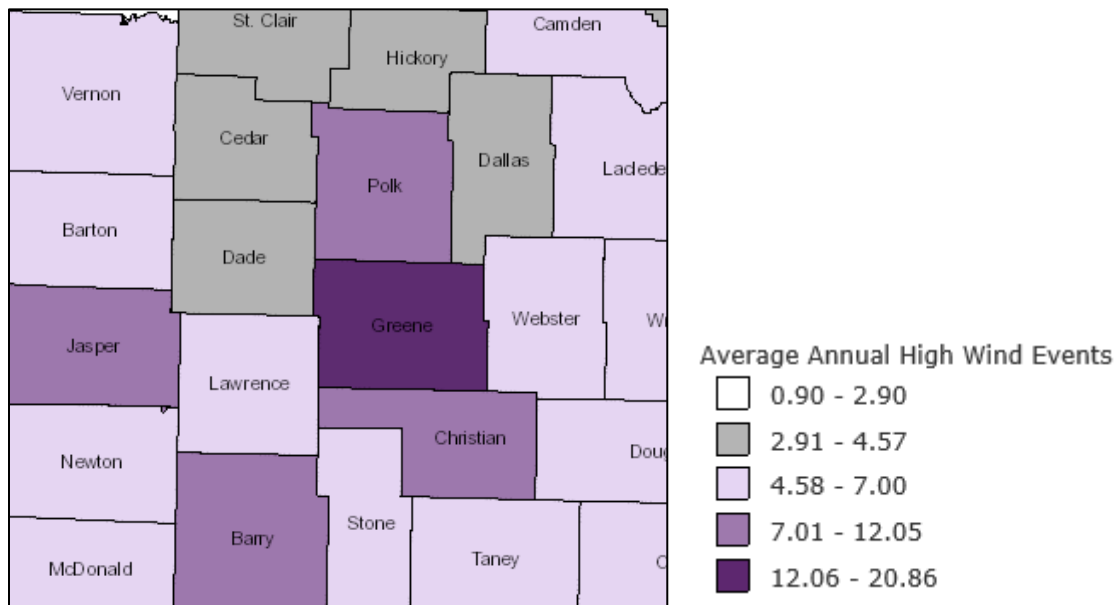
Vulnerability Overview

Severe thunderstorm losses are usually attributed to the associated hazards of hail, downburst winds, lightning and heavy rains. Losses due to hail and high winds are typically insured losses that are localized and do not result in presidential disaster declarations. However, in some cases, impacts are severe and widespread and assistance outside state capabilities is necessary. Hail and wind also can have devastating impacts on crops. Severe thunderstorms/heavy rains that lead to flooding are discussed in the flooding hazard profile. (Section 3.4.4) Hailstorms cause damage to property, crops, and the environment, and can injure and even kills livestock. In the United States, hail causes more than \$1 billion in damage to property and crops each year. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are also commonly damaged by hail. Hail has been known to cause injury to humans, occasionally fatal injury.

In general, assets in the County vulnerable to thunderstorms with lightning, high winds, and hail include people, crops, vehicles, and built structures. Although this hazard results in high annual losses, private property insurance and crop insurance usually covers the majority of losses. Considering insurance coverage as a recovery capability, the overall impact on jurisdiction is reduced.

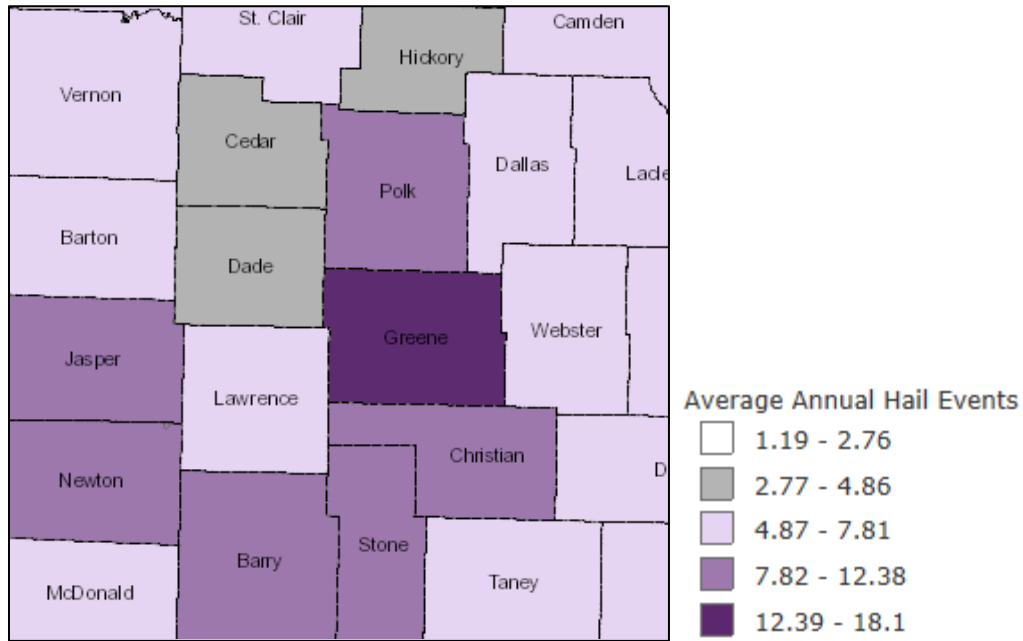
Most lightning damages occur to electronic equipment located inside buildings. But structural damage can also occur when a lightning strike causes a building fire. In addition, lightning strikes can cause damages to crops, if fields or forested lands are set on fire. Communications equipment and warning transmitters and receivers can also be knocked out by lightning strikes.

Average Annual High Wind Events

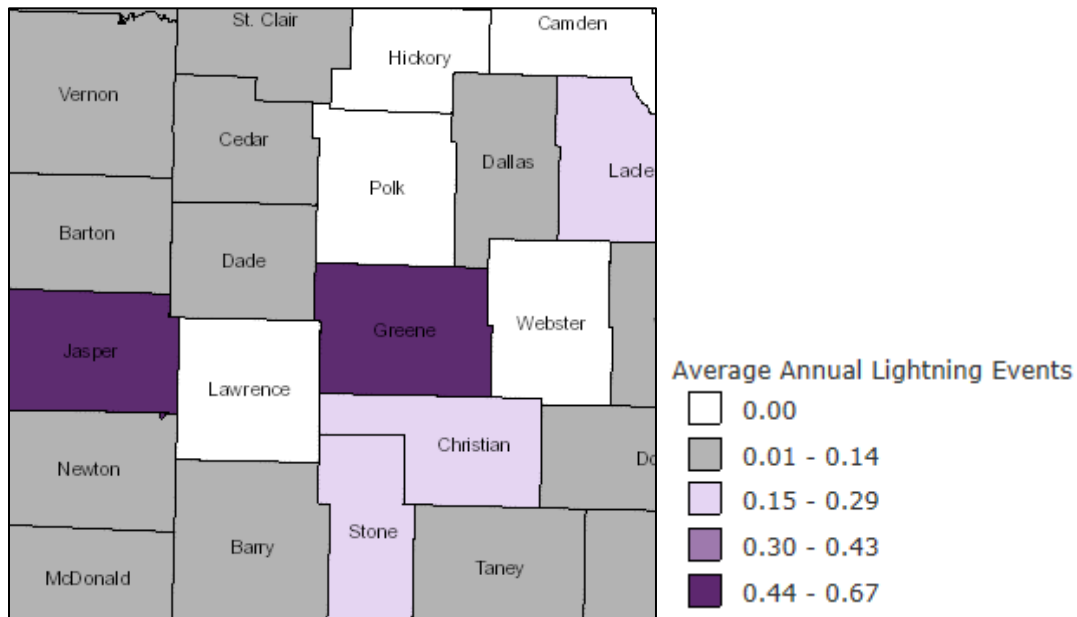


3 - RISK ASSESSMENT

Average Annual Hail Events

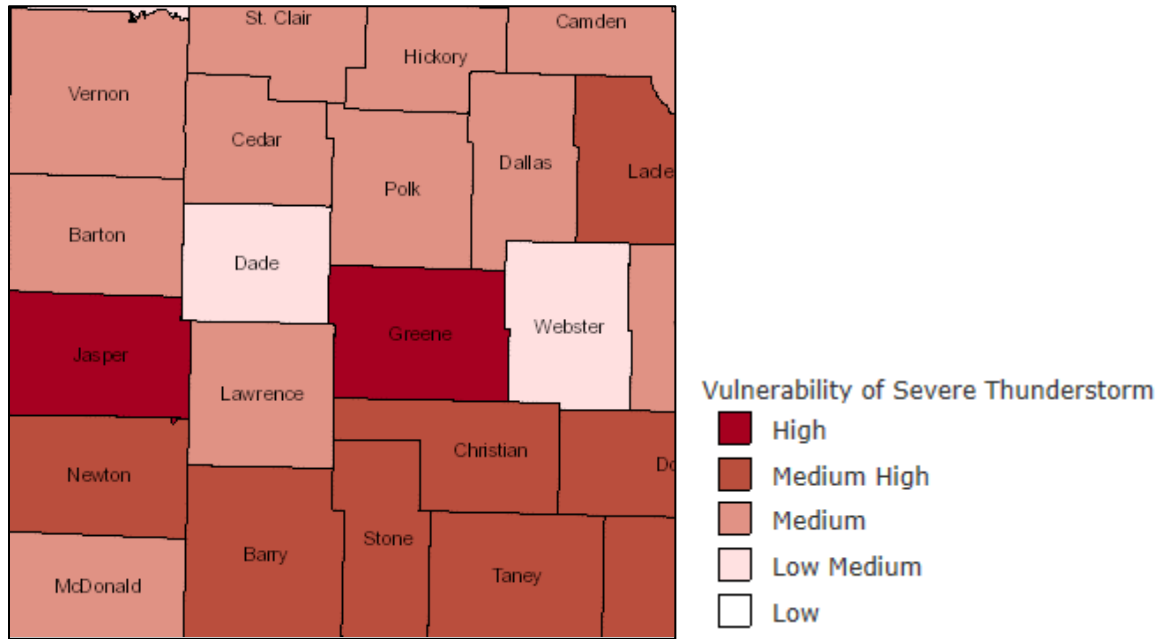


Average Annual Lightning Events



3 - RISK ASSESSMENT

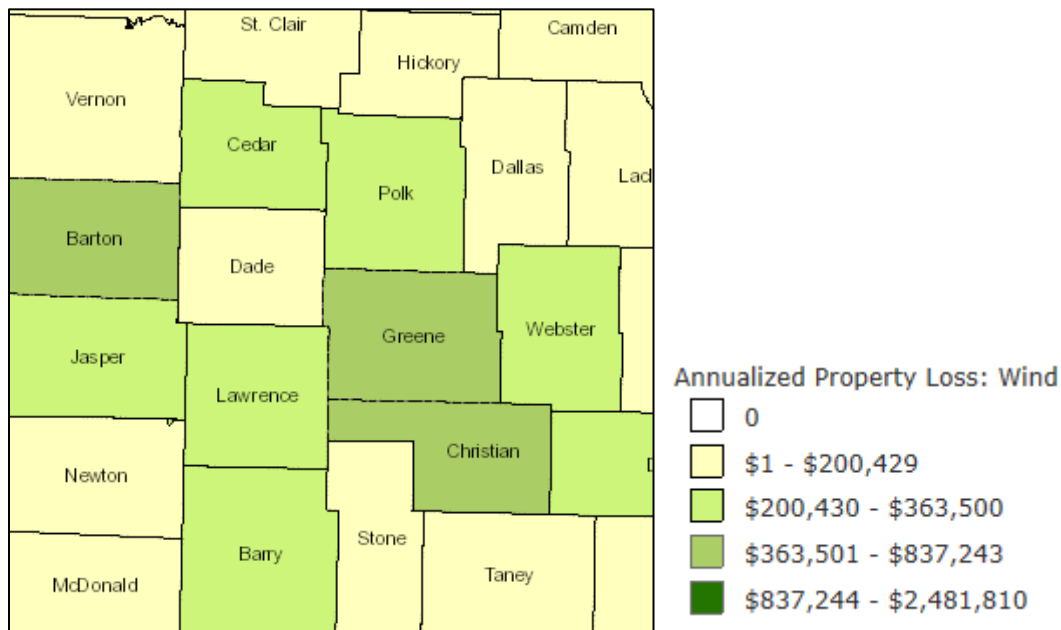
Overall Vulnerability of Severe Thunderstorms



Potential Losses to Existing Development

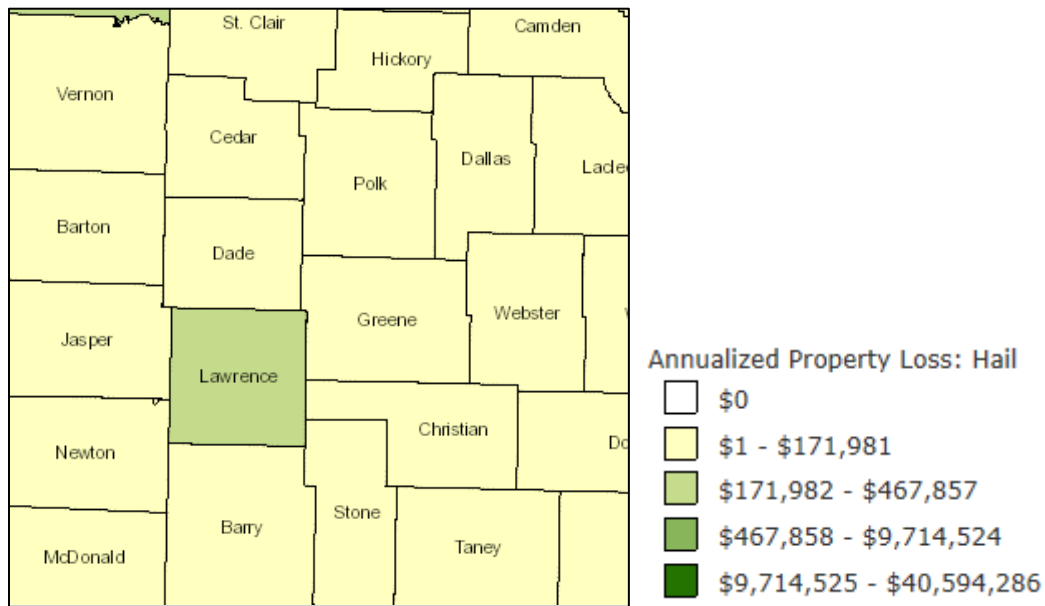
In the past, severe storms have had a history of causing damage. In 2008, a severe storm came through Greene County causing about \$300,000 in damages. In 2011, golf ball-sized hail covered the ground and destroyed \$10,000 in crops at a local orchard. Damaging winds have caused over \$17 million in damage between 2008-2018. Between the years 2008-2018, lightning has caused over \$700,000 in damage. Greene County has a lot of property that is vulnerable to severe storms.

Annualized Property Loss: Wind

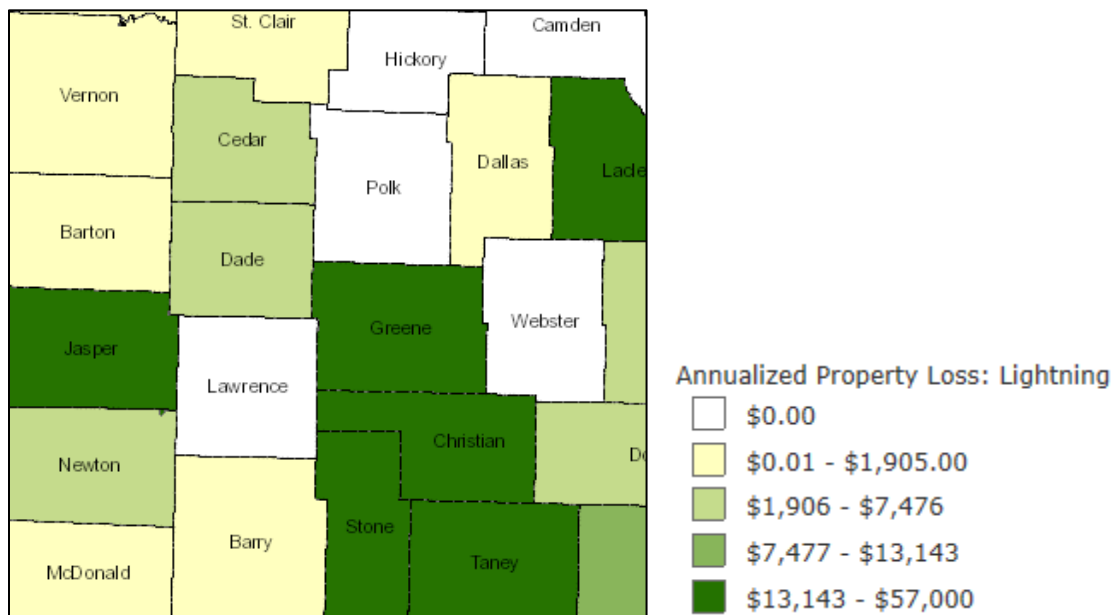


3 - RISK ASSESSMENT

Annualized Property Loss: Hail



Annualized Property Loss: Lightning



Previous and Future Development

Greene County has seen consistent population growth over the last 10 years. Over the next 10 years, the population will continue to grow and businesses will continue to develop across the area. Additional development results in the exposure of more households and businesses to damages from severe thunderstorms, high winds, lightning and hail.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Severe Thunderstorms

SUBJECT	DETRIMENTAL IMPACTS
Public	Although damaging winds can cause injury or even death, Greene County has never experienced any of these consequences. Damaging winds can create unsafe situation such as downed power lines and falling debris from trees. There is little to no impact on public safety in Greene County due to hail. There is a significant safety concern during lightning. Injuries and minimal number of deaths have occurred.
Responders	Safety and functionality of responders can be impacted by road conditions (fallen trees or power lines) or from power failure. However, damaging wind has not caused these types of conditions to interfere with the safety and functionality of responders in Greene County. There is little to no impact of the safety and functionality in Greene County due to hail. If lightning is still present at time of response, there is a potential for safety issues. There should be no impact to response functions.
Continuity of Operations	Severe thunderstorms have caused little to no impact on service operations.
Property, Facilities, and Infrastructure	<p>Damaging wind: Damaging winds cause many property damages. Trees and utility poles have been knocked over onto cars or even houses. Roofs have also been damaged from these strong winds. These damages are typically minor isolated instances, but frequently in Greene County. Damaging winds create the most problems in taking down utility services and power to the community. This can impact all other critical infrastructure sectors. Facility damages occur frequently and typically have several instances of significant damage. As discussed in the damaging wind vulnerability, schools buildings, stores, and other entities have had significant damage from damaging winds.</p> <p>Hail: hail causes minor isolated instances of property damage in Greene County. Hail has also has little to no impact on critical infrastructure and facility damage.</p>
Environment	Damaging winds have no affected the environment in terms of the floodplains or waste, but have downed numerous trees. Hail and lightning has caused little to no impact on the environment.
Economic Condition of Jurisdiction	The economy is impacted by damaging wind when power is no longer available. This can cause problems for businesses and their operations, and power also causes an economic impact on utility services. Lightning and hail have causes little to no impact on Greene County's economy.
Public Confidence in the Jurisdiction's Governance	Severe thunderstorms have little to no impact on the public confidence in governance.

*For more details on Consequence Analysis, refer to Appendix B.

3 - RISK ASSESSMENT

Hazard Summary by Jurisdiction

Severe thunderstorm events are area-wide hazards. There are some demographics that can cause higher losses in one jurisdiction as compared to another. The City of Ash Grove has 248 homes that were built in 1939 or earlier. Older homes are more at risk in suffering damage from high winds and hail than newer homes are. In Walnut Grove, over 18% of their total housing units are also homes that were built in 1939 or earlier putting them at higher risk for damage as well.

PROBLEM STATEMENT

Severe thunderstorms carry multiple risks for Greene County including damages and injury from high winds, hail and lightning. The entire planning area suffers from many severe thunderstorms year round. In the past, severe thunderstorms have been known to cause millions of dollars' worth of damage. The National Centers for Environmental Information (NCEI) Storm Events Database notes over 150 storm events between the years 2008-2018 causing over \$18 million in damages. NASA and meteorologists predict that in the future severe thunderstorms could become more popular nation-wide. Possible mitigation solutions include review of local ordinance and building codes to address high winds and/or construction techniques to include structural bracing, straps and clips, or anchor bolts. Several participating jurisdictions created mitigation projects for severe storms, they are included in the Mitigation Strategy section of the Mitigation Plan.

3 - RISK ASSESSMENT

3.4.7 Natural Hazard: Severe Winter Weather

HAZARD PROFILE

Hazard Description

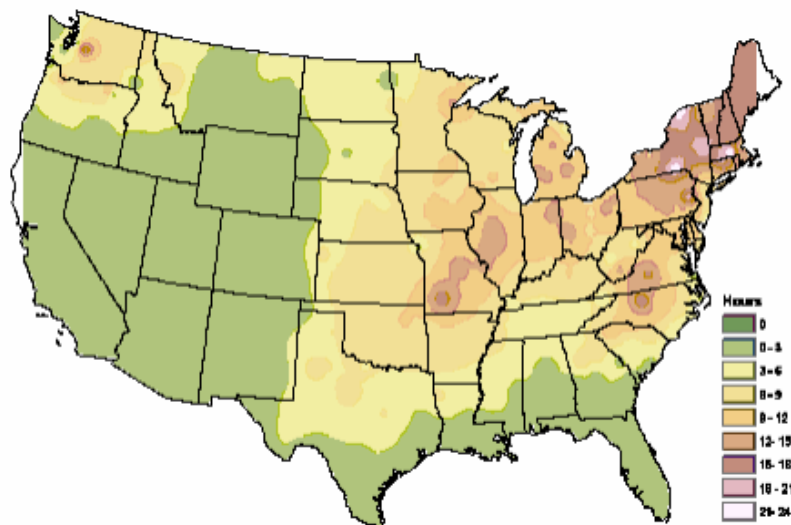
A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. The National Weather Service (NWS) describes different types of winter storm events as follows.

- **Blizzard**- winds of 35 miles per hour or more with snow and blowing snow reducing visibility to less than ¼ mile for at least three hours.
- **Blowing Snow**- Wind driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls**-Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- **Snow Showers**- Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Freezing Rain**- Measurable rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Most freezing-rain events are short lived and occurs near sunrise between the months of December and March.
- **Sleet**- Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects.

Geographic Location

The entire county is vulnerable to heavy snow, ice, extreme cold temperatures and freezing rain.

NWS Statewide Average Number of Hours per Year with Freezing Rain



Greene County experiences 18-21 hours of freezing rain per year.

3 - RISK ASSESSMENT

Source: American Meteorological Society

Strength/Magnitude/Extent

Severe winter storms include heavy snowfall, ice, and strong winds which can push the wind chill well below zero degrees in the planning area.

For severe weather conditions, the National Weather Service issues some or all of the following products as conditions warrant across the State of Missouri. National Weather Service local offices in Missouri may collaborate with local partners to determine when an alert should be issued for a local area.

- Winter Weather Advisory- Winter weather conditions are expected to cause significant inconveniences and may be hazardous. If caution is exercised, these situations should not become life threatening. Often the greatest hazard is to motorists.
- Winter Storm Watch-Severe winter conditions, such as heavy snow and/or ice are possible within the next day or two.
- Winter Storm Warning- Severe winter conditions have begun or are about to begin.
- Blizzard Warning-Snow and strong winds will combine to produce a blinding snow (near zero visibility), deep drifts, and life-threatening wind chill.
- Ice Storm Warning-Dangerous accumulations of ice are expected with generally over one quarter inch of ice on exposed surfaces. Travel is impacted, and widespread downed trees and power lines often result.
- Wind Chill Advisory- Combination of low temperatures and strong winds will result in wind chill readings of -20 degrees Fahrenheit or lower.
- Wind Chill Warning- Wind chill temperatures of -35 degrees Fahrenheit or lower are expected. This is a life-threatening situation.

Previous Occurrences

TYPE OF EVENT	INCLUSIVE DATE	NUMBER OF INJURIES	PROPERTY DAMAGES	CROP DAMAGES
Ice Storm	02/11/2008	0	0	0
Ice Storm	02/21/2008	0	0	0
Heavy Snow	03/04/2008	0	0	0
Winter Storm	01/26/2009	0	0	0
Winter Storm	01/28/2009	0	0	0
Winter Storm	03/20/2010	0	0	0
Blizzard	02/01/2011	0	\$40,000	0
Winter Storm	02/21/2013	0	0	0
Winter Storm	12/05/2013	0	0	0
Winter Storm	12/20/2013	0	0	0
Winter Storm	01/05/2014	0	0	0
Winter Storm	03/002/2014	0	0	0
Winter Storm	02/15/2015	0	0	0
Winter Storm	02/20/2012	0	0	0
Winter Storm	02/28/2015	0	0	0
Winter Weather	01/19/2016	0	\$500,000	0
Winter Weather	12/16/2016	0	\$100,000	0
Ice Storm	01/13/2017	0	\$50,000	0
Winter Weather	02/10/2018	0	0	0
Frost/Freeze	04/06/2018	0	0	0

3 - RISK ASSESSMENT

Source: National Centers for Environmental Information (NCEI) Storm Data

January 2007

The worst natural disaster to ever impact Greene County, including the city of Springfield, occurred from major ice accumulations in January of 2007. Most of the ice accumulations occurred on Friday night January 12th, however, two other episodes of ice accumulations occurred on the 13th and 14th. Power outages and catastrophic tree damage were the main impacts resulting from this historic event. Power outages occurred for over three weeks in many areas. Several indirect fatalities due to the extreme elements were documented. Carbon monoxide poisoning occurred within a few homes as gas generators were being used in garages, which allowed for dangerous levels of carbon monoxide to seep into houses. Damages including debris removal were estimated at 121.69 million.

Presidential Disaster Declarations for Winter Storms - Greene County

DISASTER NUMBER	INCIDENT PERIOD	TYPE OF DISASTER	INDIVIDUAL ASSISTANCE	PUBLIC ASSISTANCE
EM-3303	Jan 26, 2009- Jan 28, 2009	Severe Winter Storms	\$0	\$0
DR-1748	Feb 10, 2008-Feb 14, 2008	Severe Winter Storms	\$0	\$10,068,998.77
EM-3281	Dec 08,2007-Dec 15, 2007	Severe Winter Storms	\$0	\$0
DR-1676	Jan 12, 2007-Jan 22, 2007	Severe Winter Storms and Flooding	\$0	\$106,468,427.80
DR-1403	Jan 29, 2002-Feb 13, 2002	Ice Storm	\$0	\$43,824,367.31

Source: FEMA Disaster Decelerations

Winter storms, cold, frost and freeze take a toll on crop production in the planning area. The table below shows the USDA’s Risk Management Agency payments for insured crop losses in the planning area as a result of cold conditions and snow between 2008-2018.

Crop Insurance Claims Paid in Greene County as a Result of Cold Conditions and Snow-2008-2018

CROP YEAR	CROP NAME	CAUSE OF LOSS DESCRIPTION	INSURANCE PAID (\$)
2018	Wheat	Cold Wet Weather	\$501.00
2018	Corn	Cold Winter	\$1359.00
2018	Soybeans	Cold Wet Weather	\$15,249.00
2016	Soybeans	Cold Wet Weather	\$220.00
2012	Corn	Frost	\$818.00
2011	Corn	Cold Wet Weather	\$1442.00
Total			\$19,589

Source: USDA Risk Management Agency, <https://rma.usda.gov/data/cause>

3 - RISK ASSESSMENT

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is highly likely for severe winter weather to impact Greene County in the next year. For a full description of the CPRI for severe winter storms, refer to Appendix B.

Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, as both temperature and precipitation increase during the winter months, freezing rain will be more likely. Additional wintertime precipitations in any form will contribute to saturation and increase the risk and/or severity of spring flooding. A greater proportion of wintertime precipitation may fall as rain rather than snow. The Missouri State Hazard Mitigation Plan also mentions that shorter overall winter season and fewer days of extreme cold may have both positive and negative indirect impacts. Warmer winter temperatures may result in changing distributions of native plant and animal species. Warmer winter temperatures will also result in a reduction of lake ice cover. Reduced lake ice cover impacts aquatic ecosystem by raising water temperatures.

VULNERABILITY

Vulnerability Overview

Heavy snow can bring a community to a standstill by inhibiting transportation (in whiteout conditions), weighing down utilities lines, and by causing structural collapse in buildings not designed to withstand the weight of the snow. Repair and snow removal costs can be significant. Ice buildup can collapse utility lines and communication towers, as well as make transportation difficult and hazardous. Ice can also become a problem on roadways if the air temperature is high enough that precipitation falls as freezing rain rather than snow.

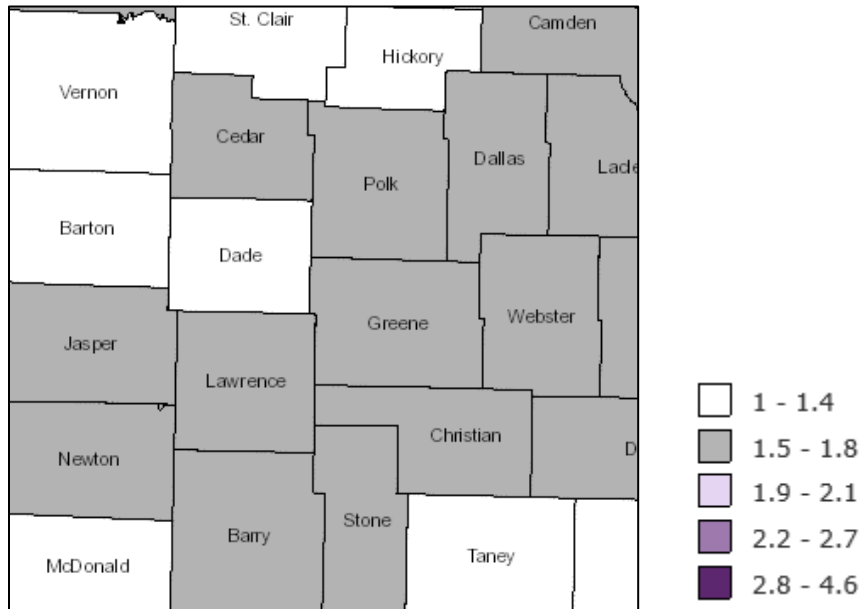
Buildings with overhanging tree limbs are more vulnerable to damage during winter storms when limbs fall. Businesses experience loss of income as a result of closure during power outages. In general, heavy winter storms increase wear and tear on roadways though the cost of such damages is difficult to determine. Businesses can experience loss of income as a result of closure during winter storms.

Overhead power lines and infrastructure are also vulnerable to damages from winter storms. In particular ice accumulation during winter storm events cause damage to power lines due to the ice weight on the lines and equipment. Damages also occur to lines and equipment from falling trees and tree limbs weighted down by ice. Potential losses could include cost of repair or replacement of damaged facilities, and lost economic opportunities for businesses.

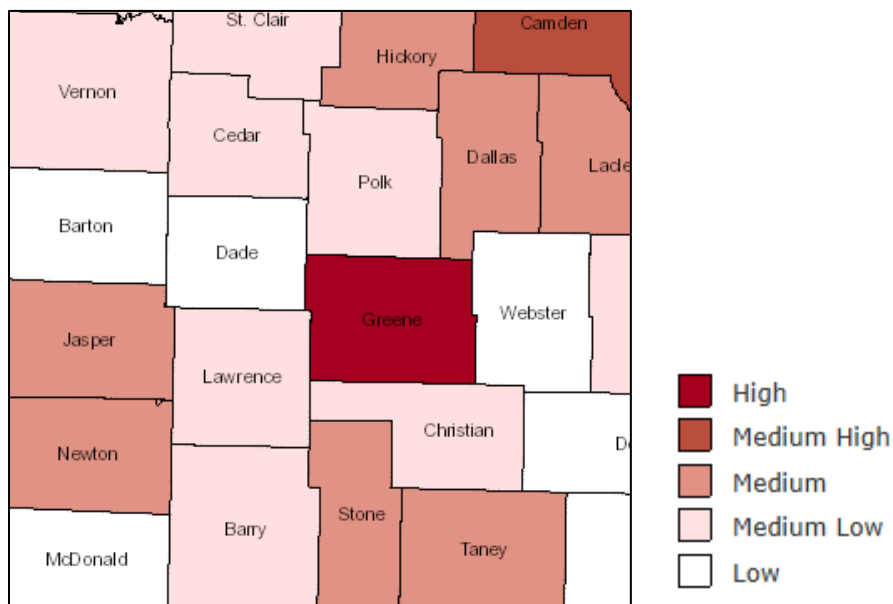
Secondary effects from loss of power could include burst water pipes in homes without electricity during winter storms. Public safety hazards include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables associated with this hazards. Standard values for loss of service for utilities reported in FEMA's 2009 BCA Reference Guide, the economic impact as a result of loss of power is \$126 per person per day of lost service.

3 - RISK ASSESSMENT

Average Annual Occurrence of Severe Winter Weather Events



Vulnerability Rating

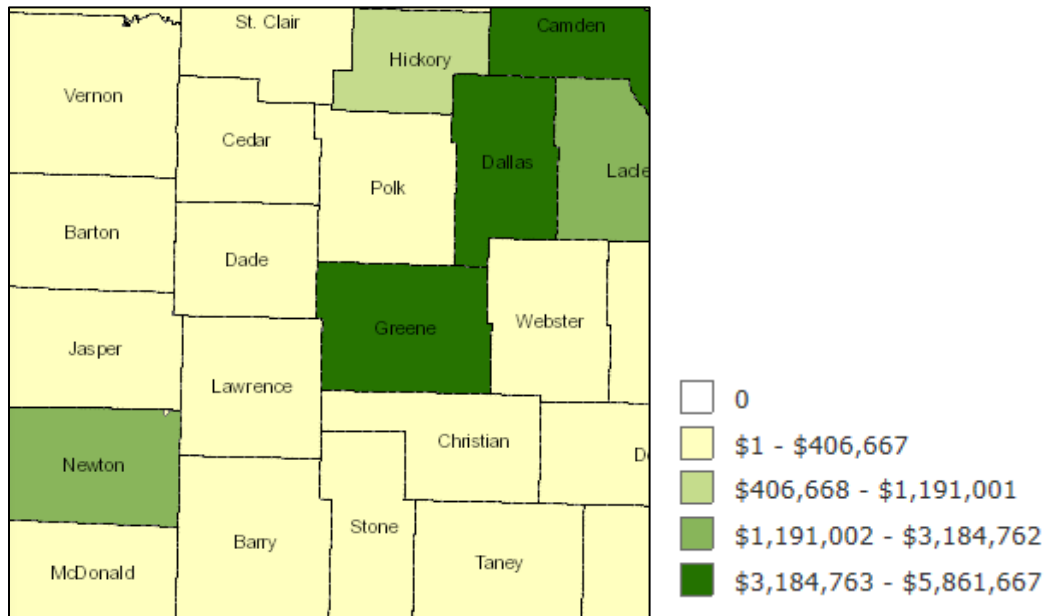


3 - RISK ASSESSMENT

Potential Losses to Existing Development

The Ice Storm that took place in January 2007 caused an estimated 121.69 million dollars in damage including debris removal. Greene County has received an estimated \$160,361,793 in public assistance from presidential disaster declarations. Severe winter weather has had history of causing large amounts of damage

Annualized Property Loss



Previous and Future Development

Greene County has seen consistent population growth over the last 10 years. Over the next 10 years, the population will continue to grow and businesses will continue to develop across the area. Additional development results in the exposure of more households and businesses to damages from severe winter weather including both ice and snow. All structures and populations are at risk for experiencing damages from winter storms including government buildings and schools.

3 - RISK ASSESSMENT

EMAP Consequences Analysis

Impact Analysis: Severe Winter Weather

SUBJECT	DETRIMENTAL IMPACTS
Public	Indirect fatalities, illnesses and injuries occur including carbon monoxide poisoning (from generators) and health hazards such as frostbite and hypothermia. Roads create extremely dangerous driving hazards that cause serious accidents.
Responders	Potential life safety issues are present to responders. Response function will also be severely impacted. This is not only from transportation hazards, but also from overwhelming calls.
Continuity of Operations	Delivery of services level of impact will heavily depend on the transportation and communication infrastructure status. Ice roads will create delays from almost all functions, and even suspension of some services.
Property, Facilities, and Infrastructure	Ice and snow causes multiple widespread property damages. There have been over 100 million dollars in damages since 1996. Houses and vehicles are damaged from the weather as well as the debris from fallen tree limbs, power lines, and other debris. Widespread power outages, downed telephone and cable lines as well as communication towers create damages to transportation, energy and other communication sectors. Structure damages to facilities can be minor or significant depending on the incident.
Environment	In the 2007 Ice Storm, there was catastrophic tree damage. Although this severity is not typically, there are usually multiple instances of significant damage.
Economic Condition of Jurisdiction	Damages and cost of debris removal are very costly. Businesses may have to shut down for weeks during the incident, and then once it is over, there may be a need for restoration.
Public Confidence in the Jurisdiction's Governance	The community relies on the government to begin responding to the event as soon as it begins (clearing roads, setting up shelters, etc.) If these types of tasks are not done well, there may be push back from the community.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

Severe winter weather is a countywide risk that could potentially affect every jurisdiction in the planning area. Buildings with large amounts of assets could see more damage than others. Jurisdictions that have larger amounts of mobile home parks, like Springfield, can also see more damage from severe winter storms. Buildings that have occupancy may also be more at risk for seeing larger amounts of damage.

3 - RISK ASSESSMENT

PROBLEM STATEMENT

Severe winter storms can produce large amounts of damage across the entire planning area. In the past, winter storms have proved just how devastating damages can be. Severe winter storms can bring down power lines, trees, and communication cables and towers. Power outages create risk for fire as home occupants seek use of alternative fuel sources to produce heat. Power outages can also generate health risks if people do not have alternative ways to keep warm. Severe winter weather can also create a huge loss agriculture and crops. Severe winter storms is a large hazard for Greene County and can cause a huge impact to the planning community. There are several mitigation solutions that help with severe winter weather including the purchasing of generators, creation of shelters in the planning area, burying power lines to prevent power outages and education. Many participating jurisdictions created projects for the purchasing of generators to help with all severe storms. These projects are located in the Mitigation Strategy section of the Mitigation Plan.

3 - RISK ASSESSMENT

3.4.8 Natural Hazard: Tornado

HAZARD PROFILE

Hazard Description

Essentially, tornadoes are a vortex storm with two components of winds. The first is the rotational winds that can measure up to 500 miles per hour, and the second is an uplifting current of great strength. The dynamic strength of both these currents can cause vacuums that can overpressure structures from the inside.



Although tornadoes have been documented in all 50 states, most of them occur in the central United States. The unique geography of the central United States allows for the development of thunderstorms that spawn tornadoes. The jet stream, which is a high-velocity stream of air, determines which area of the central United States will be prone to tornado development. The jet stream normally separates the cold air of the north from the warm air of the south. During the winter, the jet stream flows west to east from Texas to the Carolina coast. As the sun “moves” north, so does the jet stream, which at summer solstice flows from Canada across Lake Superior to Maine. During its move

northward in the spring and its recession south during the fall, the jet stream crosses Missouri, causing the large thunderstorms that breed tornadoes.

Tornadoes spawn from the largest thunderstorms. The associated cumulonimbus clouds can reach heights of up to 55,000 feet above ground level and are commonly formed when Gulf air is warmed by solar heating. The moist, warm air is overridden by the dry cool air provided by the jet stream. This cold air pressed down on the warm air, preventing it from rising, but only temporarily. Soon, the warm air forces its way through the cool air and the cool air moves downward past the rising warm air. This air movement, along with the deflection of the earth’s surface, can cause the air masses to start rotating. This rotational movement around the location of the breakthrough forms a vortex, or funnel. If the newly created funnel stays in the sky, it is referred to as a funnel cloud. However, if it touches the ground, the funnel officially becomes a tornado.

A typical tornado can be described as a funnel-shaped cloud that is “anchored” to a cloud, usually cumulonimbus that is also in contact with the earth’s surface. This contact on average lasts 30 minutes and covers an average distance of 15 miles. The width of the tornado (and its path of destruction) is usually about 300 yards. However, tornadoes can stay on the ground for upward of 300 miles and can be up to a mile wide. The National Weather Service, in reviewing tornadoes occurring in Missouri between 1950 and 1996, calculated the mean path length at 2.27 miles and the mean path area at 0.14 square mile.

The average forward speed of a tornado is 30 miles per hour but may vary from nearly stationary to 70 miles per hour. The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Tornadoes are most likely to occur in the afternoon and evening, but have been known to occur at all hours of the day and night.

3 - RISK ASSESSMENT

Geographic Location

Tornadoes can take place at any location in the planning area.

Strength/Magnitude/Extent

Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour and damage paths can be more than one mile wide and 50 miles long. Tornadoes have been known to lift and move object weighting more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes also can generate a tremendous amount of flying debris or “missiles,” which often become airborne shrapnel that causes additional damage. If wind speeds are high enough, missiles can be thrown at a building with enough force to penetrate windows, roofs, and walls. However, the less spectacular damage is much more common.

Tornado magnitude is classified according to the EF-Scale (Enhanced Fujita Scale). The EF-Scale attempts to rank tornadoes according to wind speed based on the damage caused. This update to the original F Scale was implemented in the U.S. on February 2, 2007. The table below will explain the different scales.

Enhanced F-Scale for Tornado Damage

FUJITA SCALE			Derived EF Scale		Operational EF Scale	
F Number	Fastest ¼ mile (MPH)	3 Second Gust (MPH)	EF Number	3 Second Gust (MPH)	EF Number	3 Second Gust (MPH)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Source: National Weather Service, www.spc.noaa.gov/faq/tornado/ef-scale.html

The wind speeds for the EF scale and damage descriptions are based on information on the NOAA Storm Prediction Center as listed in the table below. The damage descriptions are summaries. For the actual EF scale it is necessary to look up the damage indicator (type of structure damaged) and refer to the degrees of damage associated with that indicator. Information on the Enhanced Fujita Scale’s damage indicators and degrees of damage is located online at www.spc.noaa.gov/efscale/ef-scale.html.

3 - RISK ASSESSMENT

Enhanced Fujita Scale with Potential Damage

SCALE	WIND SPEED	RELATIVE FREQUENCY	POTENTIAL DAMAGE
EF0	65-85	53.5%	Lights. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e. those that remain in open fields) are always rated EFO)
EF1	86-110	31.6%	Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	10.7%	Considerable. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some.
EF4	166-200	.70%	Devastating. Well-constructed houses and whole frame houses completely levelled; cars thrown and small missiles generated.
EF5	>200	<.1%	Explosive. Strong frame houses levelled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur.

Source: NOAA Storm Prediction Center, <http://www.spc.noaa.gov/efscale/ef-scale.html>

Enhanced weather forecasting has provided the ability to predict severe weather likely to produce tornadoes days in advance. Tornado watches can be delivered to those in the path of these storms several hours in advance. Lead time for actual tornado warnings is about 30 minutes. Tornadoes have been known to change paths very rapidly, thus limiting the time in which to take shelter. Tornadoes may not be visible on the ground if they occur after sundown or due to blowing dust or driving rain and hail.

Previous Occurrences

There are limitations to the use of NCEI tornado data that must be noted. For example, one tornado may contain multiple segments as it moved geographically. A tornado that crosses a county line or state line is considered a separate segment for the purposed of reporting to the NCEI. Also, a tornado that lifts off the ground for less than 5 minutes or 2.5 miles is considered a separate segment. If the tornado lifts off the ground for greater than 5 minutes or 2.5 miles, it is considered a separate tornado. Tornadoes reported in Storm Data and the Storm Events Database are in segments.

3 - RISK ASSESSMENT

NCEI Reported Tornado Events-1950-2018

LOCATION	DATE	EF RATING	DEATHS	INJURIES	PROPERTY DAMAGES
Greene County	08/08/1950	F1	0	0	\$250
Greene County	07/23/1955	F1	0	0	\$250
Greene County	02/24/1956	F0	0	0	\$250
Greene County	03/12/1961	F1	0	1	\$2,500
Greene County	03/22/1966	F1	0	0	\$2,500
Greene County	04/23/1967	F1	0	0	\$25,000
Greene County	07/28/1967	F1	0	0	\$2,500
Greene County	12/14/1971	F2	1	22	\$2,500,000
Greene County	09/10/1975	F2	0	5	\$2,500,000
Greene County	12/24/1982	F2	0	1	\$2,500,000
Greene County	04/29/1983	F2	0	3	\$2,500,000
Greene County	04/29/1983	F3	1	19	\$25,000,000
Greene County	04/30/1983	F1	0	0	\$0
Greene County	10/18/1984	F1	0	0	\$2,500
Greene County	11/15/1988	F1	0	0	\$25,000,000
Greene County	05/22/1989	F2	0	0	\$250,000
Greene County	05/20/1990	F2	0	0	\$0
Greene County	11/29/1991	F4	2	64	\$25,000,000
Walnut Grove	04/26/1994	F1	0	0	\$50,000
Springfield	05/27/1995	F1	0	0	\$300,000
Springfield	06/26/2001	F0	0	0	\$0
Springfield	10/10/2001	F1	0	5	\$250,000
Battlefield	05/04/2003	F3	1	12	\$14,700,000
Battlefield	03/12/2006	F2	0	4	\$650,000
Ash Grove	05/03/2006	F0	0	0	\$0
Springfield	10/17/2007	EF1	0	0	\$150,000
Republic	01/07/2008	EF2	0	0	\$2,000,000
Greene County	01/07/2008	EF3	1	0	\$1,000,000
Greene County	01/07/2008	EF2	0	0	\$1,000,000
Springfield	01/08/2008	EF1	0	0	\$50,000
Springfield	06/19/2008	EF1	0	0	\$150,000
Battlefield	02/10/2009	EF1	0	0	\$350,000
Republic	05/08/2009	EF1	0	0	\$1,000,000
Springfield	05/08/2009	EF1	0	0	\$200,000
Ebenezer	05/08/2009	EFO	0	0	\$100,000
Greene County	06/18/2011	EF1	0	0	\$0
Ebenezer	06/18/2011	EFO	0	0	\$30,000
Willard	10/13/2012	EFO	0	0	\$25,000
Springfield	07/21/2013	EFO	0	0	\$100,000
Ash Grove	10/13/2014	EFO	0	0	\$0
Battlefield	04/27/2016	EFO	0	0	\$100,000
Greene County	05/19/2017	EFO	0	0	\$100,000
Greene County	05/03/2018	EFO	0	0	\$100,000
Republic	12/01/2018	EF1	0	0	\$175,000
Total			6	136	\$110,296,000

Source: NCEI Storm Data

3 - RISK ASSESSMENT

January 2008

On January 7, 2008, the Missouri Ozarks experienced an unusually early outbreak of severe weather. It began in the afternoon on January 7, 2008, and continued into the early morning hours on January 8, 2008. Several supercell thunderstorms spawned at least 33 tornadoes that caused significant damage to homes, trees and power lines. The supercell thunderstorms were followed by another violent squall line that produced damaging straight line winds in excess of 70 mph. The storms also produced torrential rainfall and flash flooding. This event produced approximately \$4 million in property damages and caused one fatality.

June 2008

On June 19, 2008 where a tornadic supercell caused roof damage to Harry Cooper Supply, an industrial building in Springfield. A supercell thunderstorm tracked north to south down the Highway 65 corridor producing damaging winds and hail the size of baseballs. As the storm moved into the area, an EF1 tornado developed and caused damage to furniture stores on the east side of town. Further, downdraft winds from a tornadic supercell caused major tree and power line damage in a neighborhood east of Springfield.

February 2009

Springfield experienced an EF1 tornado on February 10, 2009 that touched down near the southern end of the city. Approximately two dozen houses and businesses were damaged, and many trees and power lines were knocked over causing nearly 250 residences to go without power.

May 2009

On May 8th 2009, confirmed tornadoes touched down in Willard, Ebenezer and Republic. The roof of Fair Grove High School was torn off. Bleachers near the football field were completely demolished. The new baseball field was also destroyed. Fire Station 3 in Ebenezer was completely demolished, ruining equipment inside. This storm received a Presidential Disaster Declaration. Total damage assessments are estimated at \$4.6 million.

June 2011

A National Weather Service Survey Team determined that an EF-1 tornado with winds estimated of 80-90 mph touched down about four miles northeast of Everton and continued into Greene County. The tornado had a path width of 100-200 yards and continued for 9 miles snapping and uprooting several trees after entering Greene County just west of the Sac River. The tornado had a total path length of about 11 miles before lifting.

July 2013

A National Weather Service Storm Survey indicated that an EF-0 tornado touched down near the intersection of East Cairo Street and South Pickwick Avenue. The tornado traveled east along East Cairo Street and lifted at the intersection of East Cairo Street and Glenestone. The tornado caused several large tree branches to be blown down and damage to roofs to several houses along with several power lines to be blown down. Several windows to homes and businesses were broken or blown out. At least two businesses had roof and window damage. Winds were estimated around 60 mph with a path width of 50 yards and about half a mile length.

December 2018

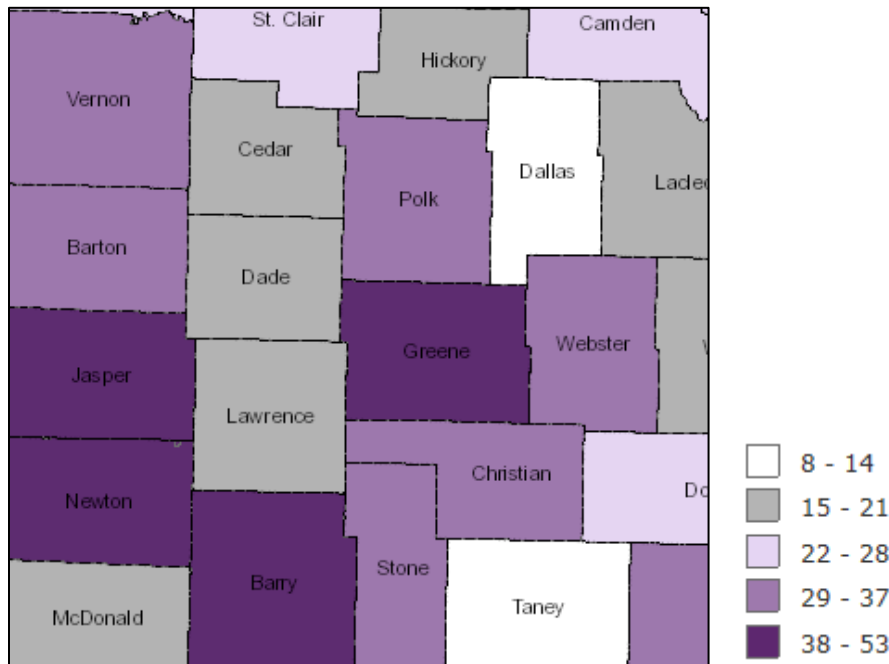
An EF-1 tornado developed approximately 3 miles west of Republic and tracked northeast and dissipated within the city limits of Republic. Two large barns were destroyed and numerous trees were uprooted. Several homes sustained minor roof damage.

3 - RISK ASSESSMENT

April-May 2019

The spring of 2019 consisted of major flooding and multiple tornadoes impacting different areas of Greene County. April 30th there were 3 confirmed tornadoes, 2 in Willard and 1 in Rogersville. The Rogersville tornado consisted of major damage, destroying 3 homes and damaging 103 more. There were no fatalities in Greene County with this storm. The same night a tornado came through Christian County, affecting many homes. Later in May, another confirmed tornado came through a portion of Greene County. The tornado did not do major damage and was only in the county for a short time.

Number of Tornadoes



In the last 10 years, there have been no insurance claim payouts reported to the USDA because of tornado damage.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is highly likely for a tornado to occur within the next year in Greene County. For a full description of the CPRI for tornadoes, refer to Appendix B.

Changing Future Conditions

According to the Missouri State Hazard Mitigation Plan, scientists do not know how the frequency and severity of tornadoes will change. Research published in 2015 suggests that changes in heat and moisture content in the atmosphere, brought on by a warming world, could be playing a role in making tornado outbreaks more common and severe in the U.S. The research concluded that the number of days with large outbreaks have been increasing since the 1950s and that densely concentrated tornado outbreaks are on the rise. It is notable that the research shows that the area of tornado activity is not expanding, but rather the areas already subject to tornado activity are seeing more densely packed tornadoes.

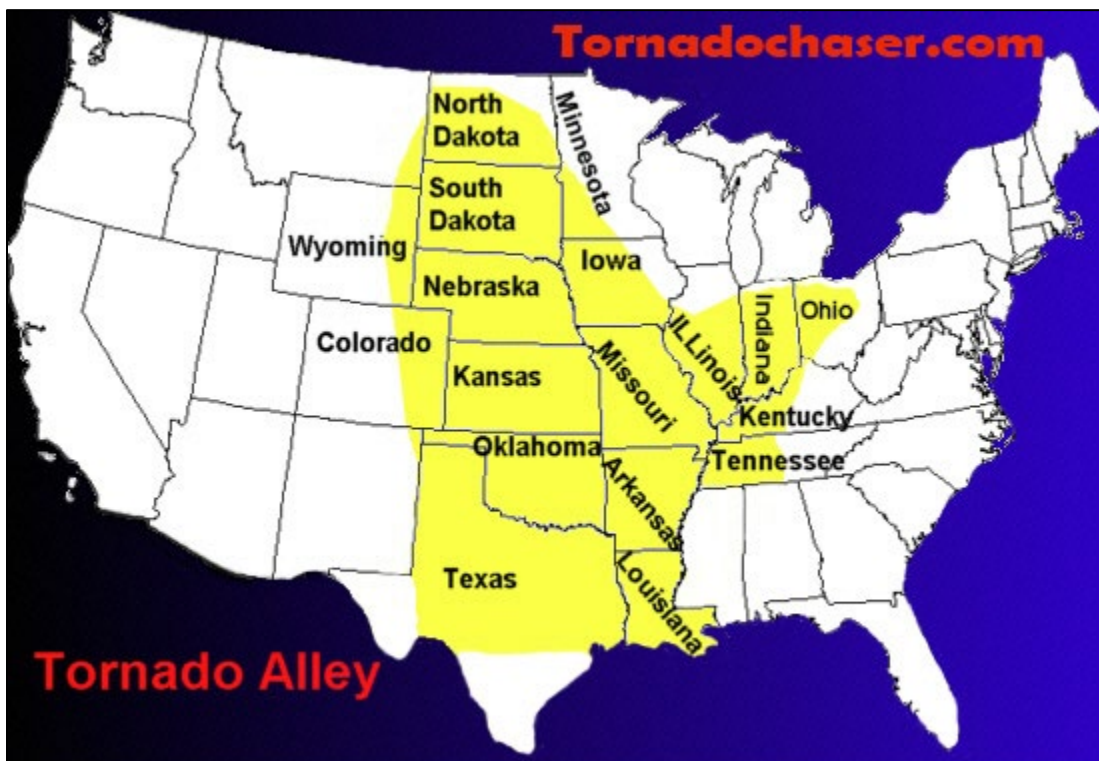
3 - RISK ASSESSMENT

VULNERABILITY

Vulnerability Overview

Tornadoes are extremely dangerous storms that can injure or kill people. Tornadoes that touch down, typically cause thousands or even millions of dollars' worth of damage. Over the years, Greene County has experienced a lot of different tornadoes that have caused millions of dollars' worth of damage. Greene County is located in the region of the U.S. with high frequency of dangerous and destructive tornadoes referred to as "Tornado Alley". The map below illustrates the areas where dangerous tornadoes have historically occurred.

Tornado Alley in the U.S.

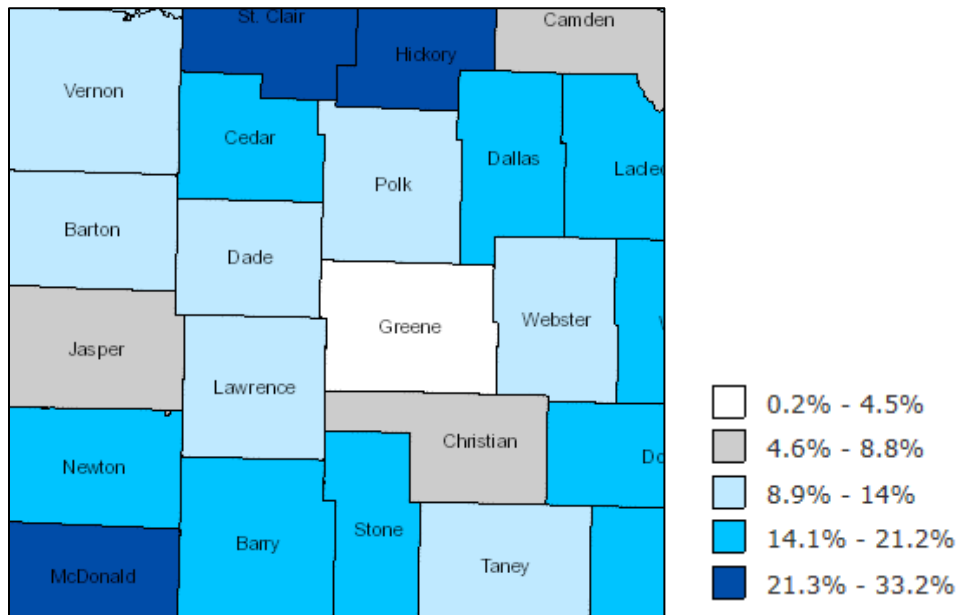


Source: <http://www.tornadochaser.net/tornalley.html>

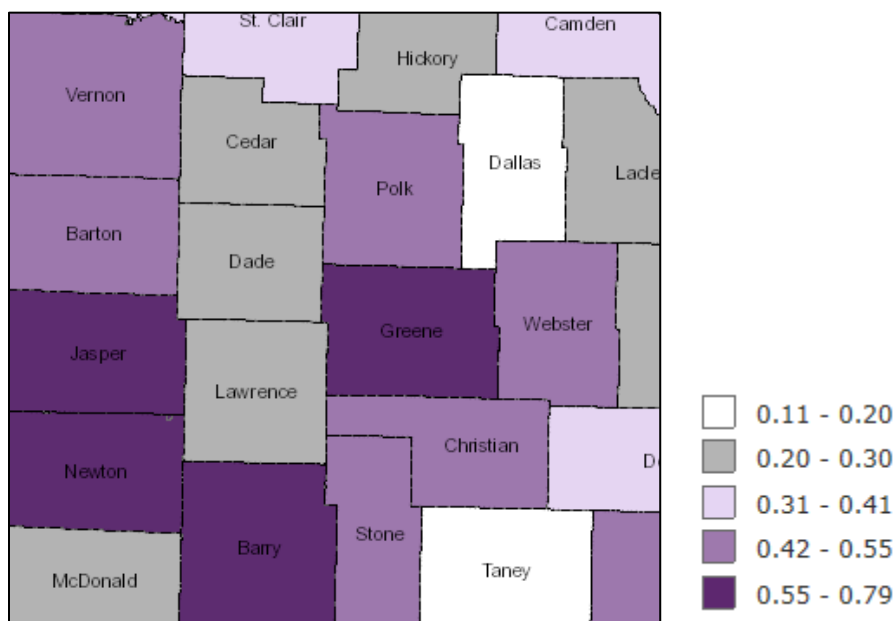
All of the planning area is at risk for experiencing effects from a tornado touch down. More vulnerable populations are ones who live in mobile homes. In Greene County, we have a relatively low percentage of people who are living in mobile homes, but we still have thousands of people more at risk.

3 - RISK ASSESSMENT

Percentage of Mobile Homes-2015

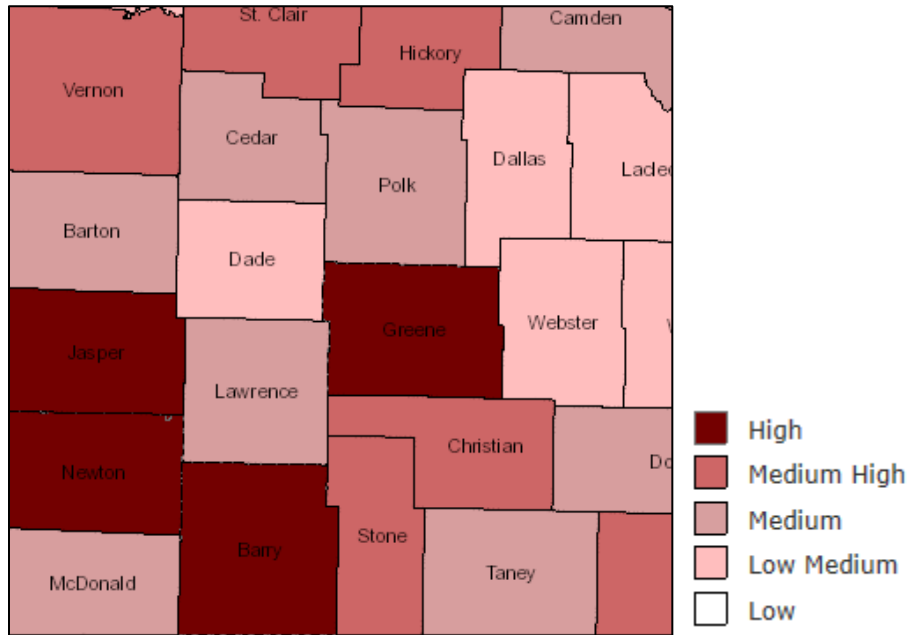


Average Annual Occurrence for Tornado



3 - RISK ASSESSMENT

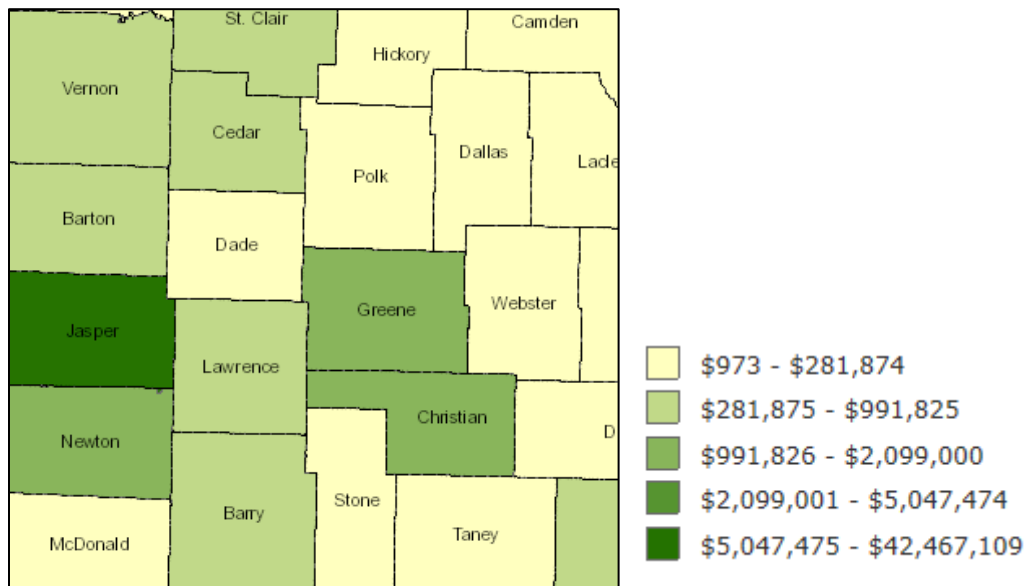
Tornado Hazard



Potential Losses to Existing Development

Tornadoes have been known to create large amounts of damage to homes, businesses, agriculture, power lines, trees, etc. Tornado damage is often times extensive and involves weeks, sometimes months' worth of clean up. One of the biggest issues with tornado damage is debris clean up. Debris can be spread for miles after a tornado touch down. Debris can also close down roads and make transportation of debris more difficult.

Annualized Property Loss



3 - RISK ASSESSMENT

Previous and Future Development

Greene County will continue to see an increase in population. As the population grows, so does that amount of houses that are being built. As houses and businesses grow in the planning area, so does the risk for experiencing large amounts of damage from tornadoes. Research is predicting that tornadoes are going to continue to increase as the climate changes. As the population grows, it is important that we remember how dangerous mobile home parks are to tornadoes and other high wind events.

EMAP Consequence Analysis

EMAP Impact Analysis: Tornadoes

SUBJECT	DETRIMENTAL IMPACTS
Public	Tornadoes in Greene County have caused injuries and death. There are widespread safety concerns associated with tornado incidents, and many times storms will produce more than 1 tornado, creating even more safety concerns.
Responders	Responders face potentially life-threatening safety issues, and response functions can be impacted depending on weather conditions and debris amount and make up.
Continuity of Operations	Delivery of services can be hampered across the jurisdiction due to infrastructure damages and overwhelming demand.
Property, Facilities, and Infrastructure	Tornadoes have caused widespread significant damages within Greene County. Many homes have been heavily damaged or completely destroyed due to multiple tornadoes that have passed through the county. Infrastructure is damaged through downed power lines, poles and communication towers. Transportation can also be affected through debris and downed trees that block roads. Facilities in Greene County have had widespread significant damages. Fair Grove High School, Glendale High School, and Harry Copper Supply industrial building, and other businesses experienced severe damage.
Environment	Minor isolated instances of environmental damages are found in a tornado incident in the form of fallen or damaged trees.
Economic Condition of Jurisdiction	The economic impact on Greene County can be major with widespread loss. Businesses may be destroyed or forced to make repairs before being operable again. This creates loss in the economy and for individuals.
Public Confidence in the Jurisdiction's Governance	There may be minor isolated instances of loss in public confidence if response and recovery operations are not executed quickly and effectively.

*For more details on Consequence Analysis, refer to Appendix B.

3 - RISK ASSESSMENT

Hazard Summary by Jurisdiction

Tornadoes are a hazard that the entire planning area is at risk for. There are some jurisdictions that could suffer more damage because of housing statistics and other vulnerabilities. The City of Ash Grove has a lot of older homes within the city limits. Older homes are more at risk for experiencing damages from high winds and tornadoes. 872 or 21.97% of Ash Grove homes were built in 1960 or before. 224 or 5.64% homes were built before 1939. The City of Walnut Grove also has a large amount of older homes. 145 or 50.69% of the homes within the city limits of Walnut Grove are built in 1960 or before. Jurisdictions that have adopted building codes may be less vulnerable to damages, but not all of our jurisdictions have done this.

In the past, some of our jurisdictions have been more prone to tornadoes than others. The City of Battlefield and City of Republic have experienced some larger tornadoes that have produced a lot of damage to the cities. Our jurisdictions that have seen repeat tornadoes are more vulnerable to experience damage than the jurisdictions that don't experience frequent tornadic storms.

PROBLEM STATEMENT

When a severe storm becomes tornadic, it puts the entire planning area at risk to suffer serious damages. Tornadoes can cause high winds, which can lead to roof damages, power outages, home uprooting, tree uprooting, etc. Tornadoes can cause catastrophic damage to property and injure or kill human and animal life. Tornado events are frequent in Greene County and with climate change tornadoes could become more frequent in the planning area. Greene County's population will continue to grow, putting more properties and people at risk for experiencing damages from tornadoes. The planning area community should be vigilant in preparing and mitigating against tornadic storms. Participating jurisdictions created many actions to help protect their communities from tornados. Many projects in the Mitigation Strategy Section of this plan include the construction of FEMA Safe Rooms or other tornado shelters and update or placement of storm warning sirens. Other mitigation options are education and drills.

3 - RISK ASSESSMENT

3.4.9 Natural Hazard: Wildfire

HAZARD PROFILE

Hazard Description

The fire incident types for wildfires include: 1) Natural vegetation fire, 2) Outside rubbish fire, 3) special outside fire, and 4) cultivated vegetation, crop fire.

The Forestry Division of the Missouri Department of Conservation (MDC) is responsible for protecting privately owned and state-owned forests and grasslands from wildfires. To accomplish this task, eight forestry regions have been established in Missouri for fire suppression. The Forestry Division works closely with volunteer fire departments and federal partners to assist with fire suppression activities. Currently, more than 900 rural fire departments in Missouri have mutual aid agreements with the Forestry Division to obtain assistance in wildfire protection if needed.



Most of Missouri fires occur during the spring season between February and May. The length and severity of wildland fires depend largely on weather conditions. Spring in Missouri is usually characterized by low humidity and high winds. These conditions result in higher fire danger. In addition, due to the recent lack of moisture throughout many areas of the state, conditions are likely to increase the risk of wildfires. Drought conditions can also hamper firefighting efforts, as decreasing water supplies may not prove adequate for firefighting. It is common for rural residents burn their garden spots, brush piles and other areas in the spring. Some landowners also believe it is necessary to burn their forests in the spring to promote grass growth, kill ticks, and reduce brush. Therefore, spring months are the most dangerous for wildfires. The second most critical period of the year is fall. Depending on the weather conditions, a sizeable number of fires may occur between mid-October and late November.

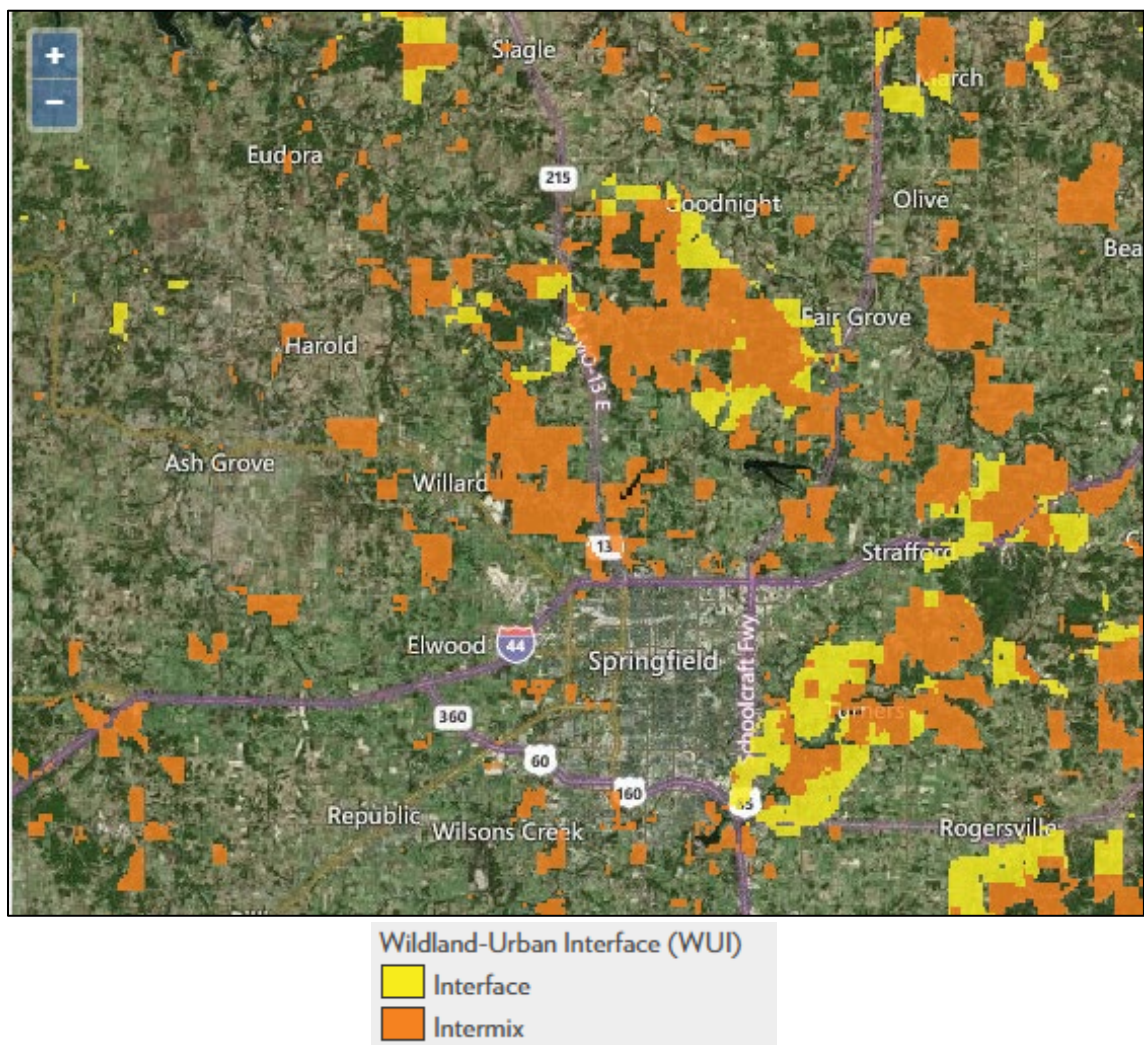
Geographic Location

Damages due to wildfire would be higher in communities with more Wildland Urban Interface (WUI) areas. WUI is the area where houses meet or intermingle with undeveloped wildland vegetation. The WUI is thus a focal area for human-environment conflicts, such as the destruction of home by wildfires, habitat fragmentation, introduction of exotic species, and biodiversity decline.

Within the WUI, there are two specific areas identified: 1) Interface and 2) Intermix. The interface areas are those areas that abut wildland vegetation and the intermix areas are those areas that intermingle with wildland areas.

3 - RISK ASSESSMENT

Wildland Urban Interface (WUI)



Communities in the planning area that are most at risk are highlighted orange and yellow. Those areas include Willard, Turners (unincorporated Greene County) Fair Grove, Strafford.

Strength/Magnitude/Extent

Wildfires damage the environment, killing some plants and occasionally animals. Firefighters have been injured or killed, and structures can be damaged or destroyed. The loss of plants can heighten the risk of soil erosion and landslides. Although Missouri wildfires are not the size and intensity of these in the Western United States, they could impact recreation and tourism in the near the fires.

Wildland fires in Missouri have been mostly a result of human activity rather than lightning or some other natural events. Wildfires in Missouri are usually surface fires, burning the dead leaves on the ground or dried grasses. They do sometimes “torch” or “crown” out in certain dense evergreen stands like eastern red cedar and shortleaf pine. However, Missouri does not have the extensive strands of evergreens found in the western US that fuel the large fire storms seen on television news stories.

3 - RISK ASSESSMENT

While very unusual, crown fires can and do occur in Missouri native hardwood forests during prolonged periods of drought combined with extreme heat, low relative humidity, and high wind. Tornadoes, high winds, wet snow and ice storms in recent years have placed a large amount of woody material on the forest floor that causes wildfires to burn hotter and longer. These conditions also make it more difficult for fire fighters to suppress fires safely.

Often wildfires in Missouri go unnoticed by the general public because the sensational fire behavior that captures the attention of television viewers is rare in the state. Yet, from the standpoint of destroying homes and other property, Missouri wildfires can be quite destructive.

Previous Occurrences

Wildfires-Greene County 2015-2018 with Greater than 2 Acre Burned

DISCOVERED DATE	STATION	CAUSE	ACRES BURNED
01/18/2015	Springfield Forestry	Debris	10
01/18/2015	Logan-Rogersville	Debris	10
01/21/2015	Ebenezer	Debris	10
01/23/2015	Strafford	Unknown	5
01/24/2015	Springfield Forestry	Debris	3
01/24/2015	Logan-Rogersville	Debris	3
02/02/2015	Fair Grove	Unknown	20
02/02/2015	Fair Grove	Equipment	10
02/10/2015	Walnut Grove	Unknown	5
02/12/2015	Fair Grove	Debris	6
03/7/2015	Walnut Grove	Debris	40
03/07/2015	Ebenezer	Unknown	10
03/08/2015	Walnut Grove	Debris	5
03/16/2015	Walnut Grove	Debris	5
03/16/2015	Fair Grove	Unknown	4
03/25/2015	Strafford	Miscellaneous	5
03/25/2015	Ebenezer	Debris	7
04/25/2015	Ebenezer	Miscellaneous	3
10/19/2015	Ebenezer	Unknown	3
10/20/2015	Fair Grove	Unknown	8
10/22/2015	Walnut Grove	Debris	20
11/11/2015	Fair Grove	Unknown	5
11/24/2015	Strafford	Unknown	5
01/27/2016	Springfield Forestry	Debris	6
01/29/2016	Ebenezer	Unknown	3
01/30/2016	Ebenezer	Miscellaneous	5
02/05/2016	Fair Grove	Unknown	170
02/05/2016	Strafford Fire	Unknown	5
02/06/2016	Ebenezer	Unknown	180
02/06/2016	Springfield Forestry	Debris	3
02/08/2016	West Republic	Unknown	9
02/10/2016	Walnut Grove	Debris	5
02/11/2016	Springfield Forestry	Debris	5
02/15/2016	Walnut Grove	Debris	20
02/19/2016	Walnut Grove	Not Reported	20

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02/19/2016	Walnut Grove	Debris	3
02/19/2016	Walnut Grove	Debris	3
02/29/2016	Ebenezer	Debris	5
02/29/2016	Walnut Grove	Unknown	3
03/03/2016	Walnut Grove	Debris	20
03/05/2016	Strafford	Debris	5
03/05/2016	Ebenezer	Unknown	50
03/05/2016	Ebenezer	Unknown	6
03/05/2016	Ebenezer	Unknown	10
03/05/2016	Walnut Grove	Debris	30
03/05/2016	Ebenezer	Unknown	6
03/05/2016	Ebenezer	Unknown	10
03/05/2016	Ebenezer	Unknown	5
03/05/2016	Walnut Grove	Debris	5
03/06/2016	Walnut Grove	Debris	5
03/11/2016	West Republic	Not Reported	58
03/14/2016	Walnut Grove	Debris	30
03/15/2016	West Republic	Debris	15
03/19/2016	Fair Grove	Unknown	30
03/21/2016	Fair Grove	Unknown	3
04/21/2016	Springfield Forestry	Debris	14
11/22/2016	Ebenezer	Debris	15
12/15/2016	Fair Grove	Unknown	70
12/20/2016	Ebenezer	Debris	7
12/28/2016	Ebenezer	Campfire	3
12/29/2016	Ebenezer	Debris	7
12/31/2016	Fair Grove	Miscellaneous	3
01/10/2017	Walnut Grove	Unknown	5
01/28/2017	Ebenezer	Debris	10
01/29/2017	Logan-Rogersville	Debris	9
01/30/2017	Strafford	Unknown	10
02/16/2017	Walnut Grove	Unknown	5
03/08/2017	Ebenezer	Debris	6
07/08/2017	Walnut Grove	Debris	20
07/20/2017	Walnut Grove	Debris	10
01/06/2018	Fair Grove	Unknown	2.09
01/25/2018	Ebenezer	Debris	3.82
01/25/2018	Fair Grove	Unknown	2.04
01/25/2018	Ebenezer	Debris	2.5
01/27/2018	Station 1	Debris	61.65
02/03/2018	Ebenezer	Debris	2.38
02/03/2018	Ebenezer	Debris	2.83
02/26/2018	Ebenezer	Debris	4.41
03/09/2018	Ebenezer	Debris	23.2
03/13/2018	Walnut Grove	Unknown	4.02
03/14/2018	Fair Grove	Debris	7.23
04/05/2018	Ebenezer	Debris	4.58
04/05/2018	Ebenezer	Debris	2.38
04/12/2018	Ebenezer	Debris	4.82
04/21/2018	Ebenezer	Debris	10.87

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04/21/2018	Fair Grove	Debris	7.58
08/13/2018	MDC Forestry	Debris	33.84
08/13/2018	Ebenezer	Debris	50.7
08/13/2018	Fair Grove	Unknown	38.8

Source: <https://mdc6.mdc.mo.gov/Applications/MDCFireReporting/Home/FireReportSearch>

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is highly likely for a wildfire to occur within the next in the next year in Greene County. For a full description of the CPRI for wildfires, refer to Appendix B.

Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, changes in rainfall are unlikely to substantially reduce forest cover in Missouri, although the composition of trees in the forests may change. More drought would reduce forest productivity, and changing futures conditions are also likely to increase the damage from insects and diseases. Higher temperatures will also reduce the number of days prescribed burning can be performed. Reduction of prescribed burning will allow for growth of understory vegetation- providing fuel for destructive wildfires. Drought is also anticipated to increase n frequency and intensity during summer months under projected future scenarios. Droughts can lead to dead or dying vegetation and landscaping material close to structures which creates fodder for wildfires within both the urban and rural settings.

VULNERABILITY

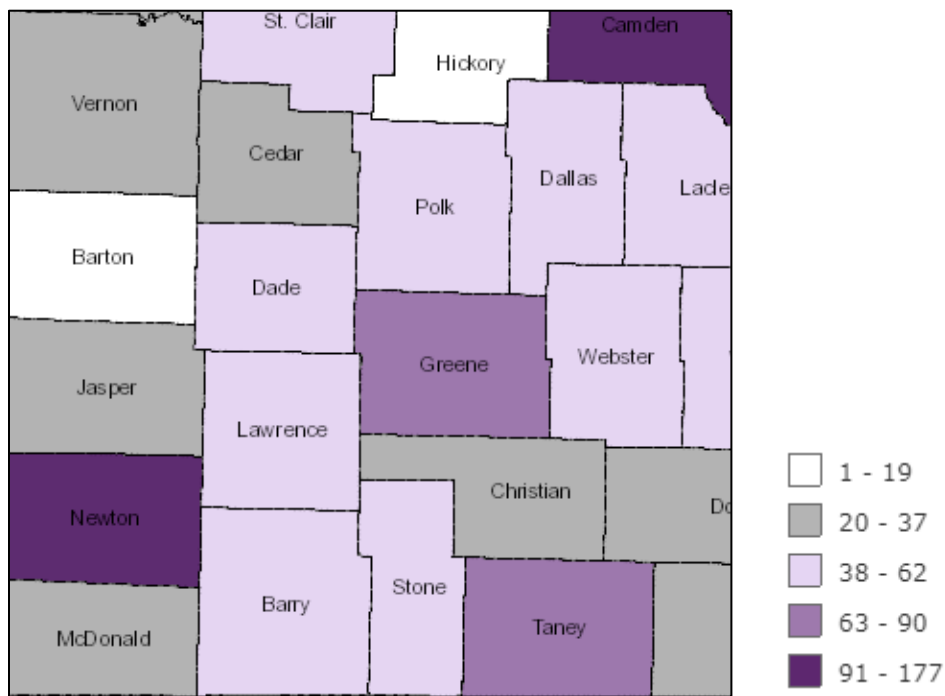
Vulnerability Overview

According to the 14 million acres, Missouri ranks seventh in the northeast region of the U.S. in forest land area. The U.S Fire Administration states that there are factors contributing to wildfire vulnerability. In order for communities to be successful they need to plan for the following:

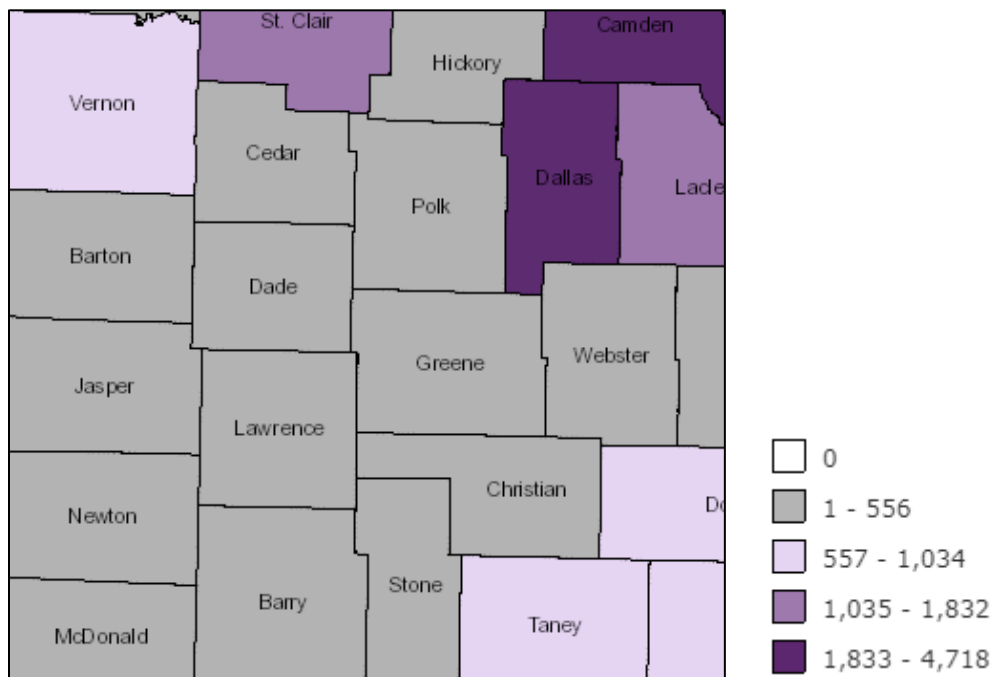
- Exposure vulnerability-What are the fuel conditions in the area? A program to reduce the flammability of building materials used in construction and reduce fuel on public and private lands, as well as in the home ignition zone.
- Sensitivity of the exposed community- What the resident’s vulnerabilities? A plan needs to determine the risk factors of the population, such as poverty, age, education, language and special needs.
- Adaptive capacity-Can residents prepare fore, respond to and recover from a wildfire based on their available resources?

3 - RISK ASSESSMENT

Likelihood of Occurrence (percent)



Average Annual Land Burned (In Acres)

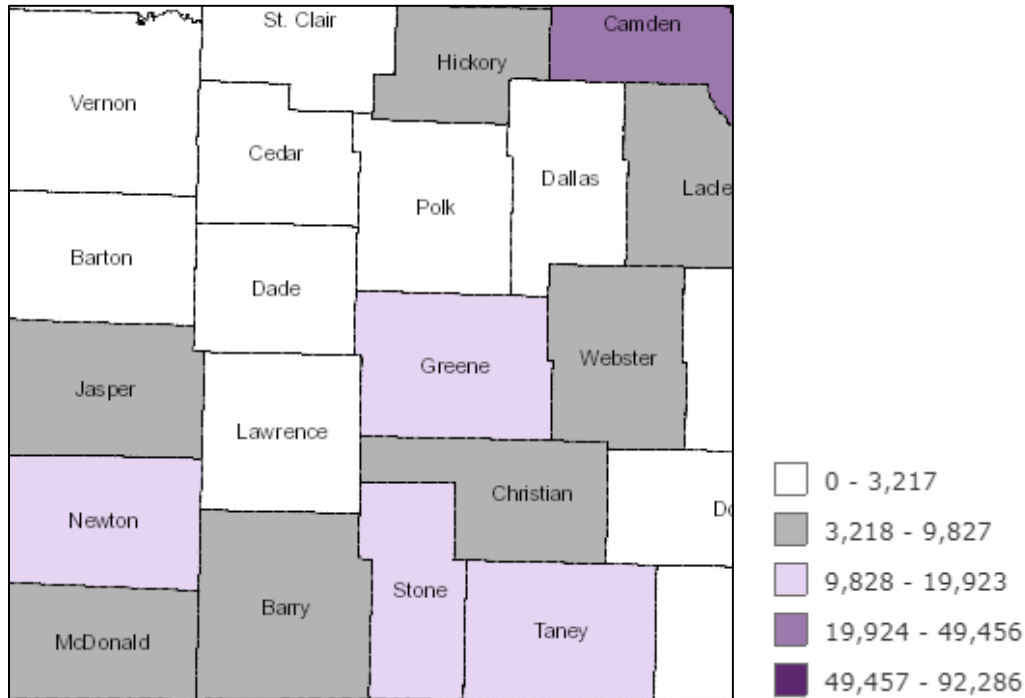


3 - RISK ASSESSMENT

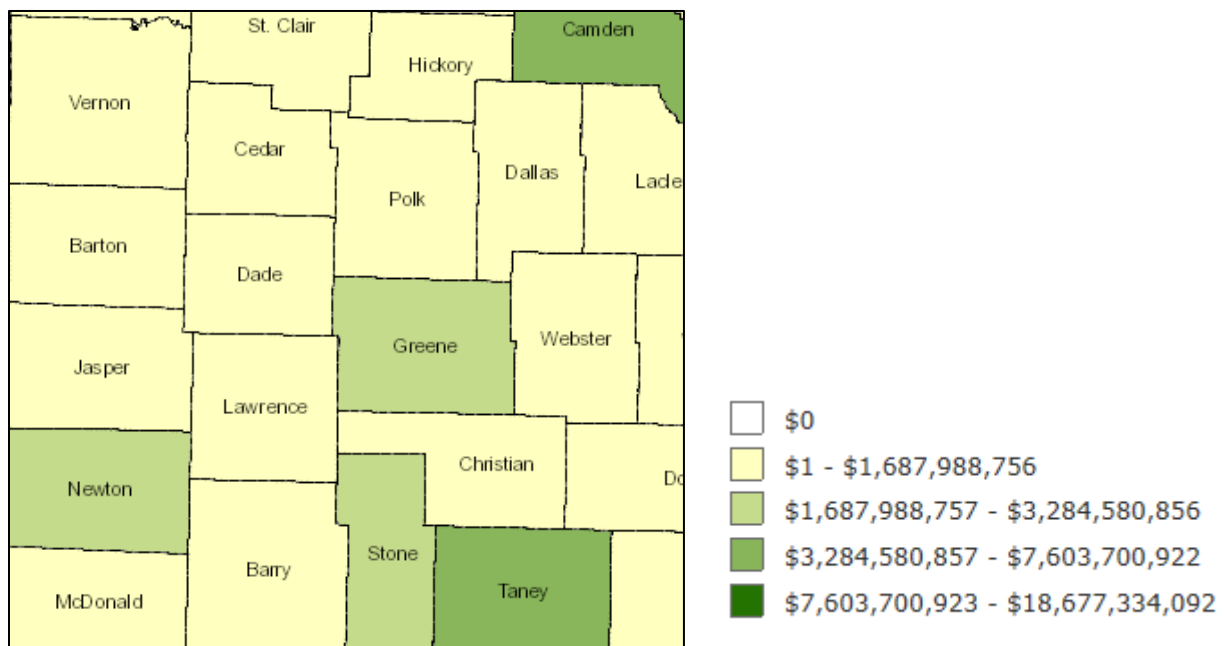
Potential Losses to Existing Development

Though wildfires can be common in Greene County, there is no historical loss information that could be obtained. The following charts were used from Missouri State Emergency Management Agency's Hazard Mitigation Viewer.

Total Number of Structures-WUI Interface/Intermix Area

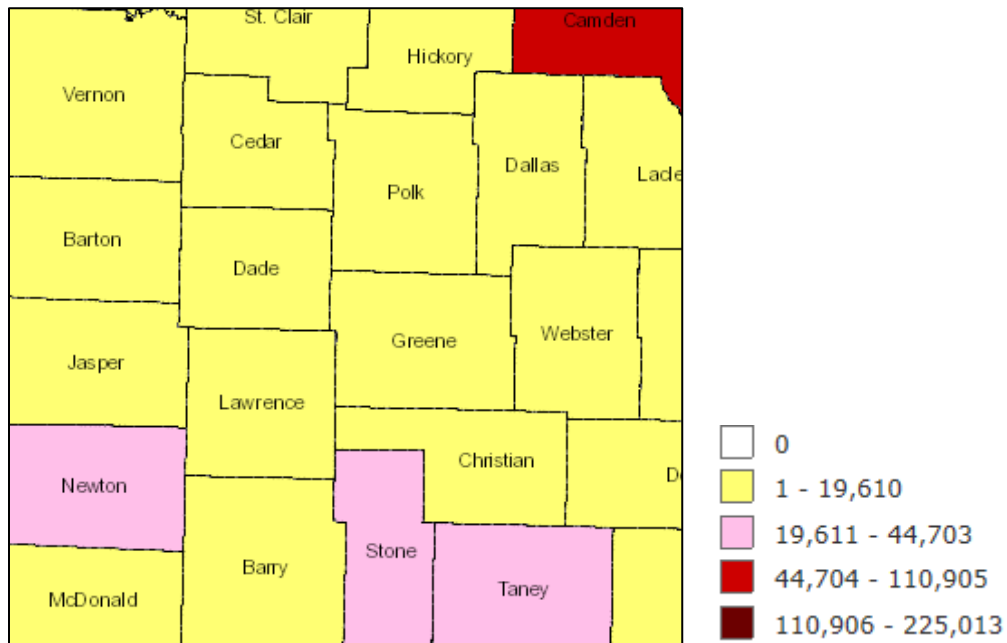


Value of Structures-WUI Interface/Intermix Area

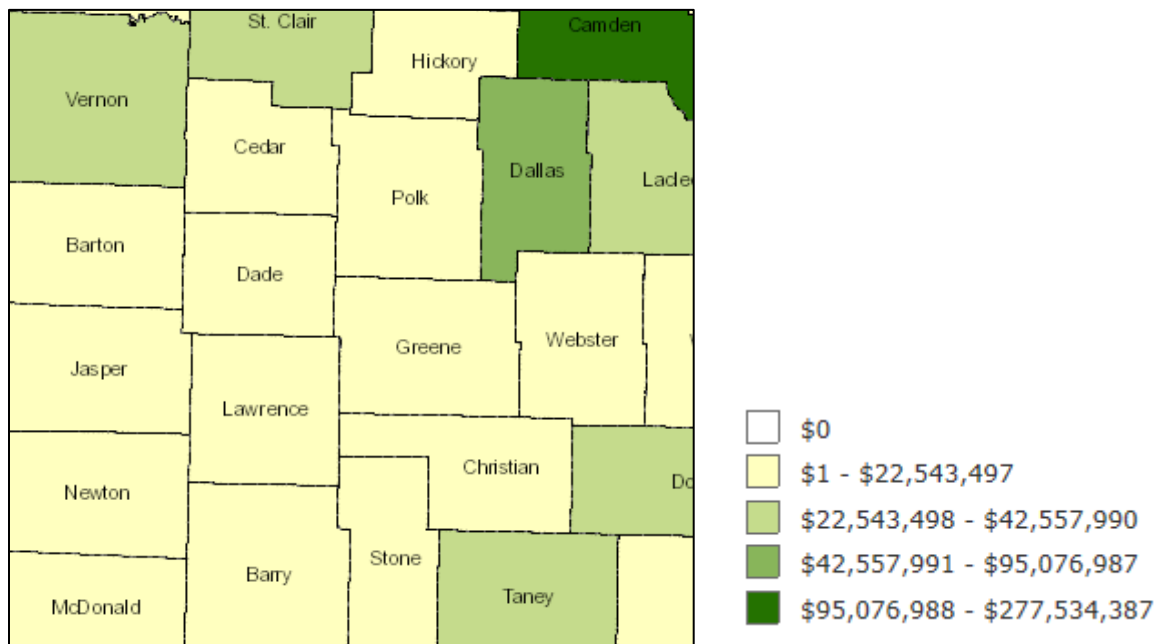


3 - RISK ASSESSMENT

Population Risk-WUI Interface/Intermix Area



Potential Loss-Average Annual Land Burned



3 - RISK ASSESSMENT

Impact of Previous and Future Development

As the population of Greene County continues to increase, the chance of development occurring in the Wildland Urban Interface (WUI) areas is possible. Though there are no plans in place as of right now, in the future there could be. Building in those areas could increase the amount of damage that occurs if/when a wildfire takes place. Development in those areas can also increase the risk of injury or death in the county's population.

EMAP Consequence Analysis

EMAP Impact Analysis: Wildfires

SUBJECT	DETRIMENTAL IMPACTS
Public	Wildfires create multiple isolated instances of safety concerns. Death or injury can occur from wildfire; however this has not been a consequence to Greene County.
Responders	There would be little to no impact on responders and response function in Greene County due to wildfires.
Continuity of Operations	Wildfires have had little to no impact on service operations.
Property, Facilities, and Infrastructure	Greene County has experienced minor isolated instances of property damage due to wildfires. Wildfires can cause minor impact to key infrastructure such as transportation or power, again, depending on the path of the fire. Greene County has experienced little to no impact on facilities due to wildfire.
Environment	Wildfires in Greene County can cause multiple instances of damage to the environment depending on what is buried. Wild life is also affected by wildfires.
Economic Condition of Jurisdiction	Wildfires have caused Greene County little to no impact on the economy.
Public Confidence in the Jurisdiction's Governance	Wildfires cause little to no loss of public confidence in governance in Greene County.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

Wildfires is a hazard that the entire planning area is at risk for. Jurisdictions in WUI areas are more vulnerable to wildfires than other jurisdictions. Walnut Grove, Ebenezer and Strafford Fire Protection Districts typically respond the most wildfire calls. This is demonstrated in the "Previous Occurrences" section of this profile. Prosperities in those fire districts are more vulnerable to experiencing damage from wildfires than other jurisdictions in the planning area.

PROBLEM STATEMENT

Wildfires can cause an extreme amount of damage if they are not controlled quickly. Wildfires spread fast and can be hard to control. Wildfires can damage crops, properties, animals and even human life. The cause of wildfires can be widespread from human caused to lightning strikes. Many wildfires go unnoticed to the public, but they can be frequent in Greene County. Development in WUI areas could potentially affect how much damage Greene County sees from wildfires. Wildfires are a county wide hazard that could affect many areas of county and could also cause large amounts of damage. Wildfires can be extremely devastating to the environment, many mitigation actions include quicker response and better equipment for fighting fires. Our Fire Protection Districts created many projects including new fire engines, more staffing, more training and more equipment to mitigate against wildfires.

3 - RISK ASSESSMENT

3.5.1 Technological Hazard: Airplane Crash

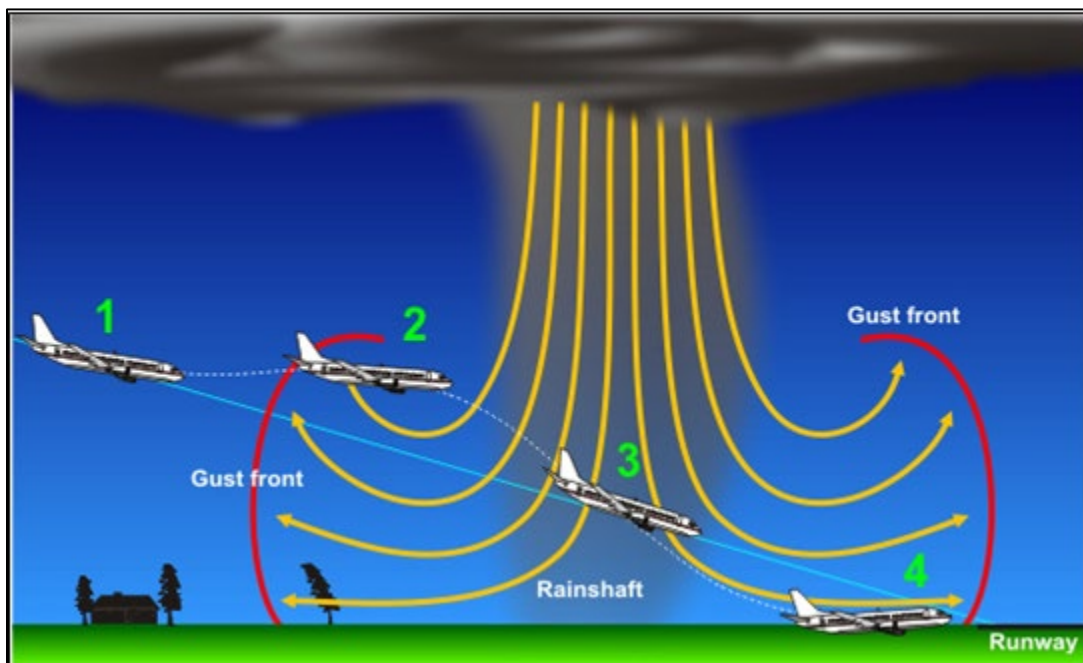
HAZARD PROFILE

Hazard Description

The definition of an airplane crash is an accident in which an aircraft hits land or water and is damaged or destroyed. Airplane crashes can be the result of hijackings, technological malfunctions, and weather or human errors. The result of an airplane crash is usually devastating.

Wind Hazards

As aircraft descend (above) into the airport they follow an imagery line called the "glide slope" (solid light blue line as depicted in the below illustration) to the runway. Upon entering a microburst, the plane encounters a "headwind", an increase in wind speed over the aircraft. The stronger wind creates additional lift causing the plane to rise above the glide slope. To return the plane to the proper position, the pilot lowers the throttle to decrease the plane's speed thereby causing the plane to descend. As the plane flies through to the other side of the microburst, the wind direction shifts and is now a "tailwind" as it is from behind the aircraft. This decreases the wind over the wing reducing lift. The plane sinks below the glide slope. However, the "tailwind" remains strong and even with the pilot applying full throttle trying to increase lift again, there may be little, if any, room to recover from the rapid descent causing the plane to crash short of the runway. Since the discovery of this effect in the early to mid-1980's, pilots are now trained to recognize this event and take appropriate actions to prevent accidents. Also, many airports are now equipped with equipment to detect microbursts and warn aircrafts.



3 - RISK ASSESSMENT

Hijacking

The September 11, 2001 attacks claimed the lives of over 3,000 Americans. This date changed anti-terrorist operations and approaches in the United States and all over the globe. On this day, 19 militants associated with the Islamic extremist group al-Qaeda hijacked four airliners and carried out suicide attacks against targets in the United States. Two of the planes were flown into the towers of the World Trade Center in New York City, a third plane hit the Pentagon just outside Washington, D.C., and the fourth plane crashed in a field in Pennsylvania. Often referred to as 9/11, the attacks resulted in extensive death and destruction, triggering major U.S. initiatives to combat terrorism and defining the presidency of George W. Bush. Over 3,000 people were killed during the attacks in New York City and Washington, D.C., including more than 400 police officers and firefighters. Hijacking can be never dangerous and devastating to both population and property.

Greene County is home to the Springfield-Branson National Airport (SGF). The airport is a small hub airport and currently has 4 airlines including: American, Allegiant, Delta and United. There are 13 non-stop destinations that leave from SGF.

The airport staffs a full-time fire department and every firefighter has Firefighter 1 or Firefighter 2 certification and is a certified EMT. The airport also is protected by Airport Police Department (APD) and has 10 full time commissioned officers who protect the airport 24/7. The APD achieved status as a criminal justice agency in 2002 and it is recognized by Missouri Department of Public Safety as a stand-alone law enforcement agency.

SGF has an Emergency Contingency Plan which meets the guidelines of the FAA Modernization and Reform Act of 2012. This plan is filed with the Department of Transportation because it is a commercial airport, and it may be used by an air carrier for diversions (USC 42301(a)(1)). Springfield-Branson National Airport also has a contingency plan for irregular operations (IROPS). IROPS are events that may be the result of aircraft holdovers, single or multiple aircraft diversions, medical emergencies, pilot/crew error, mechanical problems, weather, national airspace issues and airport closures.

Geographic Location

All of Greene County is susceptible to hazards of an airplane crash, as they can occur anywhere. Depending on the reason behind the crash leaves certain areas at greater risk. If the airplane is hijacked, areas of high population and governmental importance are at the highest risk. If a plane crash were to occur from technological malfunctions or human error, areas around the Springfield-Branson airport become the most at risk.

Strength/Magnitude/Extent

Plane crashes typically are devastating events. The crash itself can cause large amounts of injury and death to the people onboard the aircraft. Depending on where the crash happens, the aircraft can also cause injury and damage to the area that it hits. Airplane crashes typically also cause long-term effects on survivors including survivor's guilt and Post-Traumatic Stress Disorder (PTSD). Airplanes can have a devastating magnitude of impact on the community depending on the size and location of the crash. A large commercial flight could lead to several death, property damages, a decline in public confidence, and potentially many more side effects. A commercial airplane crash would be catastrophic.

3 - RISK ASSESSMENT

Previous Occurrences

Incidents and Accidents in Greene County

DATE	LOCATION	SEVERITY	CAUSE
03/21/2004	Springfield	1 Minor	Pilot Error
06/03/2004	Strafford	None	Mechanical
08/01/2005	Willard	Nonfatal	Pilot Error
10/26/2005	Springfield	2 Fatal, 1 Serious	Pilot Error
10/06/2010	Springfield	1 Fatal, 2 Serious	Pilot Error
01/03/2011	Walnut Grove	1 Fatal	Undetermined
05/21/2012	Rogersville	1 Serious, 1 Minor	Pilot Error
12/05/2013	Willard	5 Fatal	Spatial Disorientation
12/12/2014	Springfield	Nonfatal	Undetermined

January 2014

There have been many instances of close calls with malfunctions and human error in relationship to airplane maneuvers. In January of 2014, a Southwest Airlines jet destined for the Branson Airport, carrying 124 passengers, landed at the wrong airport. "The plane stopped about 500 feet from the end of a runway at M. Graham Clark Downtown Airport, but no one was injured," said Chris Berndt, the Western Taney County Fire District fire chief and emergency management director. The airport's runway is 3,738 feet long, about half the length of the Branson Airport runway, which is 7,140 feet. That forced pilots to act fast and brake hard when the aircraft touched down. If they had not, the plane could have overshot the end of the runway, tumbled down an embankment, and into U.S. Highway 65.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is possible for a smaller airplane crash to occur within the next five years in Greene County. A large airplane crash is unlikely in Greene County. For a full description of the CPRI for airplane crash, refer to Appendix B.

Changing Future Conditions and Considerations

As discussed in previous hazard profiles, the climate in Greene County and many other areas is projected to change. The planning area could see an increase of rain and flooding, severe storms including hail, wind and lightning. All of those hazards effect air travel. Changing climate could make it more difficult on pilots when landing and taking off aircrafts. Unfortunately, the risk for hijacking has also become more of a risk for communities nation-wide.

VULNERABILITY

Vulnerability Overview

Airports, including the Springfield-Branson National Airport, have strict plans and protocols in place to ensure the safety and security of their passengers. Even with protocols in place, a major accident could occur at any given time. Airports and airplanes can be targets for terrorism, with high numbers of people congregated in a small space. The Springfield-Branson National Airport is Greene County's busiest airport, but it is not the only airport located in the county. The table below lists the airports (including heliports) both private and public that are in Greene County.

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AIRPORT NAME	LOCATION	USAGE
Eads Ridge Airport	Fair Grove	Private
Medcalf Field Airport	Republic	Private
Childress Airstrip Airport	Springfield	Private
Downtown Airport	Springfield	Private
Flying Bar H Ranch Airport	Springfield	Public
Gardner Airport	Springfield	Private
KTTS Heliport	Springfield	Private
KY-3 Heliport	Springfield	Private
Lester E. Cox Medical Center North Heliport	Springfield	Private
Lester E. Cox Medical Center South Heliport	Springfield	Private
Springfield Community Hospital Heliport	Springfield	Private
Springfield-Branson National Airport	Springfield	Public
Mercy Regional Health Center Heliport	Springfield	Private
Vans Heliport	Springfield	Private
Cuinche Airport	Strafford	Private
Bird Field Airport	Willard	Private
Hogue Farm Airport	Willard	Private
Textor Airport	Willard	Private

Source: Missouri Public Use Airports, 2014

Potential Losses to Existing Development

According to the Missouri State Hazard Mitigation Plan, it is hard to determine the actual risk to Greene County because no studies have been conducted to date. The plan does state that counties in and surround the metropolitan areas of St. Louis, Springfield and Kansas City are at greater risk because of the nature of the population and the transportation hubs within each area. Tourism will also make the Springfield area become at greater risk because of people traveling to see areas in Springfield, including the Bass Pro Attractions. Both economic and human losses can come from airplane crashes.

Impact of Previous and Future Development

As tourism and population increases in the Greene County area, the number of accidents could increase. With population, growth also comes community growth. If development expands around the Springfield-Branson Airport, a larger risk for experiences damages from an airplane crash increases in that area. A lot of airplane crashes or accidents happen around the airport. It is possible that in the future the Springfield-Branson airport could become larger and carry more airlines. Springfield-Branson Airport would have more air traffic also raising the risk for an incident.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Airplane Crash

SUBJECT	DETRIMENTAL IMPACTS
Public	Airplane incidents are often fatal to everyone that was in the aircraft. There are also safety to concerns form anyone that is in the immediate area of the crash.
Responders	There would be little to no impact on responders and response functions in Greene County due to an airplane crash.
Continuity of Operations	Airplane incidents have little to no impact on service operations.
Property, Facilities, and Infrastructure	Airplane crashes have little to no property, facility and infrastructure damage in Greene County.
Environment	Airplane incidents result in little to no impact on the environment.
Economic Condition of Jurisdiction	Airplane incidents have little to no impact on the economy.
Public Confidence in the Jurisdiction's Governance	Airplane incidents causes little to no loss of public confidence in governance in Greene County.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

A plane crash could happen in any jurisdiction in the planning area. Jurisdictions that are closer to Springfield-Branson National Airport (Republic, Springfield, and Unincorporated Greene County) would be at higher risk for experiencing an airplane crash. Though Greene County has not experienced a large airplane crash in the past, with facilities high of importance and the population of Greene County, plane crashes are likely to occur in Greene County.

PROBLEM STATEMENT

There are many reasons why an airplane can crash, including hijacking, human error, and mechanical malfunctions. Airplane crashes, especially large ones, can be catastrophic. Greene County has many private and one large airports. The large, public airport sees a lot of traffic 7 days a week. Airplane crashes can be unpredictable and happen anywhere within the county. The main concern for airplane crashes is the loss of human life and destruction of property. Possible solutions to limit the loss of damage is not developing around the airport. Limiting the amount of buildings and property around the airport can limit the destruction created. No participating jurisdiction created a project involving the mitigation of an Airplane Crash in this Mitigation plan.

3 - RISK ASSESSMENT

3.5.2 Technological Hazard: Cave/Mine Collapse

HAZARD PROFILE

Hazard Description



A cave-in is a collapse of a geologic formation, underground structure or mine. Geologic structures prone to spontaneous cave-ins include many limestone formations, but can also include lava tubes and a variety of other subsurface rock formations. Limestone occurs at the surface and subsurface in 99% of Missouri, including Greene County.

In mining, the term roof fall is used to refer to many types of collapses, ranging from the fall of a single flake of shale to collapses that form sink holes that reach to the surface. However, roof falls in mining are not all accidental. In long wall mining and retreat mining, miners systematically remove all support from under large areas of the mine roof, allowing it to settle just beyond the work area. The goal in such mining methods is not to prevent roof fall and the ensuing surface subsidence, but rather to control it.

Caves

There are over 360 documented caves in Greene County. The collapse of an underground geologic formation could kill people by falling rock, trap people inside, and presents a serious danger to people or structures located above ground. Erosion of the walls supporting the cave ceiling creates an increase in the amount of overlying rock being supported. At some point, the weight becomes too great, and the ceiling collapses.

Mines

Abandoned mines are found throughout Missouri. They include both surface pits and underground mines. Older mines typically were abandoned and seldom reclaimed or closed. These mines operated long before permitting laws established requirements for reclamation and closure. Today, these pits, voids, open adits and shafts can pose a public safety hazard. Abandoned mine sites appear attractive to explore, but are unsafe to walk, climb or ride in. Embankments or high walls may be unstable or not visible behind piled material. High walls that appear to be stable can collapse. Piles of waste material called “tailings” or “slime” may be unstable and can slide and bury someone climbing on them.

Quarries

Abandoned quarries or other surface mines often are appealing swimming holes. However, from the surface it is impossible to tell how deep the mine is or if shallow ledges left from mining remain but cannot be seen. Abandoned underground mines can have poor air quality. Active underground mines are ventilated to bring fresh air to miners. Abandoned mines, however, may have dangerous levels of carbon monoxide or methane.

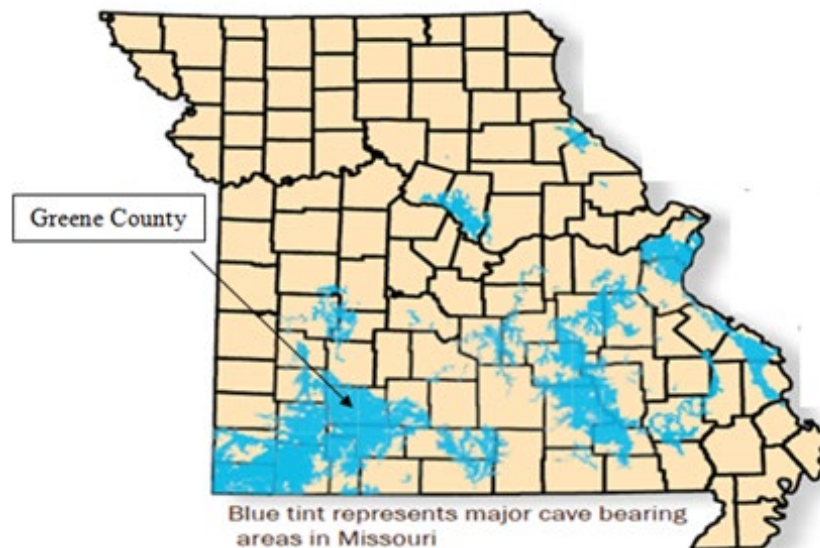
Geographic Location

Greene County has over 360 documented caves sprawled across the region. The Springfield Underground is a 2.4 million square foot underground facility located 100 feet below Springfield Missouri. The majority of these caves are located on private property. Greene County has several public show caves including Fantastic Caverns, Smallin Civil War Cave, Riverbluff Cave, and Crystal Cave.

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There are several operating mines throughout Greene County including 5 limestone and zinc mines in Springfield jurisdiction. Quite a bit of lead and zinc mining happened in the Springfield Area from about the 1870s to the 1920s. When the mines stopped producing, they were filled in and then abandoned. The actual number of abandoned mines is unknown.

Major Cave Bearing Areas in Missouri



Strength/Magnitude/Extent

Cave/Mine collapse can cause large amounts of damage. There is no scale for measuring the severity of a cave/mine collapse. However, geological and mining parameters can affect the magnitude and extent.

Previous Occurrences

January 2013

January 29, 2013, a subsidence occurred in east Springfield, Missouri. 31 feet long, 14 feet wide, and 15 feet deep this crater opened up above an abandoned mine shaft. The subsidence opened up beneath the corner of a house. No lives were lost, but \$50,000 in damages was the cost of the incident.

Probability of Future Hazard Events

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely for a cave/mine collapse to occur within the next 10 years in Greene County. For a full description of the CPRI for cave/mine collapse, refer to Appendix B.

Changing Future Conditions and Considerations

Climate changes will not necessarily effect cave and mine collapse. Development on areas with cave or mines can cause collapse because of the extra weight on top of them. Earthquakes can also cause caves or mines to collapse. Increase in earthquakes can also cause more cave/mine collapse. Please see Section 3.4.2 for more information about earthquakes.

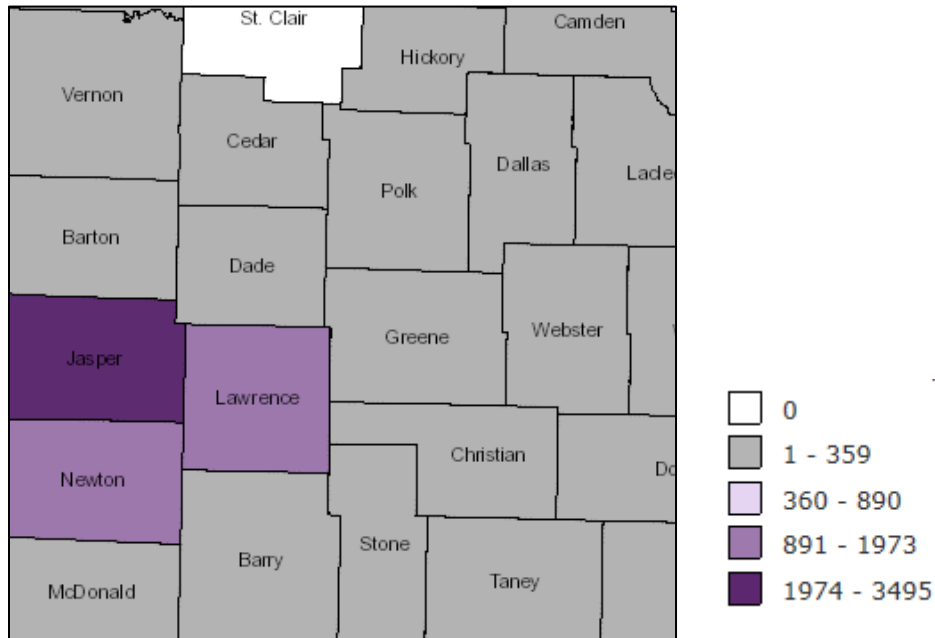
3 - RISK ASSESSMENT

VULNERABILITY

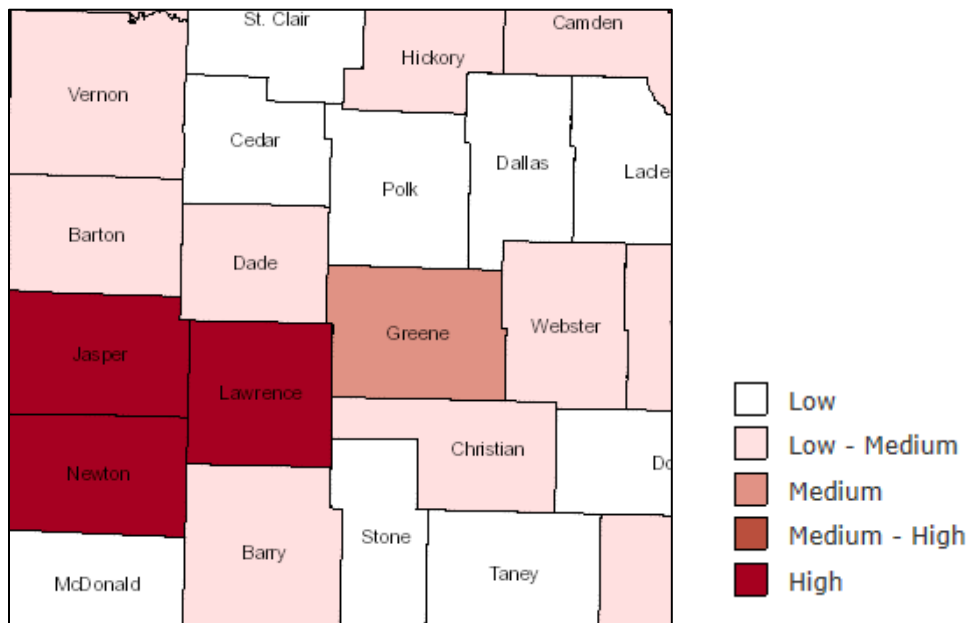
Vulnerability Overview

With increasing regulations and safety procedures, the risk of a cave in due to human error or accident is low, especially in popular show caves in Greene County. In addition, the probability of an earthquake affecting the area is low but still present. As shown by the recent subsidence cause by the mine shaft in Springfield, there is still present risk of other mine shaft collapsing or subsiding beneath unaware people and buildings.

Number of Mines



Vulnerability-Mines



3 - RISK ASSESSMENT

Potential Losses to Existing Development

Fantastic Caverns hosts over 100,000 visitors a year and the other show caves bring in thousands of more people. While the show cavers are carefully maintained, the sheer amount of people exposed to the dangers of earthquakes, erosion, and sabotage poses a serious public safety threat.

Springfield Underground, a massive underground storage facility in Springfield, is home to warehousing, laboratories, food storages, records storage and data centers. A collapse in the Springfield Underground could kill or trap hundreds of workers, contaminate millions of pounds of food, and destroy important data and records.

Many undocumented mines are scattered underneath Greene County and many public spaces and private homes have unknowingly been built above abandoned shafts. Public and private properties are vulnerable to the risk of an unknown mine shaft collapsing below.

Impact of Previous and Future Development

Greene County will continue to see development across the planning area. Development has already occurred on areas above abandoned shafts. As more development continues, it is highly likely that more development will occur above mines and caves. . Places like Fantastic Caverns bring many people to the area. As tourism continues to expand in Greene County, more population is at risk if a cave or mine does collapse

EMAP Consequence Analysis

EMAP Impact Analysis: Cave/Mine Collapse

SUBJECT	DETRIMENTAL IMPACTS
Public	Greene County has never experienced a cave/mine collapse. The most likely type of collapse would be an old mine shaft. These are abandoned and would not create much of a safety impact if there was a collapse.
Responders	If responders are called to the scene of a collapse, there are life safety issues if they must enter an unsafe structure. There may be another collapse.
Continuity of Operations	A cave or mine collapse would cause little to no impact on service operations.
Property, Facilities, and Infrastructure	The collapse of an abandoned mine or save would create little to no property damage. It would also create little to no facility or infrastructure damage.
Environment	A cave or mine collapse could create isolated instances of environmental damage if the collapse occurs in a used water source.
Economic Condition of Jurisdiction	A collapse would cause little to no impact on the economy.
Public Confidence in the Jurisdiction's Governance	The collapse of a cave or mine would cause little to no lose in public confidence in governance.

*For more details on Consequence Analysis, refer to Appendix B.

3 - RISK ASSESSMENT

Hazard Summary by Jurisdiction

There are many caves and mines placed throughout the planning area. Many have been identified, but many have not. The entire planning area is at risk from experiencing a cave or mine collapse. The planning area has not experienced a large cave/mine collapse, but it is still possible for the future.

PROBLEM STATEMENT

Cave and mine collapses can be very dangerous and cause large amounts of damage to both property and human loss. Caves and mines can also go unnoticed for long periods of time; sometimes they are not noticed until they are completely collapsed. As development continues around the planning area, it is important for communities to stay educated about what a cave/mine collapse is and how to mitigate against it. Cave collapse can cause large amounts of damage. It can be damaging to the environment as well. Mitigation solutions include not developing in or around large caves and education. No participating jurisdiction created mitigation projects involving cave collapse.

3 - RISK ASSESSMENT

3.5.3 Technological Hazard: Dam Failure

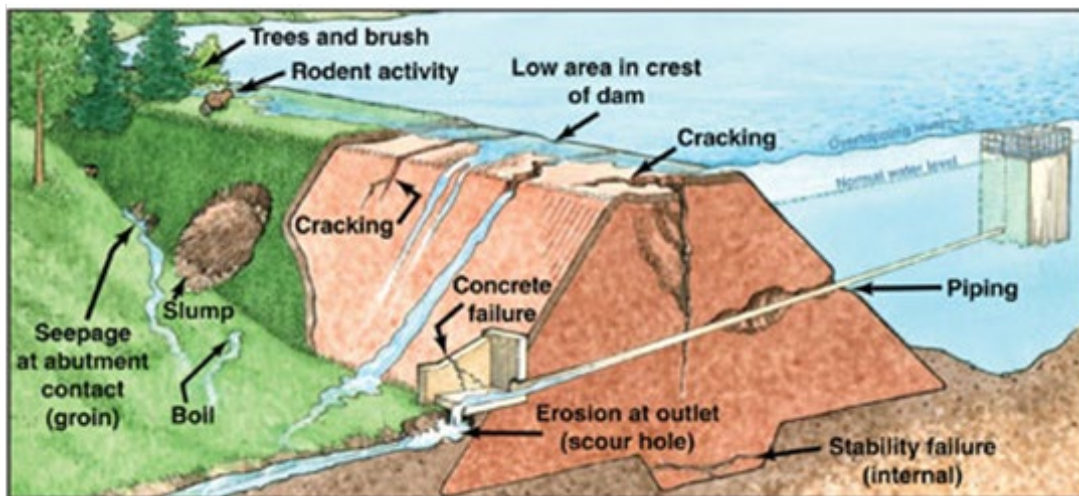
HAZARD PROFILE

Hazard Description

A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams are typically constructed of earth, rock, concrete, or mine tailings. Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, affecting both life and property. Dam failure can be caused by any of the following:

Causes of Dam Failures

- Overtopping: Caused by water spilling over the top of a dam. Overtopping of a dam is often a precursor of dam failure. National statistics show that overtopping due to inadequate spillway design, debris blockage of spillways, or settlement of the dam crest account for approximately 34% of all U.S. dam failures.
- Foundation Defects: foundation defects including settlement and slope stability cause about 30% of all dam failures.
- Cracking: mostly caused by movements like the natural settling of a dam.
- Inadequate maintenance and upkeep
- Piping: when seepage through a dam is not properly filtered and soil particles continue to progress form sinkholes in the dam. Another 20% of U.S dam failures have been cause by piping. Seepage often occurs around hydraulic structures, such as pipes and spillways; through animal burrows; around roots of woody vegetation; and through cracks in dams, dam appurtenances and dam foundations.



3 - RISK ASSESSMENT

Missouri Department of Natural Resource (MoDNR) Dam Hazard Classification Definitions

HAZARD CLASS	DEFINITION
Class I	The area downstream from the dam that would be affected by inundation contains 10 or more permanent dwellings or any public building. Inspection of these dams must occur every 2 years.
Class II	The area downstream from the dam that would be affected by inundation contains 1 to 9 permanent dwellings, or 1 or more campgrounds with permanent water, sewer and electrical services or 1 or more industrial buildings. Inspection of these dams must occur once every 3 years.
Class III	The area downstream from the dam that would be affected by inundation does not contain any of the structures identified for Class 1 or Class 2 dams. Inspection of these dams must occur once every 5 years.

Source: Missouri Department of Natural Resources

National Inventory of Dams (NID) Dam Hazard Classification Definitions

HAZARD CLASS	DEFINITION
Low Hazard	Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probably loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.
Significant Hazard	Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probably loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.
High Hazard	Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.

Source: Damsafety.org

3 - RISK ASSESSMENT

Geographic Location

Dams Located Within the Planning Area

Dam Name	Year Complete	Length	Height	ResArea	Drainage Area (Acres)	State Regulated	Hazard Class	Permit Number
Barnard Lake Dam	1963	0	22	2	830	No	3	-
Lake Springfield	1956	1,950	45	360	193,920	Yes	1	R-116
Valley Water Mills Dam	1890	0	21	17	3,200	No	1	-
Fellows Lake Dam	1955	1,500	100	812	12,858	Yes	1	R-012
McDaniel Lake Dam	1929	700	48	300	25,000	Yes	3	R-215
Salisbury Lake Dam	1963	0	25	8	1000	No	3	-
Rainbow Lake Dam	1974	500	42	13	227	Yes	2	R-500
Leo Journagan Lake Dam	1975	1100	20	8	284	No	3	-
D&R Pipeline Construct. Co Lake Dam	1975	0	25	7	560	No	1	-
McLean, Lee and Hammons, John Q Lake	1962	0	15	9	635	No	1	-
Mueller Lake Dam	1971	300	25	2	173	No	3	-
Hilliard Estates Lake Dam	1977	0	27	4	50	No	1	-
Lake James Dam	2000	0	30	6	210	No	3	-
Ford lake Dam	1978	0	25	9	99	NO	2	-
Hardeke Lake Dam	1964	0	22	8	190	No	1	-
Hagewood Lake Dam	1970	0	25	3	80	NO	2	-
Allen Dale Subdivision Dam	2000	0	18	8	6660	No	3	-
Stonegate Dam	1999	250	45	2.1	30	Yes	3	S-092

Source: <https://dnr.mo.gov/geology/wrc/dam-safety/damsinmissouri.htm>

3 - RISK ASSESSMENT

High Hazard Dams in Greene County

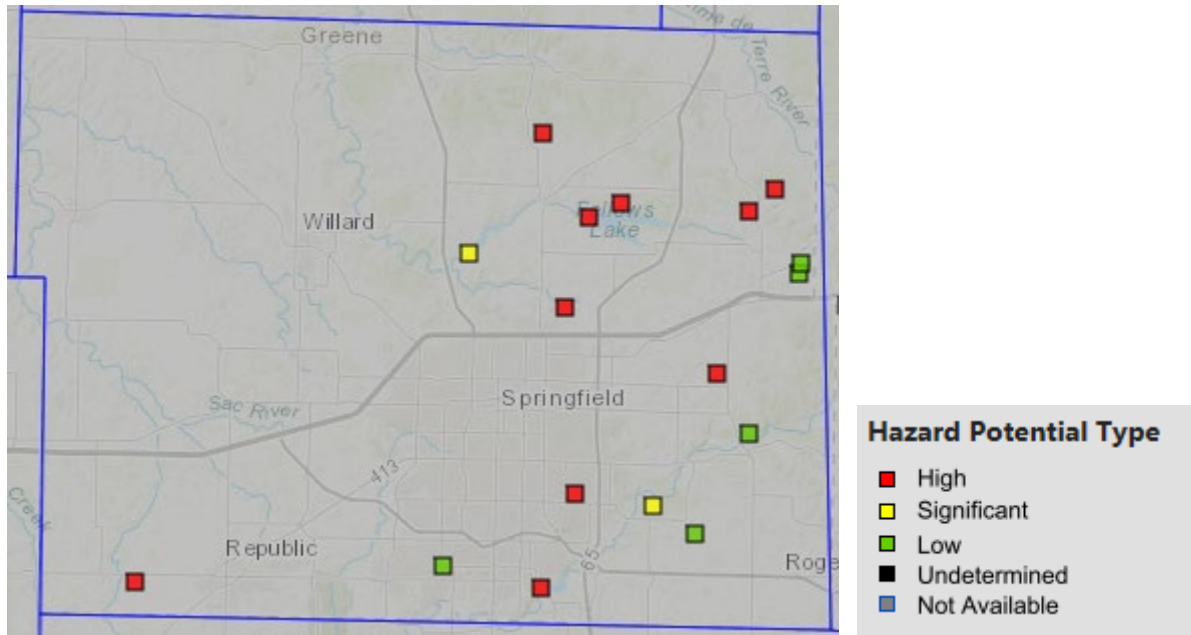
DAM NAME	EMERGENCY ACTION PLAN (EAP) AP	DAM HEIGHT (FT)	NORMAL STORAGE (ACRE-FT)	LAST INSPECTION DATE	RIVER	NEAREST DOWNSTREAM CITY	DISTANCE TO NEAREST CITY	DAM OWNER
Hagewood Lake Dam	Not Required	25ft	40	N/A	TR-Pickerel Creek			R B Hagewood
Lake Springfield Dam	Yes	45ft	20,077	11/22/2016	James River	Springfield	0	Springfield City Utilities
McLean, Lee & Hammons John Q lake #3	Not Required	15ft	72	05/15/1979	Tributary to James River	Springfield	0	L Mclean & J Q Hammons
Ford Lake Dam	Not Required	25ft	120	N/A	TR-Pierson Creek	Unin. Greene County	0	Edel Ford Tractor CO
Valley Water Mills Dam	Not Required	21ft	191	06/06/1979	TR-South Dry Sac River	Springfield	0	Springfield Utilities
Fellows Lake Dam	Yes	102	36,368	05/30/2017	Little Sac River	Springfield	7	City of Springfield
D&R Pipeline Construct	Not Required	25ft	94	05/15/1979	TR-Little Sac River	Springfield	7	D&R Pipeline Construction CO
Rainbow Lake Dam	Yes	42ft	240	02/25/2016	TR-Sims BR N Dry Sac River	Unin. Greene County	0	Paul Olive
Hilliard Estates Lake dam	Not Required	27ft	58	11/19/1980	TR-Little Pomme De Terre River	Strafford	4	John Norman
Hardeke Lake Dam	Not Required	22ft	94	07/17/1980	Trib-Pomme De Terre	Unin. Greene County	0	Carl Hardeke Jr.

Source: Missouri Department of Natural Resources National Inventory of Dams

Inundation Maps are included in Appendix C. These maps give details on areas in danger for a dam breach. These maps also show flow direction of the water.

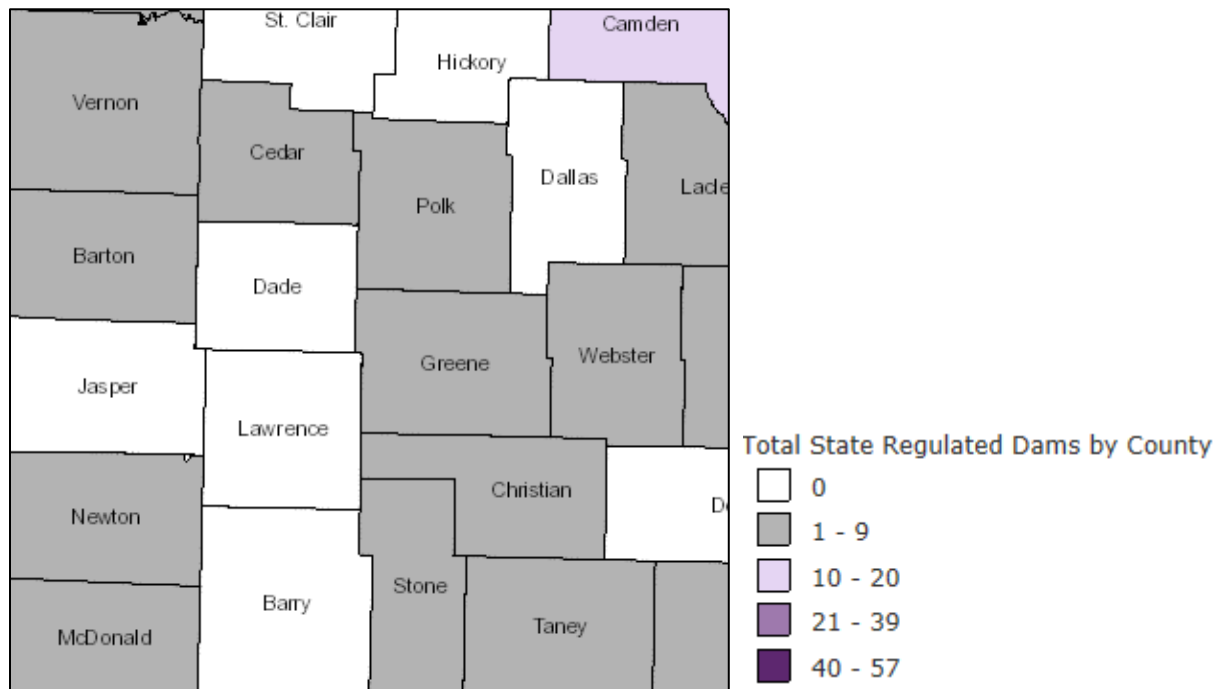
3 - RISK ASSESSMENT

Dam Locations in Greene County



Source: National Inventory of Dams

Total State Regulated Dams-Greene County



3 - RISK ASSESSMENT

Strength/Magnitude/Extent

The strength/magnitude of dam failure would be similar in some cases to flood events (see section 3.4.4). The strength/magnitude/extent of dam failure is related to the volume of water behind the dam as well as the potential speed of onset, depth, and velocity. Not that for this reason, dam failures could flood area outside of mapped flood hazards. The State of Missouri has 5,356 dams in the state, 33 of those dams have failed.

Flooding can also result in overtopping of the dam when they spillway and reservoir storage capacity are exceeded by the excess water. Complete structural collapse can occur as a result of an earthquake or severe tremors. When a dam fails, the pent-up water can be suddenly released and have catastrophic effects on life and property downstream. Homes, bridges and roads can be demolished in minutes.

Actual dam failure does not only result in loss of life, but also considerable loss of capital investment, loss of income and property damage. Loss of a reservoir (drinking water source) can cause considerable hardship for the community that relied on it for its water supply. Loss of a reservoir can lead to an upset in the ecological balance of the area as well.

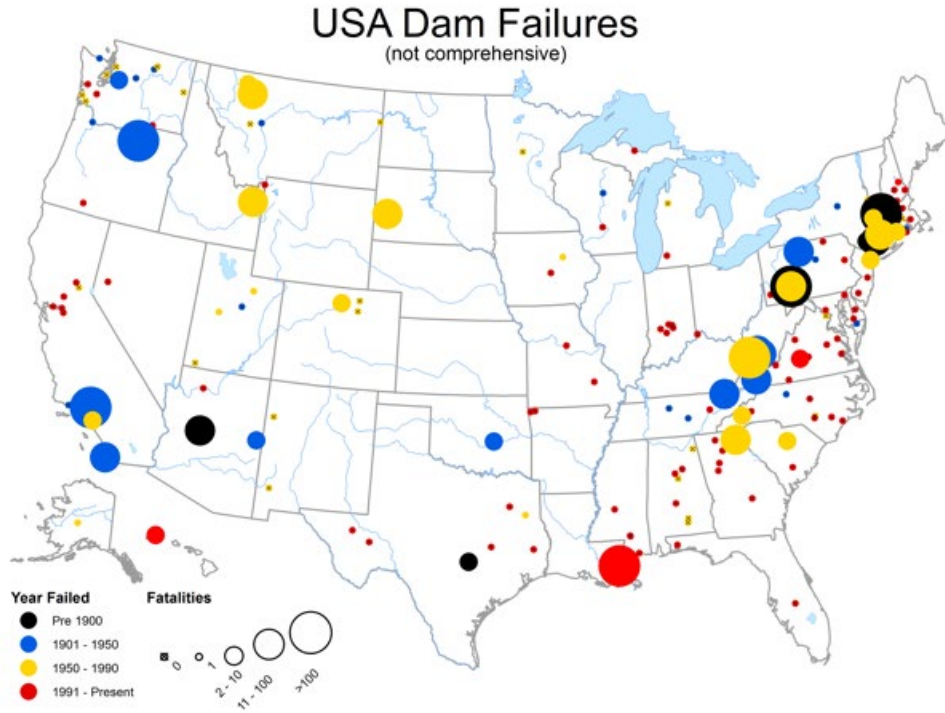
If a failure were to occur with the non-regulated dams, agriculture could be affected for the immediate area, otherwise no loss of life and little property damage would be expected. Failure of one of the regulated dams, especially one of the two lakes established for drinking water purposes, would affect the ability of Springfield City Utilities to supply potable drinking water to residents, in addition to water for schools, businesses and manufacturing. This could cause significant widespread property damage, and shut down of critical facilities.

Within the State of Missouri, to ensure that dams are safely constructed, operated, and maintained, the Legislature enacted Chapter 236 RSMo. Under the law, a dam must be 35 feet or higher to be state regulated. These dams are required to be surveyed every three to five years. The Department of Natural Resources maintains a Water Resources Program within the Division of Geology and Land Survey based in Rolla. In 2004, the program stopped doing dam inspections for permit renewals. The owners are now required to provide inspection documentation for permit renewal. New dam construction will be inspected prior to initial permits being used. Dams under the 35 foot minimum do not require state inspection; the State has for many years encouraged dam owners to do inspections on their own. However, the condition of many of these dams continues to deteriorate. Two of the five lakes provided by the dams are used for potable drinking water for the City of Springfield. One of the lakes provides cooling water for a power facility.

Previous Occurrences

Over the year, dam failures have injured or killed thousands of people, and caused billions of dollars of property damage in the United States. Among the most catastrophic were the failures of the Teton Dam in Colorado in 1976, which killed 14 people and caused more than \$1 billion in damages, and the Kelly-Barnes Dam in Georgia which left 39 dead and \$30 million in property damage. The problem with unsafe dams in Missouri was underscored by dam failures at Lawrenceton in 1968, Washington County in 1975, Fredericktown in 1977 and a near dam failure in Franklin County in 1979. Flash Flooding in October 1998 compromised a dozen small unregulated dams in the Kansas City area. Greene County has not experienced a dam failure yet.

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Source: Association of Dam Safety

Map Showing the Location of Dam Failures Involving Fatalities in the U.S



Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely for a dam failure event to occur within the next 10 years in Greene County. For a full description of the CPRI for dam failure, refer to Appendix B.

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Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, studies have been conducted to investigate the impact of climate change scenarios on dam safety. Dam failure is already tied to flooding and the increased pressure flooding placed on dams. The impacts of changing future conditions on dam failure will most likely be those related to a change in precipitation and flooding. Changing future conditions projections suggest that precipitation may increase and occur in more extreme events, which may increase risk of flooding, putting stress on dams and increasing likelihood of dam failure.

The safety of dams for the future climate can be based on an evaluation of changes in design floods and the freeboard available to accommodate an increase in flood levels. The results from the studies indicate that the design floods with the corresponding outflow floods and flood water levels will increase in the future, and this increase will affect the safety of the dams in the futures. Studies concluded that the total hydrological failure probability of a dam will increase in the future climate and that the extent and depth of flood waters will increase by the future dam break scenario.

VULNERABILITY

Vulnerability Overview

The downstream hazard classification system utilized by the National Inventory of Dams (NID) provides the Hazard Classification system as a means to determine overall vulnerability in the event of dam failure. According to the NID, of the 17 dams in Greene County, 10 dams are high hazard (58.8%), 2 are significant hazard (11.8%) and 5 are low hazard (29.4%). The hazard classification system is a means to classify dam according to what impacts could occur in downstream inundation areas. But, this system does not indicate the structural integrity of the dam or likelihood of failure. For regulated dams, there are two main processes in place to advance dam safety: 1) Inspection and 2) Emergency Action Planning.

Emergency Action Planning/ Inundation Mapping

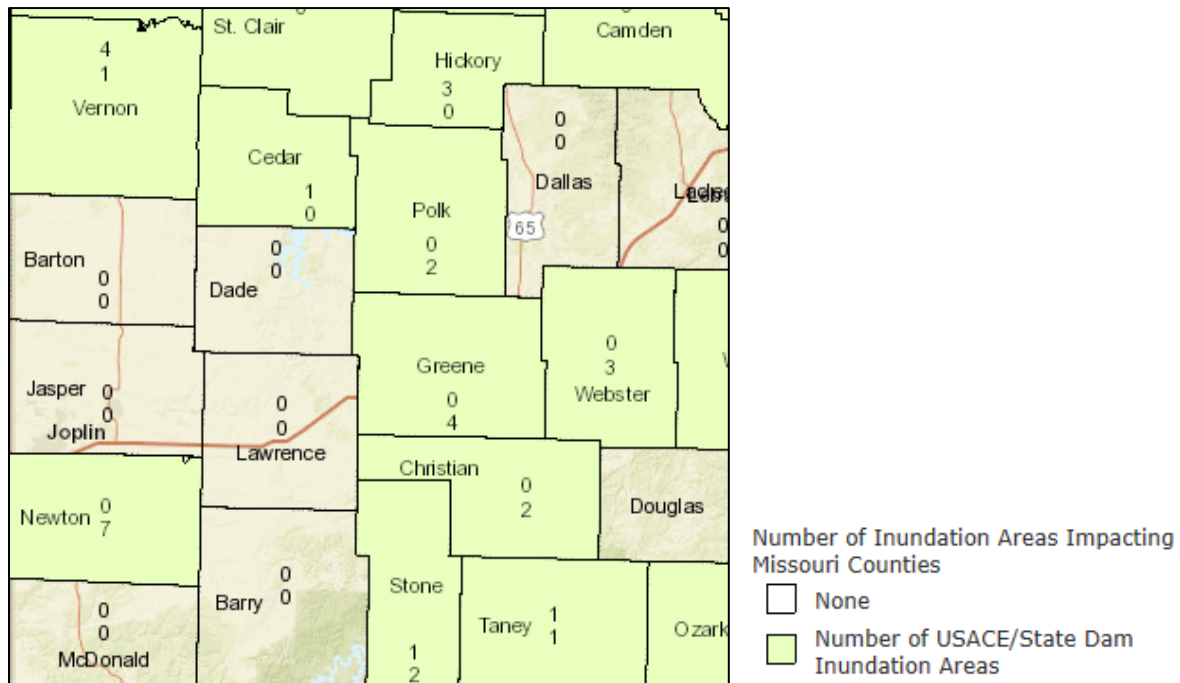
An Emergency Action Plan (EAP) helps emergency managers know the structures that are at risk as well as the roads that will be flooded so that evacuation routes and emergency management efforts can be developed accordingly. Since 2009, the Missouri Department of Natural Resources has been working with dam owners and emergency personnel to develop Emergency Action Plans. A dam inundation map is an important part of the EAP for all state-regulated high-hazard potential dams in Missouri. The EAP template that was developed by the Missouri Department of Natural Resources can be found on the Dam and Reservoir Safety Program Emergency Action Planning Website. To date, over 400 Emergency Action Plans with inundation maps have been completed by dam owners with the assistance of their county emergency management directors (EMD).

Each US Army Corps of Engineer (USACE) dam also has an emergency action plan and inundation map. These EAPs are updated generally on an annual basis. Inundation maps for all USACE dams are in various stages of development. The USACE Modeling, Mapping, and Consequences (MMC) Production Center, which is part of the USACE Risk Management Center, are tasked with producing these maps. When a dam fails, the stored water can be suddenly released and have catastrophic effects on life and property downstream. Homes, bridges, and roads can be demolished in minutes. Residents near High Hazard or Significant Hazard dams should become familiar with the dam's emergency action plans, if available.

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Emergency plans written for dams include procedures for notification and coordination with local law enforcement and other governmental agencies, information on the potential inundation area, plans for warning and evacuation, and procedures for making emergency repairs. Persons at risk in inundation areas may include farm workers, hunters, anglers, hikers, campers and other recreationists. Livestock may also be endangered and crops may be damaged. To complete a quantitative analysis of people and property vulnerable to dam failure in Missouri as well as estimate potential losses, this risk assessment relied on available inundation maps for state and federally-regulated dams. While this analysis does not capture vulnerability to failure of all dams in the state, it is the most comprehensive analysis possible at this time with the available data.

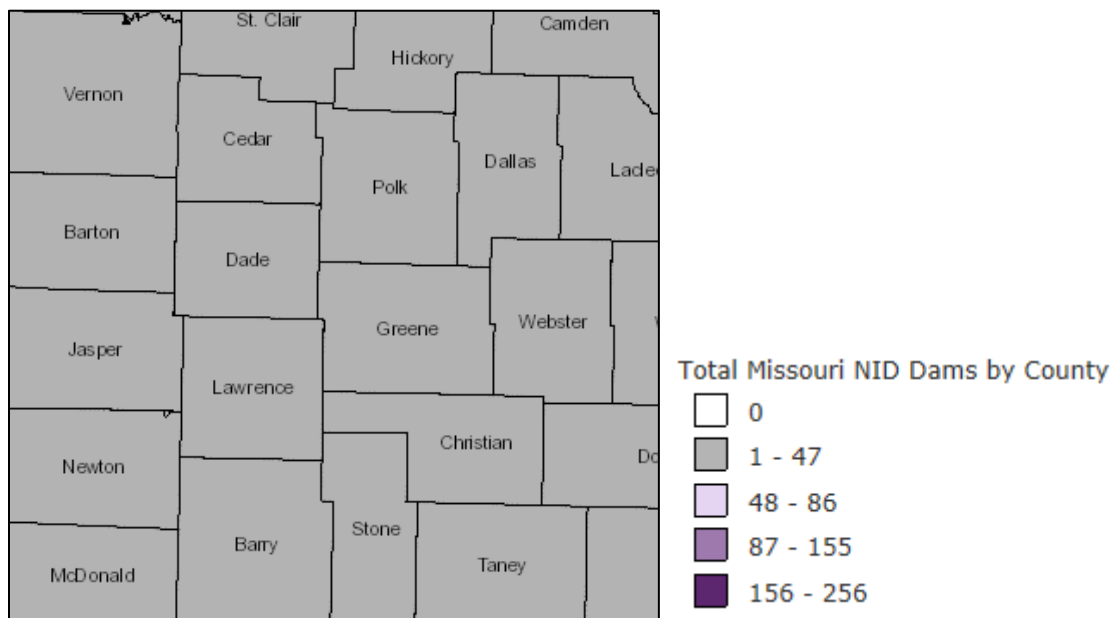
State and Federally-Regulated Dams with Provided Inundation Areas



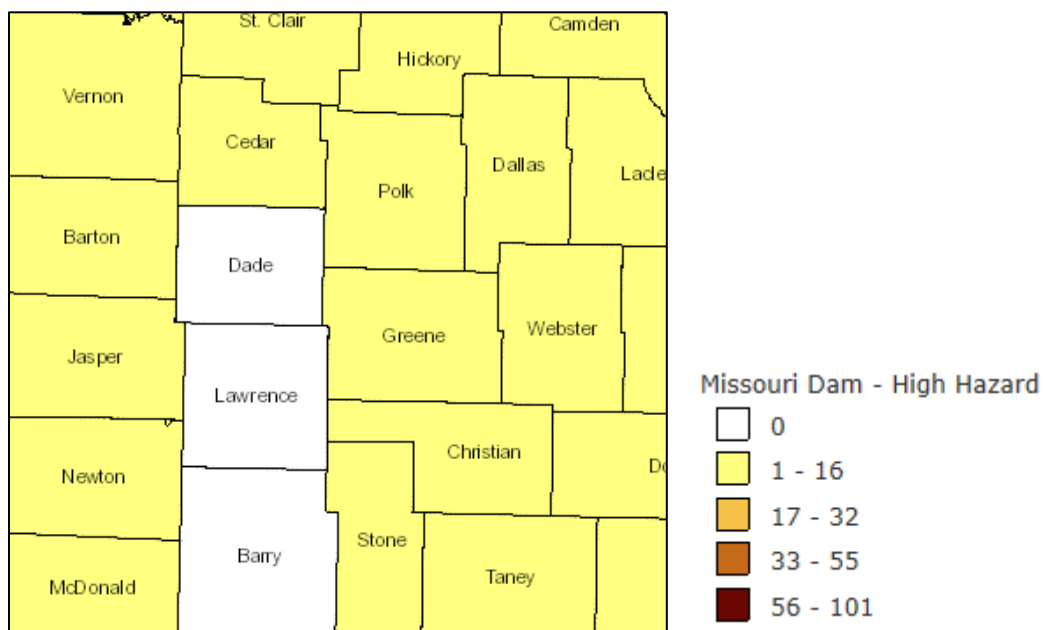
Inundation maps are included in the Maps section of the plan in the maps section of the plan.

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Total NID Dams by County

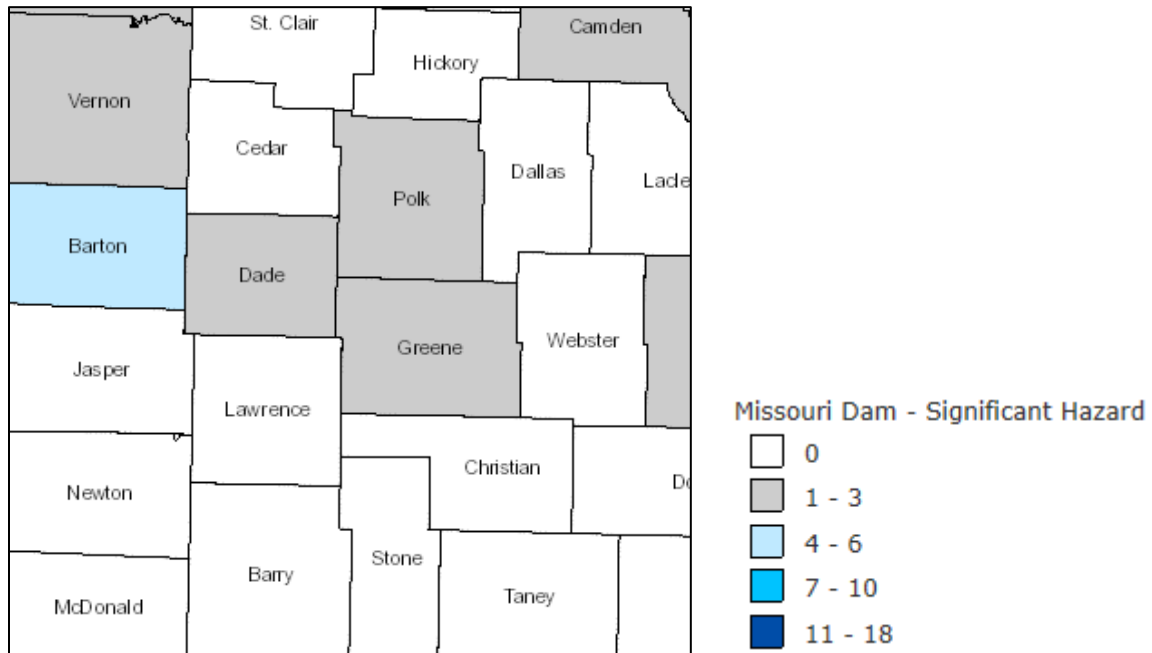


Greene County Dams-High Hazard

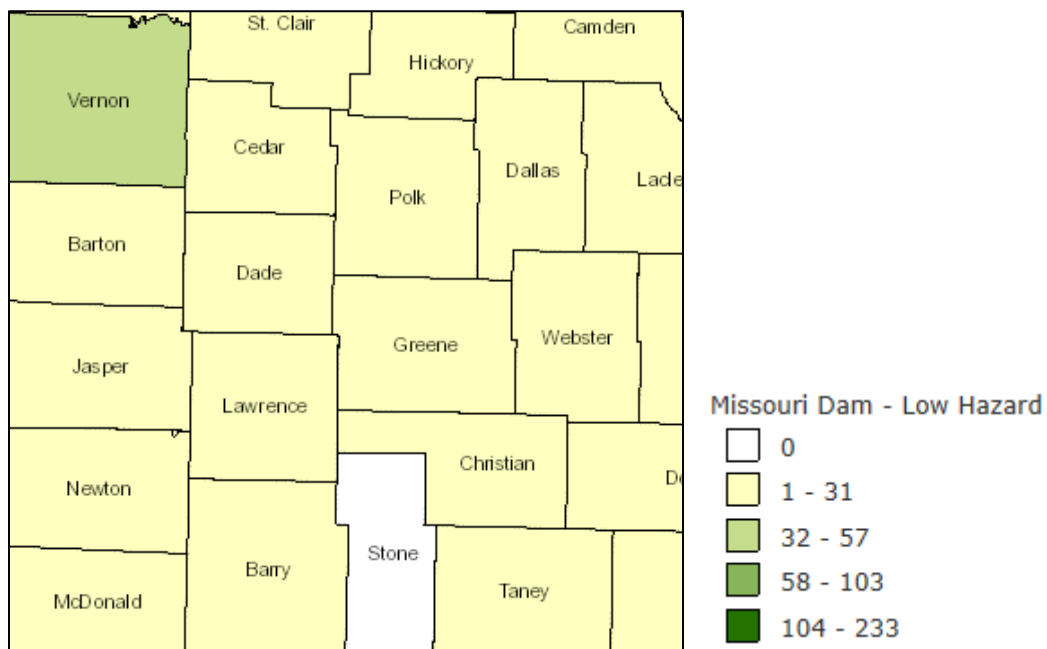


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Greene County Dams-Significant Hazard

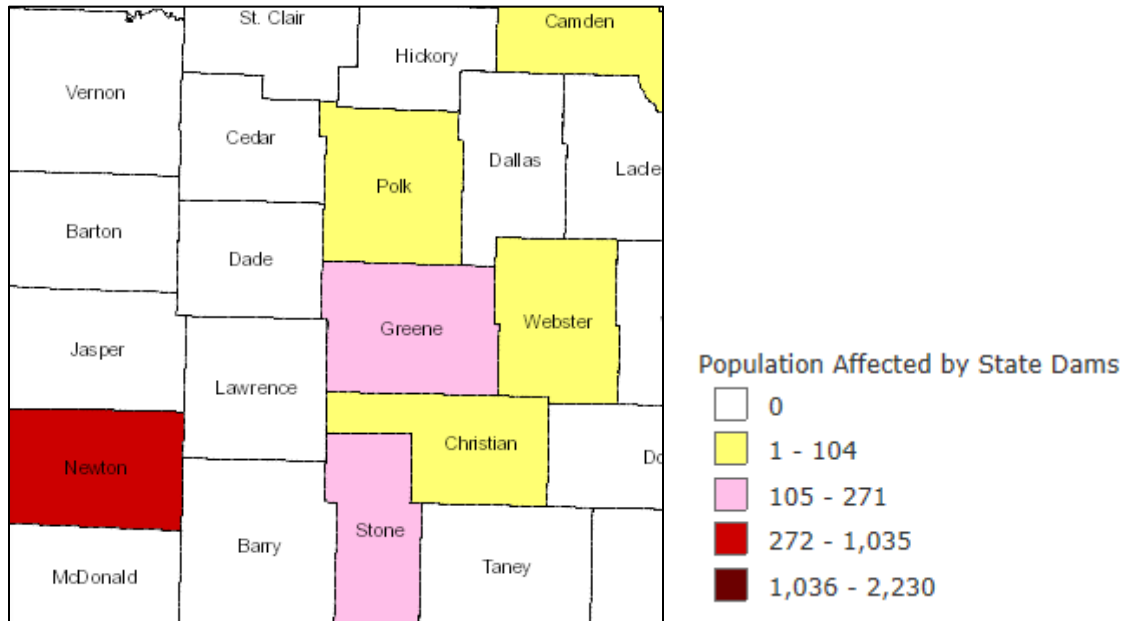


Greene County Dams-Low Hazard



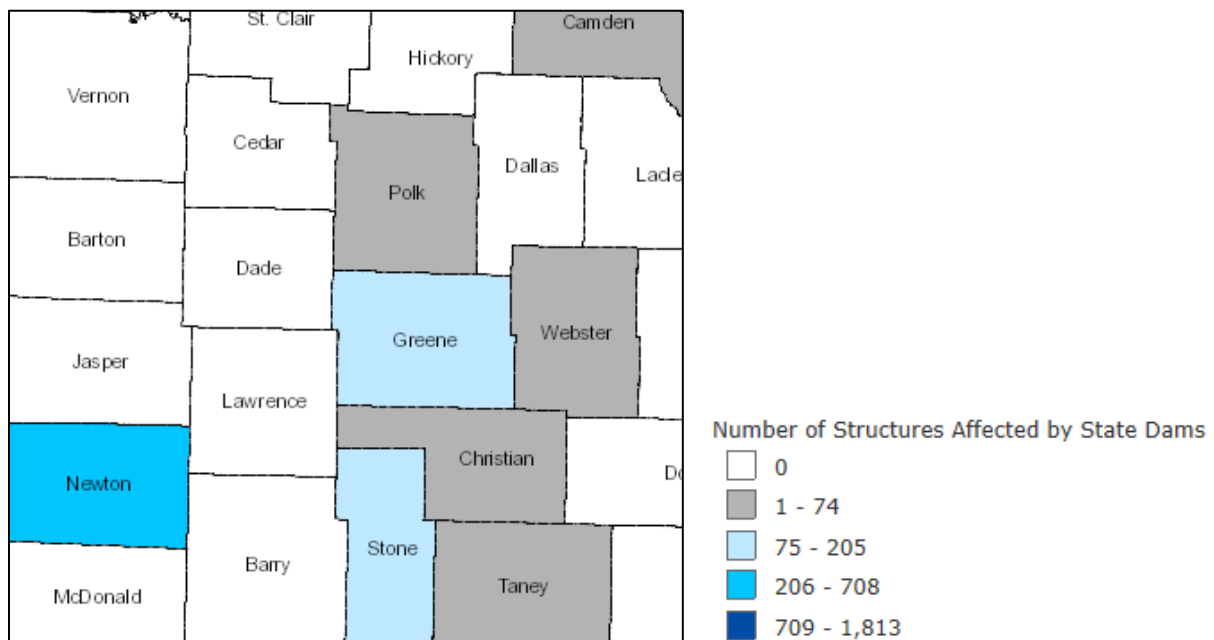
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Population Affected by State Dams



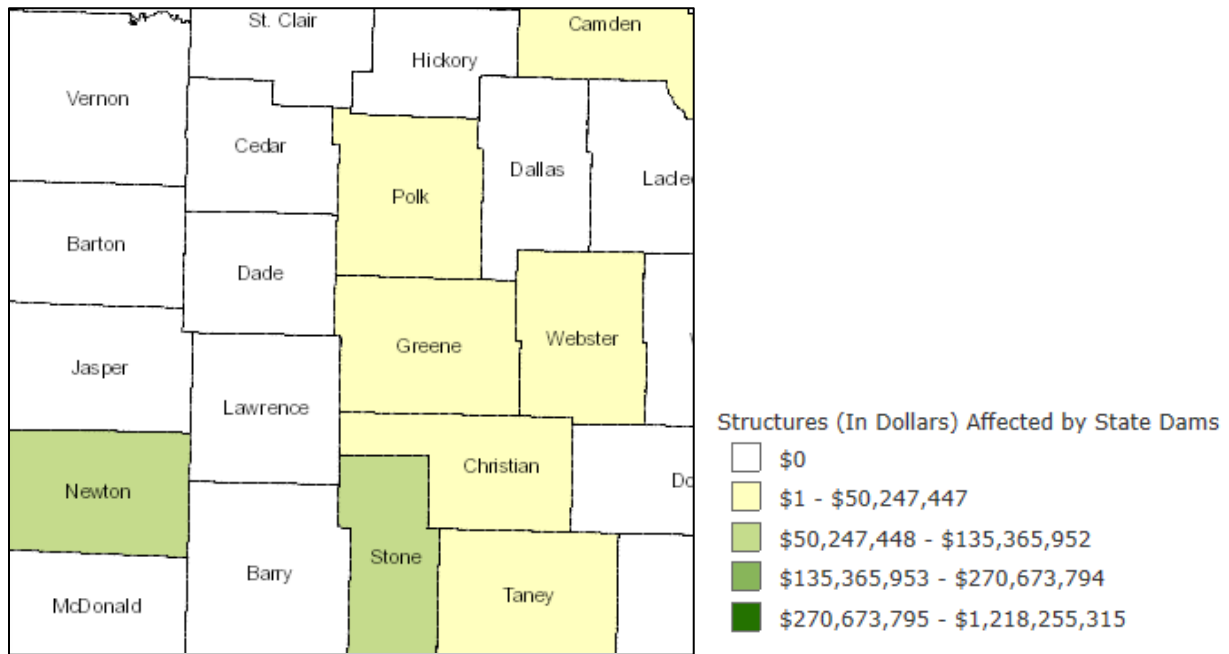
Potential Losses to Existing Development

Number of Structures Affected by State Dams



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Structures (In Dollars) Affected by State Dams



Other Potential Losses

Any dam failures can cause large amounts of damage to the community. These graphics above show the affects of state dams in Greene County but there are many other dams that can cause damage. One of the major risks of dam failure is environmental risks. The soil loss from erosion and scouring could be significantly greater, because of a large amount of fast-moving water affecting a small area. Large amounts of sediment from erosion can alter the landscape and change the ecosystem.

Impact of Previous and Future Development

As development continues in the Greene County area, the risk for many of our hazards increase. There is not much area to develop around Lake Springfield Dam, but there is space around Fellows Lake Dam. With these two dams being the largest dams in the county, they pose the most risk if there was a failure. There are many other smaller dams located around the planning area, any development close to those dams would also be at risk for experiencing damage from a dam failure.

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EMAP Consequence Analysis

EMAP Impact Analysis: Dam Failure

SUBJECT	DETRIMENTAL IMPACTS
Public	A dam failure in Greene County could result in the loss or severe limitation of drinking water. Health and safety concerns associated with dehydration could cause major widespread safety concerns, and possible illness and death.
Responders	Responder safety and response functions would be impacted due to a lack of water. This would become even more of a safety issue if the dam failure occurred in times of extreme heat or drought.
Continuity of Operations	A shortage of water from a dam failure would create interruptions from some services, and others may be delayed.
Property, Facilities, and Infrastructure	A dam failure in Greene County would cause little to no property damage. Utilities and essential facilities such as hospitals would not be able to operate efficiently without water. Facilities would experience little damage however; they would be impacted in a water shortage situation.
Environment	The environment would experience multiple instances of significant damage in the event of a waster shortage.
Economic Condition of Jurisdiction	A dam failure would greatly impact the economic condition throughout the jurisdiction in areas affected by the dam failure.
Public Confidence in the Jurisdiction's Governance	A water shortage from a dam failure would cause minor isolated instances of loss of public confidence in governance.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

There are two main dams in Springfield that could potentially cause a large amount of damage to the city if the dam would fail. Those two dams are Lake Springfield and Fellow Lake. If those dams would fail, the City of Springfield could experience large amounts of damage. There are many neighborhoods around the Lake Springfield Dam that could be affected. There is also the James River Power Station located right on the dam. Fellows Lake Dam does not have as much development around it as Lake Springfield, but there are some houses around the dam that could be affected if there was a failure. Most of the other dams around Greene County are small and would only affect a small amount of land/homes if there was a failure.

PROBLEM STATEMENT

Greene County has many dams spread around the planning area. Many of the dams are smaller and located in undeveloped parts of Greene County. The two main dams that could cause large amounts of damage if there was a failure are Lake Springfield Dam and Fellow Lake Dam. Dam failure can cause property damage, injuries and even death to the population affected. Dam Failure can also cause environmental and soil issues within the planning area. Many of the effects of dam failure are the same as flooding which is discusses in Section 3.4.4. Even though there have not been any dam failures in Greene County, there is a risk for one of the 17 dams in Greene County to fail. According to the Missouri State Hazard Mitigation Plan Greene County is in the top five counties for potential residential losses due to dam failure. Mitigation projects include relocating the dam to a less populated area if possible, improve safety around the dam and other dam structure improvements. The participating jurisdictions did not include any dam improvement projects in this Hazard Mitigation Plan.

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3.5.4 Technological Hazard: Hazardous Materials

HAZARD PROFILE

Hazard Description

The Department of transportation (DOT) has defined a hazardous material as any substance or material that can cause harm to safety of the public, handlers or carriers during transportation. Hazardous materials are essential to the economy of the United States where more than 3 billion tons of regulated hazardous material is transported in the country a year.

Hazard Materials by Class

Class 1: Explosives	<ul style="list-style-type: none">• Mass Explosion Hazard• Projectile Hazard• Predominantly a Fire Hazard• No Significant Blast Hazard• Very Insensitive Explosives with a Mass Explosion Hazard• Extremely Insensitive Explosives
Class 2: Compressed Gases	<ul style="list-style-type: none">• Flammable Gases• Non Flammable, Non-Toxic Gases• Toxic Gases
Class 3: Flammable Liquids	<ul style="list-style-type: none">• Flammable (Combustible)
Class 4: Flammable Solids	<ul style="list-style-type: none">• Flammable Solids• Spontaneously combustible• Water-Reactive Substances/ Dangerous when Wet Material
Class 5: Oxidizing Agents and Organic Peroxides	<ul style="list-style-type: none">• Oxidizing Substances• Organic Peroxide
Class 6: Toxic Materials	<ul style="list-style-type: none">• Toxic Substances• Infectious Substances
Class 7: Radioactive Materials	<ul style="list-style-type: none">• Radioactive Substances/Materials
Class 8: Corrosive Materials	<ul style="list-style-type: none">• Corrosive Materials
Class 9: Miscellaneous	<ul style="list-style-type: none">• Risk of Spontaneous Violent Reaction

Source: U.S. Department of Transportation

The Emergency Response Guide (ERG) states that there are suggested distances to be used with helping to keep the public safe from vapors and other hazards from spills when they happen. There is the initial isolation zone that defines the area surrounding the incident in which the person exposed upwind is dangerous and downwind is life threatening. The protective action zone is the area downwind of the incident in which a person may become incapacitated. Depending on the hazardous material the distance zone for safety will vary and a Safety Data Sheet (SDS) is required with every chemical per OSHA and has to be presented in a consistent and user-friendly format. The SDS will include information on the properties, physical, health and environmental hazards, protective measures, and safety precautions for handling, storing and transporting the material.

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Geographic Location

The entire planning area is susceptible to hazardous materials. Areas around modes of transportation are especially vulnerable due to the number of hazardous materials that go through the Greene County area. A Tier II facility is a facility that reports storing hazardous material. In Greene County, there are 378 Tier II facilities and 105 Tier II facilities with extremely hazardous substances (EHS).

The environmental Protection Agency (EPA) also maintains a National Priority List (NPL) which serves primarily for informational purposes, identifying for the States and the public for those known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation. Inclusion of a site on the NPL does not in itself reflect a judgement of the activities of its owner or operator, it does not require those persons to undertake any actions, nor does it assign liability to any person. In Greene County, there are 3 active NPL sites: Compass Plaza Well TCE, Fulbright Landfill and Solid State Circuits, Inc.

Strength/Magnitude/Extent

The magnitude of a hazardous materials release incident will vary in every case depending on the amount spilled or released, type of chemical, method of release, location of release, time of day, and weather conditions. Close coordination between the Missouri Department of Natural resources, the U.S Environmental Protection Agency (EPA), the local jurisdiction, and the spiller will be required to minimize the potential impacts to public health and the environment. A hazardous material incident could cause widespread and/or significant property damage, and create injuries or illnesses if human life.

Previous Occurrences

Probability of Future Occurrences

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is very likely for an accidental hazardous material event occur within the next year in Greene County. For a full description of the CPRI for hazardous materials, refer to Appendix B.

Changing Future Considerations

According to the Missouri State Hazard Mitigation Plan, accidental or incidental releases of hazardous materials are non-natural incidents and therefore, there are no implications for impacts from climate change. However, there is growing evidence that hazardous material releases triggered by natural hazards can pose significant risks. In these incidences, the impact of climate changes is of a secondary nature. It may exacerbate the natural hazard event by triggering release of hazardous materials.

VULNERABILITY

Vulnerability Overview

The entire county is susceptible to a hazardous materials incident. This hazard could have significant impact on the public health, the environment, private property, and the economy. The impact of this type of disaster will likely be localized to the immediate area surrounding the incident. The initial concern will be for people, then the environment. If contamination occurs, the spiller is responsible for the cleanup actions and will work closely with the Missouri Department of Natural Resources, EPA, and the local jurisdiction to ensure that cleanup is done safely and in accordance with federal and state laws.

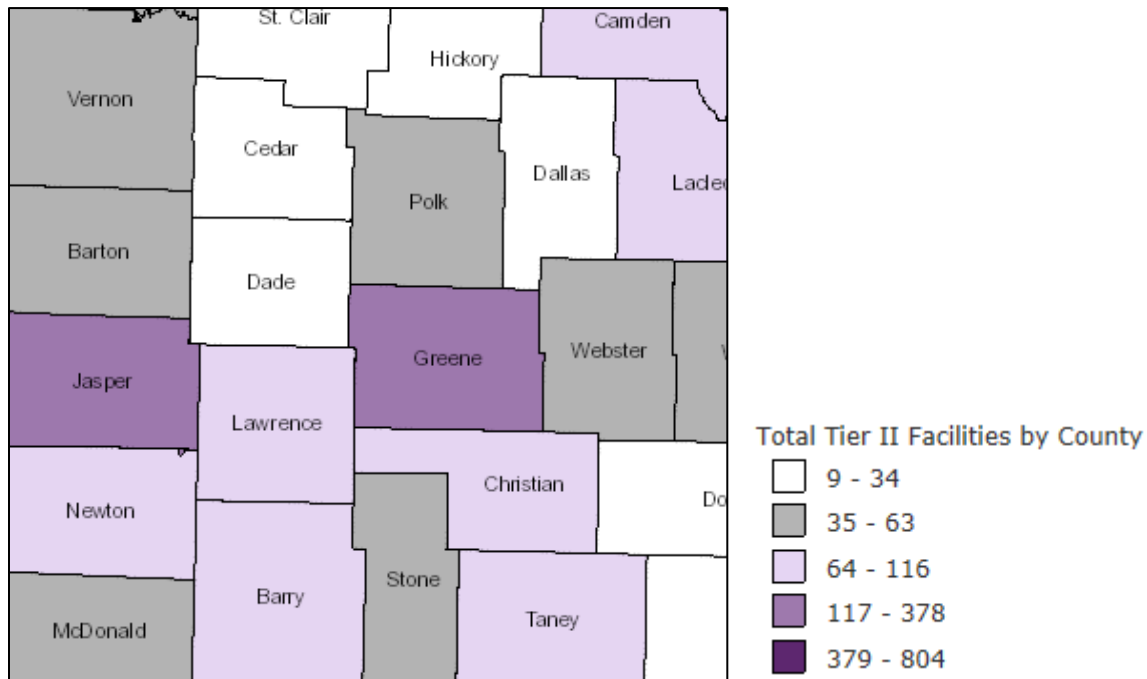
Local responders are generally the first on scene for any incident. They are responsible for treating any injured victims and transporting them to a hospital for more complete medical care. First responders have the initial

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responsibility for controlling exposure of emergency workers and the public to any radioactive materials. While cleanup of any actual spill of radioactive materials rests with the shipper (in most cases), local responders may be required to provide site control for several hours until the responsible parties arrive on the scene.

Every day, hundreds of trucks with chemical tanks travel through Greene County on Interstate 44 (I-44) and other highways/interstates. Hazardous materials also frequently travel through the county by train. These trucks and railcars constitute potential hazards on wheels. In addition, fixed facilities that store and use chemicals have the potential for accidents. During an accidental release of toxic chemicals or other emergencies where air quality is threatened, the toxins heavier than air settle on the ground and the people in proximity can breathe these toxins and be affected. The toxins lighter than air spread for several miles and impact distant people.

Total Tier II Facilities



Potential Losses to Existing Development

In most cases, the impact of this type of disaster will likely be localized to the immediate area surrounding the incident. The initial concern will be for people, then the environment. It is difficult to determine the potential losses to existing development because of the variable natures of a hazardous materials spill. If there was a hazardous spill in a heavy populated area, it would have a great potential for loss of life. If a spill happened in an agricultural area, it would be less costly.

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Potential Cost Estimate for HAZ-MAT Spill Remediation

ASSOCIATED COSTS	COST PER HOUR/UNIT	NUMBER OF HOURS/UNITS	TOTAL COST
Project Manager	\$92.65	8	\$741.20
Equipment Operator	\$95.76	8	\$766.08
Response Vehicle	\$30.66	8	\$245.28
Track Hoe	\$81.75	8	\$654.00
Environmental Tech	\$76.95	8	\$615.60
Duct Tap	\$7.63	6	\$45.78
Sampling Containers	\$13.08	20	\$261.60
PPE-Level B Protection	\$267.05	3 Staff @ 1 Day	\$801.15
Vermiculite (19lb Bag)	\$32.70	4	\$130.80
55 Gallon Drum	\$87.20	20	\$1,744.00
85 Gallon Overpack Drum	\$272.50	20	\$5,450.00
Total			\$11,455.49

Source: Missouri State Hazard Mitigation Plan

The total of \$11,455.49 is the cost per incident. Because the nature of this hazard is so variable, it is difficult to create a potential dollar loss estimate for Greene County. The damage that would be expected would be based on the type of chemical release, weather conditions, location of the spill, size of the spill, etc.

Impact of Previous and Future Development

As the population continues to increase along with the industries and the number and type of hazardous chemical stored and transported through Greene County, the amount of potential losses will also increase. According to the Missouri State Hazard Mitigation Plan, increased use and transport of materials across the country also creates serious problems for emergency services personnel. Many factors can increase the magnitude of an otherwise simple transportation accident into an incident of potential hazard to high number to people. The following are potential factors to be considered.

- Over 14,000 different chemicals are estimated as being shipped by the various transportation modes. Some types of highly toxic chemicals do not require placarding if shipped in quantities of less than 1,000 pounds, even though lesser quantities could devastate a small town.
- Only a few emergency response organizations in the larger cities and counties near the more metropolitan areas have had training for handling peacetime radiological problems. With recent federal grants and programs in place to provide funding for training, exercises and equipment for state Homeland Security response Teams and local responders, the general capabilities of hazardous materials response personnel and teams statewide is expected to improve.

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EMAP Consequence Analysis

EMAP Impact Analysis: Hazardous Materials

SUBJECT	DETRIMENTAL IMPACTS
Public	Hazardous materials have caused documented injuries in Greene County. Fatalities have not occurred, however are very possible.
Responders	Depending on the type of hazardous materials that are involved, there could be significant safety risks for responders. Response functions may also be impacted.
Continuity of Operations	Hazardous materials have had little to no impact on service operations.
Property, Facilities, and Infrastructure	Areas around modes of transportation are especially vulnerable due to the number of hazardous materials that go through the Greene County area. Hazardous materials in various forms can cause damage to buildings, homes and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways and pipelines. Some infrastructure functions such as transportation may have minor impact, especially if the incident occurs on a highway. Greene County has experienced little to no impact on facilities due to hazardous materials.
Environment	Hazardous materials in Greene County can cause multiple instances of damage to the environment if the spill creates a runoff of the roadway.
Economic Condition of Jurisdiction	Hazardous materials could have a minor impact on the economy in Greene County.
Public Confidence in the Jurisdiction's Governance	Hazardous materials incidents cause little to no loss of public confidence in governance.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

Though the entire planning area is susceptible to experiencing and hazardous materials risk, there are some jurisdictions that are more likely to see an incident. Jurisdictions along I-44 are closer to chemicals that are traveling through Greene County. Two major jurisdictions that are along I-44 are Springfield and Strafford. Strafford school district is located right off the I-44 exit, making them more vulnerable. Other jurisdictions that are more at risk are cities or communities with railroads traveling through them. The main jurisdictions that experience rail travel are Springfield, Strafford, Ash Grove, Rogersville, and Republic. Many hazardous materials travel by railroad and a train derailment could lead to a large exposure. The railroad in Strafford actually travels through the middle of town and could be potentially dangerous if hazardous materials were to derail.

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PROBLEM STATEMENT

Greene County has a large amount of Tier II facilities, with many of those facilities housing extremely hazardous substances. Greene County also has a major interstate, I-44, that runs through the middle of two jurisdictions. Many hazardous material incidents can occur because of a motor vehicle accident or train derailment. Hazardous material incidents pose a large threat to public and responder health and can be very expensive to clean up. Hazardous material incidents also need immediate clean up and responder action to contain. It is very likely that Greene County will continue to experience hazardous material waste incidents. Some examples of Mitigation solutions for hazardous materials include creating a Hazardous Materials Response Team, training more fire staff to handle this incidents, purchasing better equipment and public education. Many fire proection districts in the planning area requested more training or more staff for their districts as mitigation projects. These are located in the Mitigation Strategy section of this plan.

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3.5.5 Technological Hazard: Power Failure

HAZARD PROFILE

Hazard Description

A power failure is any interruption or loss of electrical service due to disruption of power transmission caused by accident, sabotage, natural hazards or equipment failure. There are many ways that a power failure can happen to an area such as: issues at power stations, damage to the power lines, substation or distribution system, short circuit or even overloading of the mains. Many systems require power that is critical to city and human life. These sites have automatic backup generators that will startup when the electrical power is lost.

- Transient fault: A transient fault is when there is just a few seconds of power loss to a line and the power is restored quickly.
- Brownout: A brownout is an intentional or unintentional drop in voltage in an electrical power supply system. A voltage reduction may be an effect of disruption of an electrical grid, or may occasionally be imposed in an effort to reduce load and prevent a power outage known as a black out.
- Blackout: A blackout is the total loss of power to a certain area of which this is the most severe form of power outage. These can last from minute to weeks depending on the nature and complexity.

Geographic Location

Power failure can affect any private or public property supplied with power. However, the source of the hazard is at the source of the power. Springfield City Utilities supplies both gas and electric to its customers in Springfield. The rest of Greene County is supplied by four electric service providers: Empire Electric, Southwest Electric, Ozark Electric and Webster Electric.

Strength/Magnitude/Extent

Electric companies have multiple transmission and distribution lines serving a community so that if a line goes down there is an alternative line to provide power to the community. Therefore, electricity is lost to as limited an area and for as limited time as possible. Many water companies have some type of back-up, alternative or redundant systems, such as water impoundments, other deep wells, storage tanks or interconnection arrangements with other water companies. Similar switching and rerouting capabilities may exist with communications, while damage to natural gas utilities can often be isolated leaving customers without service for some period of time. Many utilities utilize emergency batteries or generators to provide back-up power for high priority equipment.

Power failures usually last between a few minutes and a few hours. Little danger is present at this short of time, even in the heat of summer or cold of winter. On the other hand, if power went out for a day or more, serious problems could be had. Power failures during extreme temperatures put people at risk for heat stroke or hypothermia.

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Short-Term Power Failure Severity

Refrigerated foods are at risk of contamination after a few hours and should not be consumed. Water is also at risk of contamination due to supplier's water filters losing power. The longer a power failure lasts, the more danger is presented to the public. A lack of food and water and a lack of heating or cooling can result in serious health problems and even death.

Downed power lines can also be hazardous. Overhead and buried power lines are especially hazardous because they carry extremely high voltage. Fatal electrocution is the main risk, but burns and falls are also a hazard.

Long-Term Power Failure Severity

Power failures can cause secondary hazards and have an effect on the health of residents. One potential secondary hazard is chemical accidents that occur after power is restored to industrial facilities. Chemical spills in turn can have significant health and environmental impacts. Another secondary hazard that can result from power failure is a loss of communications capability by first responders, which may in turn have negative impacts on public safety. Backup systems such as amateur radio operators may be required during disaster to augment communications capabilities. Power outages can also lead to instances of civil disturbance, including looting. Wastewater and potable water utility interruption may occur as a result of a power failure. These critical utilities are essential to community continuity and recovery. Their interruption of service may have cascading economic and environmental impacts. Retail and wholesale gas suppliers cannot access gas in underground tanks nor have the electricity to pump it into the tanker trucks for delivery. While hospitals usually have backup generators, a long power outage could cause irreparable harm in a hospital.

Power outages can last anywhere from one minute to a few days. Usually power outages last no longer than a few hours. However, in some circumstances people have been without power for over a week. Greene County normally experiences mild and limited power outages. Therefore, the severity is generally limited with little property damage, and no injuries, or shutdown of critical facilities for greater than 24 hours.

Previous Occurrences

The following incidents that are listed are those that impacted 1,000 people or more. There are power outages that occur around the county all the time according to the City Utility website. City Utilities has an outage map on their website that lists current outages. This can be viewed at: <https://www.cityutilities.net/outage/map-status/>.

January 12-14, 2007

During the days of January 12-14, 2007, a historic ice storm hit Greene County. Approximately 1-2" of freezing rain accumulated over the 3 days, leaving over 200,000 southwestern Missouri residents without power. The heavy ice downed power lines and snapped tree branches. The Missouri National Guard was activated to patrol the rural areas. It took days to weeks for some areas to regain power because of the ice accumulations of the trees and power lines.

September 21, 2010

On September 21 2012, thunderstorms knocked out power all over Springfield. City Utilities of Springfield reported approximately 1,000 customers lost electricity. It knocked out traffic signals on Kansas Expressway at Sunshine Street, where drivers treated it as a four-way stop. No injuries or damages were reported.

September 27, 2010

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On September 27, 2012 a line failure at an electric substation in south central Springfield resulted in 2,500 people being without power. City Utility restored power back to Cox Health and majority of its customer within 45 minutes with about the remaining 800 people having power restored an hour later.

July 12, 2018

Overloaded substations caused over 7,000 Liberty Utilities Empire District customers were without power on July 12, 2018. It took over an hour to get power restored to the city of Republic. A message was pushed out to the Empire District customers to raise the temperature in their homes to relieve some of the stress on the power stations.

March 2019

Over 5,000 customers were without power, including Mercy Hospital Campus when a contractor crew damaged a line near Seminole and Kings Ave. The power outage caused a few major traffic lights to go out including the one on National and Sunshine.

June 2019

Missouri State University had an incident with a bird effecting a power grid. The University had to shut down power for a large portion of the campus for one hour while the systems were being repaired. Many classroom halls and dorms were effected.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is very likely for a power failure event to occur within the next one year in Greene County. For a full description of the CPRI for power failure, refer to Appendix B.

Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, Deteriorating infrastructure is a current nationwide problem that is likely to be exacerbated by changing future conditions. Higher future temperatures, for example, would increase the demand for cooling homes, businesses, and public buildings, placing greater stress on power systems. Other storms including severe storms (high wind and tornados) can also have an effect on power outages. If the amount of severe storms increase in the county, the risk for experiencing power outages also increases.

VULNERABILITY

Vulnerability Overview

All utilities, including power, are vulnerable to damage from many natural hazards. Public health and safety and potential impacts on the economy are primary concerns with this hazard. Power is the most vulnerable utility infrastructure. Typically, the most damage comes from damaging wind, lightning, winter storms or tornados. The electrical grid is vulnerable in periods of extreme heat when air conditioning use peaks. Underground utilities can also be damaged by expansive soils, erosion, earthquake and intentional or unintentional human actions. The Missouri Underground Facility Safety and damage Prevention Act helps prevent accidental damage of underground facilities. This statute makes it illegal to excavate without first giving notice and obtaining information concerning the possible locations of underground facilities.

Potential Losses to Existing Development

Electrical blackouts and power surges can damage high tech equipment but generally do not cause structural damage. Electrical utilities in Missouri prepare for disaster and power outages by developing written plans to

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follow when events cause outages to customers. Power outages caused by severe weather have prompted the creation of tree trimming plans to ensure above ground power lines are free of potential limbs that could fall on power lines and cause interruptions of power if knocked down.

Typically the damage that will occur from a power outage is damage to the equipment running the power.

Impact of Previous and Future Development

As many of the other hazards, increasing population can put more strain on our power systems leading to power failure. As seen in the Previous Occurrences portion of this hazard profile, the City of Republic and many other customers saw this in July 2018. Utility and infrastructure development and expansion should be minimized or mitigated in known hazard areas to ensure the vulnerability to this hazard is not increases as a secondary impact to the other hazards.

EMAP Consequence Analysis

EMAP Impact Analysis: Power Failure

SUBJECT	DETRIMENTAL IMPACTS
Public	Power failure can cause minor injuries or illnesses and a few safety concerns. A power failure in Greene County can cause illnesses if spoiled food is consumed, and lack of power can be a safety concern in weather extremes such as heat or cold.
Responders	Response functions are slightly impacted during a power failure. There are no life safety issues for responders.
Continuity of Operations	Power failure can cause many severe operations to be delayed or even suspended.
Property, Facilities, and Infrastructure	Power failure in Greene County has caused little property damage. Infrastructure is very depending on power. Fire alarms and water sprinklers that cease to function, inability to communicate via phone or email with emergency services. Major critical infrastructure is impacted in all key sectors in power failure. Power failure in Greene County has caused little facility damage.
Environment	Power failure in Greene County has caused little to no impact to the county's environment.
Economic Condition of Jurisdiction	A power failure would greatly impact the economic condition for the industrial and business operations.
Public Confidence in the Jurisdiction's Governance	Power failure would cause minor isolated instances of loss of public confidence in governance.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

The entire planning area is at risk for experiencing power outages at any given point throughout the year. The utility companies are generally prepared to deal with day-to-day outages. All jurisdictions, including school districts and universities are at risk for experiencing large power outages that could affect the jurisdictions for days. Cities and communities that have more damage from high winds or severe storms may experience more power outages than other communities may. Jurisdictions that have power cables that are buried underground may be at a lower risk as well.

3 - RISK ASSESSMENT

PROBLEM STATEMENT

Power outages are a hazard that the planning area will continue to see. Power outages happen on a daily basis throughout the county but are normally fixed in a timely manner. An increase in severe weather can put the county at a greater risk for experiencing power outages. Power outages that last a long period of time can affect the health and well-being of Greene County Citizens. Power outages are a hazard that the county should expect to see frequently in the area. The major mitigation solution for power outages is supply generators to critical facilities across the planning area. Many jurisdictions chose to projects that included purchasing at least one generator for multiple critical facilities including, EOC, fire houses, shelters and schools. These projects can be found in the Mitigation Strategy section of this plan.

3 - RISK ASSESSMENT

3.5.6 Technological Hazard: Train Derailment

HAZARD PROFILE

Hazard Description

A train derailment is when a train runs off its track. Although many derailments are minor, all result in temporary disruption of the proper operation of the railway system, and they are potentially seriously hazardous to human health and safety. In Missouri, there are approximately 4,400 miles of main track, 2,500 miles of yard track and about 7,000 public and private crossings. There are many reasons why a train may derail; some of the reasons are listed below.

- The primary mechanical failure of a track component. (For example: Broken rails, gauge spread due to tie failure)
- The primary mechanical failure of a component of the running gear of a vehicle (For example: axle box failure, wheel breakage)
- A fault in the geometry of the track components or the running gear that results in a quasistatic failure in running. (For example: rail climbing due to excessive wear of wheels or rails, earthworks slip)
- A dynamic effect of the track-vehicle interaction (For example, vertical bounce, track shift, under a train, excessive speed)
- Improper operation of points, or improper observance of signals protecting them.
- As a secondary event following collision with other trains, road vehicles, or other obstructions.
- Train handling (For example, snatches due to sudden traction of braking forces)

Geographic Location

Passenger trains no longer serve Springfield; however, more than 65 freight trains travel to, from and through the city each day. The Burlington Northern Santa Fe (BNSF) Railway is the largest. BNSF has three switch years in Springfield. Mainlines to and from Kansas City, St. Louis, Memphis and Tulsa converge at the railroad's yard facility in the north part of the city. The Missouri and Northern Arkansas Railroad also operate several miles of industrial track within the city. Many of our jurisdictions have railroads that travel through them including Springfield, Strafford, Ash Grove, Rogersville, and Republic. Those jurisdictions are at risk for experiencing train derailment.

Greene County, MO Railroad Lines from BNSF



3 - RISK ASSESSMENT

Strength/Magnitude/Extent

Train derailment poses several threats to Greene County. A derailment could cause loss of life, an explosion and subsequent fire, chemical/gas spill, and damage to the natural and man-made environment. A derailment could impact the surrounding area upwards of a mile or more if a hazardous chemical is spilled. A fire in an urban area could spread quickly, posing significant risk to the high population in the area. With several potential causes for a derailment and little warning time, the public is very vulnerable to any accident that could happen.

Previous Occurrences

Greene County does not have a large history of train derailments. Though Greene County does not have many incidents, the State of Missouri has had over 36 incidents and the U.S has seen over 1,200.

January 2019

Five train cars and a locomotive derailed at BNSF rail yard just north of Division Street in Springfield and came off their tracks. Three of the cars were carrying a hazardous material, Anhydrous Ammonia. Another car was carrying another hazardous material called Ethylene Oxide. The Springfield Fire Department investigated the seen to make sure none of the cars were leaking the hazardous materials. Fortunately, there were no leaks discovered and the rail cars were lifted without incident. If fire crews did find a leak, evacuations would take place immediately.

February 2013

Lilbourne, MO- Over a dozen rail cars flipped over when a faulty wheel broke on a train. No one was injured even though the train derailment blocked off an entire street.

May 2013

Rockview, MO- Two trains collided causing a derailment and the collapse of a highway overpass. Several people were injured including the train crew and two people driving under the overpass.

June 2012

Portageville, MO- Twenty rail cars tipped over spilling coal following a derailment. No one was injured in the derailment.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely for a major train derailment to occur within the next 10 years in Greene County. For a full description of the CPRI for train derailment, refer to Appendix B.

Changing Future Conditions Considerations

Weather hazards can be a potential cause for derailment. This includes ice and snow, tornadoes, and damaging winds. As those weather related hazards increase there is a possibility that train derailment could increase as well. Most of train derailments are caused become of equipment failure or mechanical issues.

3 - RISK ASSESSMENT

VULNERABILITY

Vulnerability Overview

Large train derailments or train derailments that involve hazardous materials can be very dangerous and cause large amounts of damage. Damages from a derailment that involve hazardous materials can lead to public health issues and public evacuations for miles of where the derailment happened. Despite the limited number of incidents that occur each year, the danger is significant. Train rails cars go through towns daily carrying everything from explosives to class-nine miscellaneous chemicals. Train derailments can also lead to urban or wild fires.

Potential Losses to Existing Development

Train derailments can be extremely expensive depending on the magnitude and extent of the derailment. If the train was carrying hazardous materials, it could involve a hazmat clean up. See Section 3.5.4 for more information on hazardous material cleanup cost. Typically, the damages from a train derailment are localized to a specific area.

Impact of Previous and Future Development

Population increase could cause the amount of people affected by a train derailment to increase, but typically, train derailments are localized hazards. Any new development that is close to a railroad would be at higher risk for experiencing damages from a derailment. When population grows, so does development.

EMAP Consequence Analysis

EMAP Impact Analysis: Train Derailment

SUBJECT	DETRIMENTAL IMPACTS
Public	A recent train derailment that happened in Springfield could have caused a large public safety risk if the rail cars that tipped would have leaked. There is a possibility for injuries and there are definite safety concerns with train derailment and hazardous materials.
Responders	Responders and response functions may be impacted depending on what the train was carrying (hazardous materials) and the severity of the derailment.
Continuity of Operations	Minor service operations may be interrupted and there may be some delay of service depending on the train load, location of the incident, and the situation.
Property, Facilities, and Infrastructure	A train derailment could cause multiple instances of significant property damage in Greene County. Minor impacts to some key infrastructure sectors may occur from a train derailment incident depending on the rail load, the location of the incident, and situation. A train derailment would result in little to no facility damages.
Environment	A train derailment could cause minor instances of environmental damage depending on what type of chemicals are involved and amount of the environment contaminated.
Economic Condition of Jurisdiction	A train derailment may have a minor economic impact depending on the train load, location of the incident and the situation.
Public Confidence in the Jurisdiction's Governance	There is little to no effect on public confidence in governance from a train derailment incident.

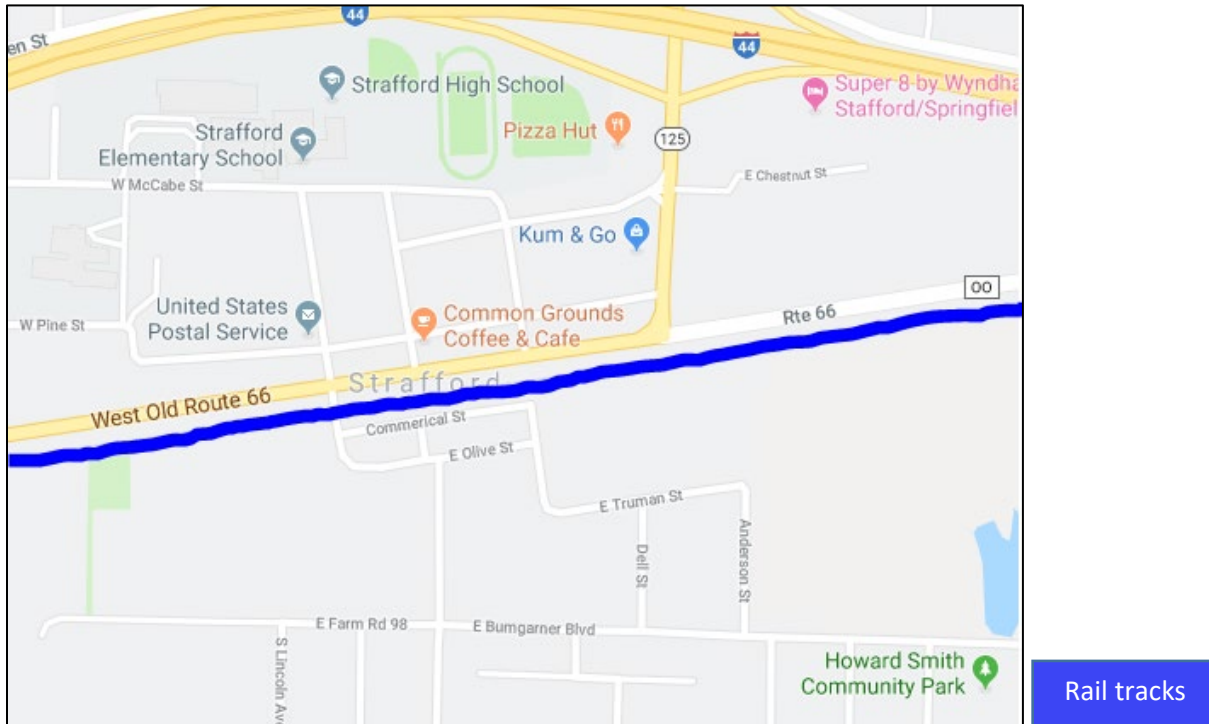
*For more details on Consequence Analysis, refer to Appendix B.

3 - RISK ASSESSMENT

Hazard Summary by Jurisdiction

Train derailments are a hazard that some of our jurisdictions are at a higher risk for experiencing. The jurisdictions that have trains that run through the cities are Springfield, Strafford, Ash Grove, Rogersville, and Republic. The City of Strafford actually has a train track that runs through the middle of town. The train track is very close to businesses and the school district. If there was a derailment of hazardous materials in the city of Strafford, it is likely that the schools would have to evacuate.

City of Strafford



As you can see in the map above, the schools district is on one side of the tracks and on the other side is a community park and residential housing.

PROBLEM STATEMENT

Though train derailments do not happen very often in Greene County, they still have a large risk in the planning area. A train derailment carrying hazardous materials can cause a huge public health risk and can be very expensive to clean up. A train derailment in a populated area, like Strafford, can also cause a large amount of damage and injury to people around the derailment. Train derailments are hard to mitigate, but some solutions include education, quicker response, and relocation of critical facilities around the railroad. No participating jurisdiction chose to create a project mitigating train derailment in this Hazard Mitigation Plan.

3 - RISK ASSESSMENT

3.5.7 Technological Hazard: Urban Fire

HAZARD PROFILE

Hazard Description

An urban fire describes an uncontrolled fire within an urban area. Protection from an urban fire is based largely on amount of firefighters, built-in fire protection and building techniques. An urban conflagration is the term used to describe a catastrophic urban fire. An urban conflagration is a large, destructive fire that spreads beyond natural or artificial barriers; it can be expected to result in large monetary loss and may or may not include fatalities. These fires can occur for a variety of reasons. They can come secondary to another event such as a ruptured gas line or a flood. Urban fires can also be caused from open flames and accidental fire. Heating sources within homes or industrial processes are a part of everyday life that can cause a fire to start and spread rapidly.

Causes of Urban Fires:

- Storms
- Droughts
- Transportation Accidents
- Hazardous Material Spills
- Arson
- Terrorism

Urban fires can be maintained and limited by creating natural breaks in buildings, including sprinkler systems into buildings, ensuring adequate water pressures and volumes, ensuring secondary water sources, and maintaining an adequate number of firefighters to reduce chances of a fire growing into an urban fire.

Geographic Location

An urban fire can occur anywhere in the planning area, but the fire needs fuel supply and room to grow. Large urban fires are most likely to occur in areas of dense population, crowded buildings with little or no open spaces, or in buildings that do not meet building code requirements. Urban fires can occur within towns and cities, in buildings or structures, in mines, or on transportation routes such as bus, train, or other vehicles on the road.

Strength/Magnitude/Extent

Urban or structural fires can cause large amounts of damage. Many single structural fires carry large amount of loss to the individual structure. If the fire continues to spread, it can cause more damage to other property, it can also be harder to contain and even cause loss of life or injury to animals and people. Depending on how old buildings are and if they are up to code makes a huge difference on how much damage could be caused.

The extent of damage relies mostly on insurance coverage. Some fires can cause large amounts of damage and if the home or building is not insured, that could mean a huge loss for the owner. Insurance does not always cover everything that was in the home or building that was destroyed either.

Previous Occurrences

Individual structure urban fires occur frequently in Greene County. It can occur weekly or even daily at certain times of the year. Greene County has not experienced a large occurrence that effected multiple buildings or urban areas.

3 - RISK ASSESSMENT

Probability of Future Occurrences

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely for an urban fire to occur within the next 10 years in Greene County. For a full description of the CPRI for urban fire, refer to Appendix B.

Changing Future Conditions and Considerations

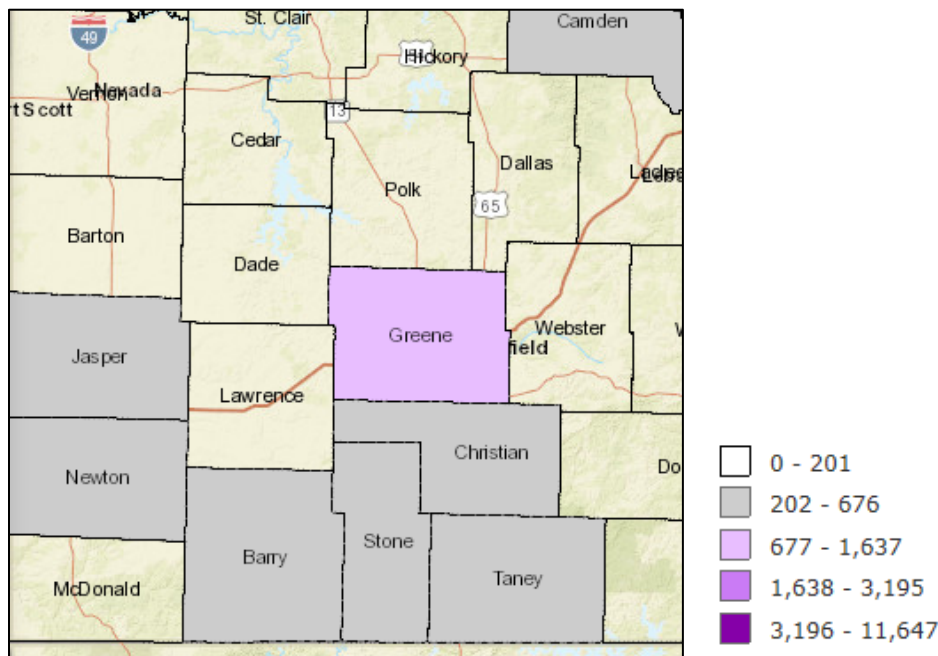
As mentioned in the hazard description sections, urban fires can be caused by weather events. Storms and droughts are two of the main causes. As discussed in sections 3.4.1 and 3.4.6, it is possible for Greene County to experience more severe storms and droughts with climate change. Droughts make things dry out and can make it easier for fires to spread. When flooding occurs, it increases the chances of water causing an electrical fire which can lead to structural fires. Large floods can lead to catastrophic urban fires. This was demonstrated with Hurricane Sandy caused flooding in Queens, New York. Fires destroyed 122 homes in a neighborhood, the fires started from sea water hitting electrical systems.

VULNERABILITY

Vulnerability Overview

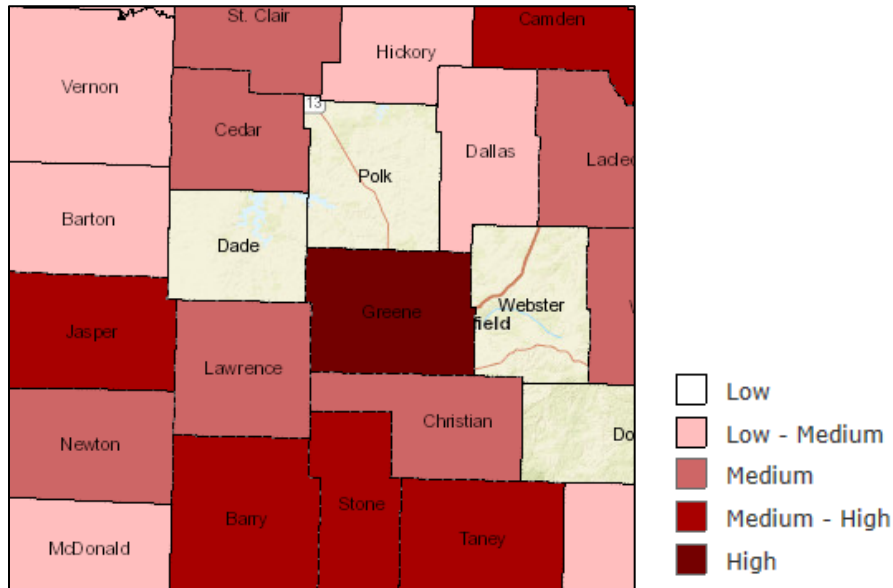
Urban fires can be extremely dangerous and cause large amounts of property loss if not controlled quickly. The entire planning area is at risk for experiencing damages from an urban fire, but more densely populated areas are more likely to experience large urban fires. The elderly population tend to be more vulnerable to fires than any other age group. They also experience the highest number of deaths per fire. The second most vulnerable age group are children. Older homes are also more at risk in experiencing urban fires. Urban fires often occur in heavily populated areas and developed areas.

Structure/Urban Fire Average Annual Occurrence

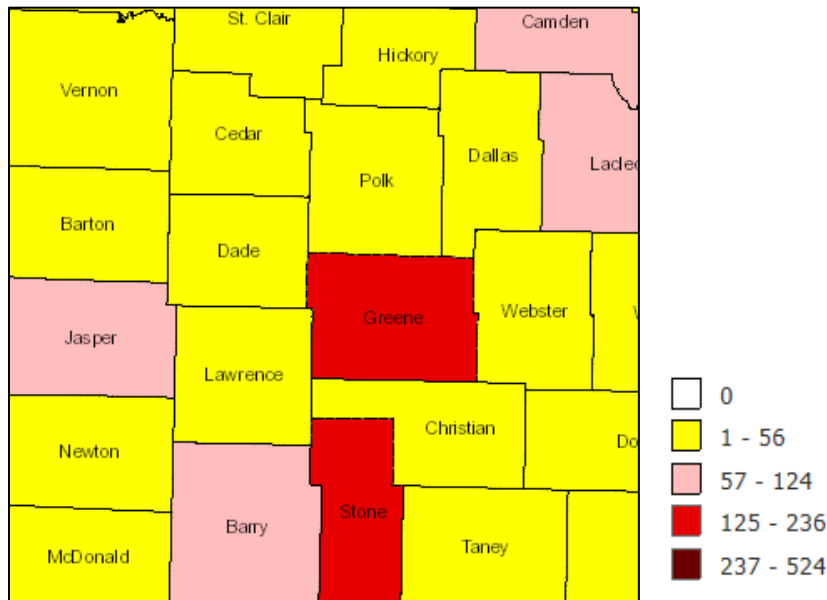


3 - RISK ASSESSMENT

Vulnerability of Occurrence

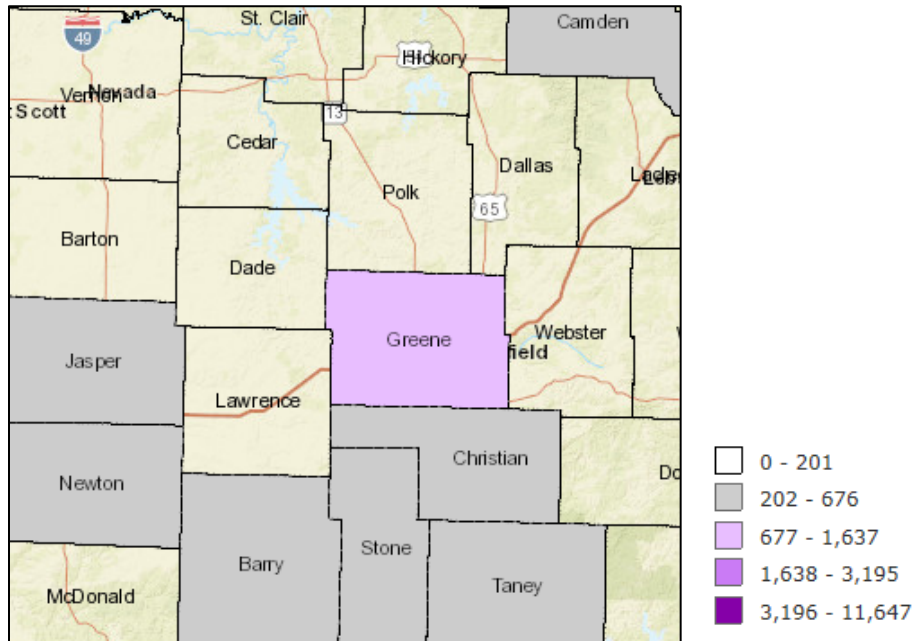


Historical Number of Deaths and Injuries



3 - RISK ASSESSMENT

Average Annual Occurrence



Potential Losses to Existing Development

As mentioned above, urban fires can cause large amounts of damage and cost the owner and insurance companies a lot of money. If a fire is not controlled quickly, potential loss for more structures is at risk. Older homes are more at risk for experiencing large amounts of damage because of an urban fire. Many of our jurisdictions have older homes and buildings.

Impact of Previous and Future Development

The probability of a fire occurring does increase with population increase. This is due mostly to human error and carelessness, which are other factors contributing to urban fires. More people in the county can also lead to more people making their own source of heat using wood burning, space heaters, etc. Population increase also means more development, newer homes can be built closer together to make room for more homes. This can cause an increase in risk of a larger urban fire to occur.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Urban Fire

SUBJECT	DETRIMENTAL IMPACTS
Public	The safety of the public is of significant concern if an urban fire were to take place. Older neighborhoods in Greene County could create a large number of injuries or fatalities.
Responders	An urban fire in Greene County could present life threatening issues and challenges for response functions.
Continuity of Operations	An urban fire would have little to no impact on service operations in Greene County.
Property, Facilities, and Infrastructure	An urban fire could cause widespread significant property damages. Large urban fires are most likely to occur in areas of dense population, crowded building with little or no open spaces, or in building that do not meet building code requirements. An urban fire could cause multiple critical infrastructure sectors to be impacted such as bank and finance, emergency responders, etc. An urban fire could also cause widespread or multiple instances of facility damage.
Environment	An urban fire would have a very limited effect on the environment, because it is located in an urban areas. There may be minor isolated instances of damage to the environment.
Economic Condition of Jurisdiction	An urban fire could greatly impact the economic system due to damage in Greene County.
Public Confidence in the Jurisdiction's Governance	An urban fire would cause little to no loss of public confidence in governance in Greene County.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

Urban fires is a hazard that the entire planning area is at risk for. There are certain areas in the county that could experience more damages than others. Springfield is the most densely populated community within Greene County. Springfield has many older homes and homes/buildings that are built in close proximity to one another. This puts Springfield at a greater risk for experiencing urban fires. Springfield has many fire stations placed around the Springfield area, which helps reduce the risk of experiencing large amounts of damage. Ash Grove has many old homes and buildings that are more at risk in experiencing damage because of urban fires. Locations in the planning area that are in poverty may also experience more urban fires because alternative heating sources used in the winter.

PROBLEM STATEMENT

Urban fires have the potential to become extremely dangerous in the planning area. Urban fires can cause large amounts of property damage if not controlled quickly. They can also cause loss of life to both people and animals. Though Greene County has not experienced a large urban fire event, many small structural fires happen frequently in the area. Small structural fires can often lead to larger urban fire events. Other hazards like storms and droughts can also can an increase in urban fires. Mitigation solutions for urban fires include training for fire personnel, more fire protection district locations, public education and development planning within the local governments. No participating jurisdiction created mitigation projects for urban fires in this Hazard Mitigation Plan.

3 - RISK ASSESSMENT

3.6.1 Human Caused Hazard: Biological

HAZARD PROFILE

Hazard Description

This hazard profile focuses on deliberate attacks using biological weapons. For more information on naturally occurring diseases, please see the Communicable Disease Hazard Profile.



Biological Terrorism

Biological Terrorism (Bio-terrorism) is the deliberate release of agents (viruses, bacteria or other germs) to cause illness or death in people, animals and plants. The agents are usually found in nature, but may be modified to increase the severity of the attack (e.g. making the agent resistant to medication). Biological agents may be spread through air, water or food. Some biological agents may be spread human to human (e.g. small pox), while others cannot (e.g. anthrax).

Agricultural Terrorism

The Congressional Research Service explains that agriculture terrorism, or agro-terrorism, is the deliberate introduction of animal or plant disease with the goal of generating fear, causing economic losses and/or undermining social stability. The goal of agro-terrorism is not to kill animals or plants; agro-terrorism is an outlet for terrorists to cause public panic.

Biological Agent

AGENT	POPULATIONS/SPECIES MOST LIKELY AFFECTED
Anthrax	Wild and domestic lower vertebrates (Cattle, sheep, goats, camels, antelopes and other herbivores). Humans may also become infected if exposed to infected animals. Anthrax outbreaks occur on an annual basis in livestock and wild game animals (e.g. deer)
Botulism	Humans are most likely to be exposed and experience botulism-related events; humans are typically infected due to inadequate in-home canning practices.
Brucellosis	Sheep, goats, cattle, deer, elk, pigs, dogs and humans
Plague	Fleas, small rodents and humans
Smallpox	Humans are the only natural hosts.
Tularemia	Frequently found in rodents, rabbits and hares; humans are also affected.

Source: Greene County Multi-Jurisdictional Hazard Mitigation Plan 2015-2020

3 - RISK ASSESSMENT

Transmission

As with many man-made hazards, biological agents may be used intentionally or unintentionally. Thus, the agents listed below articulate modes of transmission. An intentional transmission implies a malicious intent or the use of a biological agent as a weapon. An unintentional transmission involves unknown or accidental contact with infected humans, animals and objects.

AGENT	TRANSMISSION
Anthrax	Anthrax may be deliberately spread by contaminating items that humans come in contact with.
Botulism	Food supplies may be contaminated, passing the agent to a large population across a large region.
Plague	An aerosol attack could distribute the agent and infected individuals would develop pneumonic plague. This can be spread to anyone who is in close contact with the infected. Because of the delay from exposure, the agent may cover a wide geographical area as people travel.
Smallpox	After September 11 th , the U.S. government has become increasingly concerned that smallpox will be used as a biological agent because citizens have not been regularly vaccinated for smallpox since 1980.
Tularemia	The mechanisms for intentionally spreading Tularemia would occur by using natural carriers of the disease.

Source: Greene County Multi-Jurisdictional Hazard Mitigation Plan 2015-2020

Geographic Location

All areas of Greene County are equally susceptible to a biological hazard whether that is directly or indirectly.

Strength/Magnitude/Extent

Biological weapons can be extremely dangerous to the Greene County population. Biological weapons can bring serious health risks to our citizens.

The use of biological weapons is not only a threat to humans; it is also a serious threat to agricultural ecosystems, wildlife faunas and their habitats. A bio-terrorist attack on a nation's livestock would have a devastating effect on that nation's agricultural industry in terms of economic loss. Moreover, it could have harmful spill-over effects on other susceptible wildlife species: introduced diseases affecting domesticated animals or humans could be particularly harmful for native species that are naturally rare and species whose numbers have been depleted due to habitat degradation.

Agro-terrorism

Agro-terrorism is particularly disconcerting because of the ease in which the industry may be attacked. Farms are geographically dispersed in unsecured environments. Agriculture diseases can be easily obtained, handled and distributed. Further, many veterinarians and farmers are unfamiliar with foreign animal diseases because most diseases have been eradicated domestically. Thus, terrorists are given a low-cost but highly effective way to disrupt the United States economy and cause a public panic.

Economics

The agriculture industry is vital to the U.S. economy, yet it would be easy to infect animals and humans. A concern is the effect an agriculture disease would have on crops and animals. The demand for produce would rapidly increase, but the supply would rapidly decrease. This may result in a famine.

3 - RISK ASSESSMENT

Previous Occurrences

Greene County and our surrounding areas have not experienced a terrorist attack in the past. Though there has not been an event that has occurred, Greene County is still a strong contributor to the cattle/beef production industry.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely for a biological event to occur within the next ten years in Greene County. For a full description of the CPRI for biological events, refer to Appendix B.

Changing Future Conditions Considerations

Climate change will not affect the chances of Greene County experiencing a biological attack.

VULNERABILITY

Vulnerability Overview

The fear of an attack from biological weapons is greater than ever because, of all weapons of mass destruction, they are the easiest and cheapest to produce. At the most basic level, bio-terrorist attacks against people only require access to natural diseases that can cause disastrous epidemics – laboratory cultures or specialized disease strains are not necessary. Natural diseases are common, widely distributed and easily acquired and transported.

Biological weapons are sometimes the hardest to detect, especially with today's ease and rapidity of international transport, and the increase human and animal resistance to antibiotics enhances the spread of disease. There is a chance that there could be no warning time for an attack. Biological terrorism attacks have the chances of producing large loss to Greene County's agriculture. Biological attacks can also put large amounts of our population at risk.

Potential Losses to Existing Development

The greatest loss that Greene County could experience from a bioterrorism attack would be agricultural loss. As discussed, many diseases are passed through animals. Greene County has a large amount of cows that are used for the beef industry. Farmers would see a huge loss if cattle was affected by Anthrax. The economy could also see a huge loss and the supply demand for crops, produce and meat would increase and supply would decrease.

Impact of Previous and Future Development

As the population increases, it is likely that Greene County could see an increased risk to experience a biological attack. Greene County, more specifically Springfield, is becoming more of a tourist place because of Bass Pro Shops. Springfield is also located fairly close to Branson, which is a larger tourist town. More traffic of people in Greene County can raise the risk of bioterrorism attacks.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Biological

SUBJECT	DETRIMENTAL IMPACTS
Public	A biological attack can deliver any of a large range of safety and health consequences. A biological attack would create a severe number of illnesses, and possibly death.
Responders	Responders will become overwhelmed in a biological incident. There will also be potential fire safety issues for responders as well. Response functions will be impacted.
Continuity of Operations	Minor service operations may be interrupted (anything to do with food and water), and many may be delayed.
Property, Facilities, and Infrastructure	A biological attack would result in minor isolated instances of property and facility damage (where it was detonated or released). Multiple critical infrastructure sectors will be impacted by a biological hazard. Hospitals and emergency response will be overwhelmed.
Environment	The environment would experience widespread significant damage from a biological incident.
Economic Condition of Jurisdiction	A biological incident would be catastrophic for the economy. The agriculture sector would be in ruins, and non-contaminated food and water will be scares possibility for very long distances.
Public Confidence in the Jurisdiction's Governance	Lack of food and water after a biological attack could result in major widespread loss of public confidence in governance.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

The entire planning area could be affected by bioterrorism attacks. Greene County's agriculture is most at risk for being targets. Greene County does contribute to the cattle/beef industry. Our jurisdictions with crops and cattle would be at higher risk than other jurisdictions. Greene County has a pretty low risk of experiencing a bioterrorism attack.

PROBLEM STATEMENT

Biological terrorism has been around for many of years. The fear of an attack grew more after the attacks on September 11, 2001. Bioterrorism can affect many different aspects of Greene County, including public health and agriculture. Though our risk for experiencing a biological attack is low, a risk is still present. Mitigation solutions for bioterrorism include detailed planning from the local, state and federal governments. The planning should include responses, idea of multiple events, first responder safety, public health safety and many other aspects. Other solutions include public education. No participating jurisdiction chose a project for bioterrorism in this Hazard Mitigation Plan.

3 - RISK ASSESSMENT

3.6.2 Human Caused Hazard: Chemical

HAZARD PROFILE

Hazard Description

The chemical industry is the center of the modern world economy, converting raw materials (e.g. oil, natural gas, water, metals and minerals) into more than 70,000 different products. Chemical manufacturing is a nearly \$3 trillion global enterprise with companies from the EU and the USA being the world's largest producers.



Chemical hazards, however, encompass any chemical that has the capability to cause an unreasonable risk to human health and safety or the environment when transported in commerce, used incorrectly or not properly stored and contained.

Forms of Exposure

- **Inhalation:** Absorption through the respiratory tract by inhalation. This is probably the easier way for chemicals to enter the body.
- **Ingestion:** Absorption through the digestive tract by eating or smoking with contaminated hands or in contaminated work areas. Depending on particle or droplet size, aerosols may be ingested.
- **Skin or Eye Contact:** Absorption through the skin or eyes. Skin contact is the most common cause of the widespread occupational disease dermatitis. The eyes are very porous and can easily absorb toxic vapors that cause permanent eye damage.
- **Injection:** Percutaneous injection through the skin. This can occur through misuse of sharp items, especially hypodermic needles.

Intentional Release

Though most chemical hazards are caused by accidental release of a material, the possibility of intentional release cannot be ruled out when planning for response to chemical threats. Given that some chemicals toxic to people and the environment are both colorless and odorless it would not be difficult, for example, to covertly expose the public to such chemical hazards via release from a moving vehicle. The Federal Emergency Management Agency (FEMA) explains that delivery of chemical hazards in lethal dosages is difficult, especially in an outdoor environment where they dissipate rapidly. Nevertheless, the ready availability of toxic chemicals makes intentional release a threat not to be ignored. A more complex and coordinated release of chemical hazards via explosives laced with toxic agents or introduction into the public drinking water system even has the potential to create a major public health emergency in addition to creating unrest among the people.

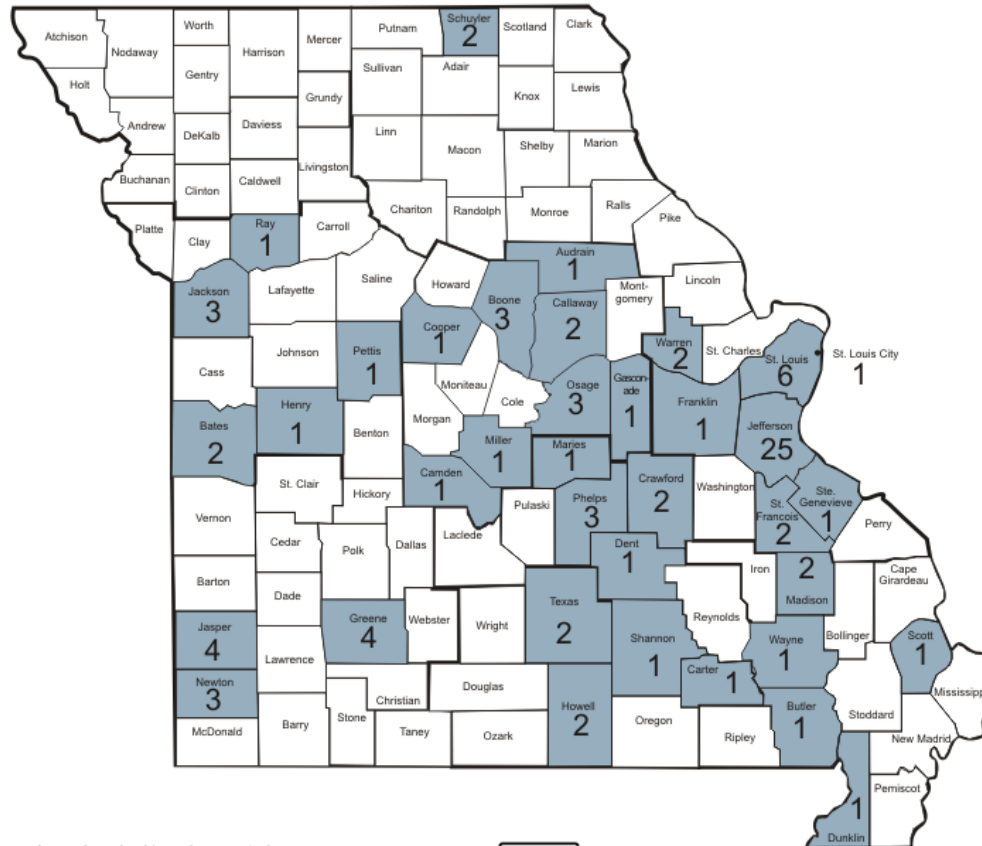
Clandestine Laboratory

Clandestine laboratories found in this area primarily produce methamphetamine, most commonly referred to as: meth, crank, crystal, ice, speed, go fast, and go. These laboratories range from highly sophisticated to makeshift operations, more and more of which are mobile being set up anywhere. They are commonly located in private residences, hotels, trailers, cemeteries, abandoned farms, rural lands and all types of vehicles.

3 - RISK ASSESSMENT

Methamphetamine addiction varies from person to person. Meth initially sends the brain a feeling of pleasure but through prolonged use the pleasurable feeling is lessened or lost. The meth addict suffers the same cycle of drug cravings as crack cocaine addicts. The biggest difference of the drugs is that the highs of meth last far longer than crack cocaine and binges differ greatly. In crack cocaine, a binge rarely lasts more than 72 hours, while meth binges can last up to 2 weeks.

Number of Missouri Methamphetamine Incidents-2017



Map includes Laboratories, Chemical/Equipment/Glassware seizures, and Dumpsites. These numbers reflect the incidents as reported to EPIC NSS. Report ran by MSHP on 01-04-2018.

91

2017 had a lower amount of incidents compared to the previous years. In 2014 there were 26 incidents in Greene County, 2015 there were 22 incidents and in 2016 there were 10.

Geographic Location

The entire county is at risk for experiencing chemical related hazards.

Strength/Magnitude/Extent

Health of individuals and the environment is a risk with chemical hazards. There is a possibility of injury, minor isolated instances of property damage.

3 - RISK ASSESSMENT

Health Hazard

The United States Department of Labor Occupational Safety and Health Administration (OSHA) defines a chemical hazard as any chemical that is a health or physical hazard. A chemical known to cause acute or chronic health effects causes a health hazard. This includes carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic system and agents that damage the lungs, skin, eyes or mucous membranes.

Health Problems

Acute Toxicity: Symptoms caused by exposure become severe quickly. Acute effects are often results of short-term exposure and are often short in duration. Examples of acutely toxic chemicals include hydrogen cyanide and ammonia.

Chronic Toxicity: Symptoms caused by exposure that develop slowly over a long period of time as a result of frequent exposure. The amount of exposure may be so small that no effects are noticed at the time of exposure. Cumulative poisons are the chemicals that build up in the body as a result of numerous chronic exposures and lead to chronic toxicity. These effects are not seen until a critical burden for a body is reached.

Carcinogenicity: A carcinogen is a chemical that causes malignant (cancerous) tumors.

Reproductive Toxins: Chemicals can affect both adult male and female reproductive systems. Chemicals may also affect a developing fertilized ovum, embryo or fetus through exposure to mother (teratogenic effect).

Reproductive hazards affect people in a number of ways, including mental disorders, loss of sexual drive, impotence, infertility, sterility, mutagenic effects on cells, teratogenic effects on the fetus and transplacental carcinogenesis.

Physical Hazard

A physical hazard is a chemical that is known to be a combustible liquid, a compressed gas, explosive, flammable, organic peroxide, an oxidizer, pyrophoric, unstable or reactive, or water-reactive. Hazardous chemicals may also include paints, cleaning compounds, inks, dyes and many other substances.

Clandestine Laboratories

Clandestine laboratories present many forms of health risks. Explosions, caustic fumes, and deadly gases are very common. Anyone who lives or works nearby or comes into contact with the materials used in its operation are subjected to health risks. Byproducts of meth production are often discarded or disposed of indiscriminately to avoid detection, posing a significant human health and environment hazard. Chemicals spilled or dumped as waste into bathtubs, sinks, toilets, on the ground, along roadways, and waterways are common practices.

3 - RISK ASSESSMENT

Previous Occurrences

Greene County Methamphetamine Incidents-2004-2018

YEAR	INCIDENTS
2004	189
2005	145
2006	36
2007	32
2008	69
2009	78
2010	87
2011	124
2012	96
2013	67
2014	26
2015	22
2016	10
2017	4
2018	3

Source: Missouri State Highway Patrol

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is probable for a small chemical event to occur within the next three years in Greene County. A larger chemical incident that would cause catastrophic damage, is unlikely for Greene County. For a full description of the CPRI for chemical events, refer to Appendix B.

Changing Future Considerations

Climate change will not affect chemical incidents in Greene County.

VULNERABILITY

Vulnerability Overview

Most incidents occur at the interfaces between transport, storage, processing, use and disposal of hazardous chemicals, where these systems are more vulnerable to fail, error or manipulation. Factors that affect the vulnerability of responders and the public include: the nature of hazard, the level of exposure, availability and quality of shelter, availability of personal protective equipment (PPE), access into and out of the site, the degree to which employees and responders and possibly the public are prepared and trained to deal with a chemical release and the amount of training provided.

People who are at most risk for experiencing illness from chemical related hazards are people who live or work about hazardous chemicals. People who live around meth labs are more vulnerable to experience illness. Common symptoms of toxic exposure to the chemicals involved in methamphetamine production include headaches, nausea, fatigue, lethargy, and dizziness. More acute exposures can result in similar symptoms, as well as difficulty breathing, chest pain and cough, loss of physical coordination, and irritation and chemical burns on the skin, eyes, nose and mouth. Exposure can even be lethal. There is also a long-term risk of cancer, liver, brain and kidney damage, miscarriage and birth defects.

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The toxic chemicals that are used to manufacture meth are:

- Hydrochloric Acid
- Methylamine
- Mercuric Chloride
- Anhydrous Ammonia
- Freon
- Methanol
- Red Phosphorus

Potential Losses to Existing Development

Chemical incidents are typically localized to the location where the incident happens. There are times where evacuation would be needed and property damage could happen. If a meth lab were to blow up, extensive damage could happen. Meth labs are highly flammable and can cause explosions. This could cause damage to surrounding properties as well.

Impact of Previous and Future Development

As the population of the county increases, the risk of people being exposed to toxic chemicals also increases. There is also a risk that as the population increases, the chance of people who are making drugs also increases.

EMAP Consequence Analysis

EMAP Impact Analysis: Chemical

SUBJECT	DETRIMENTAL IMPACTS
Public	Chemical incident in Greene County could cause significant safety concerns. There have been reported injuries, but no deaths in Greene County.
Responders	Responders would face some safety concerns in a chemical incident and there may be minor impact to response functions.
Continuity of Operations	Greene County has not experienced no impact on delivery of service due to a chemical incident.
Property, Facilities, and Infrastructure	Chemical incidents in Greene County have resulted in significant property damage. Greene County has experienced no damages to infrastructure due to a chemical incident. However there could be impact to the transportation sector in incident occurs on railway, roadways, airport, etc.
Environment	There is no record of a chemical incident effecting the environment in Greene County. However, this could possibly cause isolated instances of agricultural damage.
Economic Condition of Jurisdiction	Greene County has experienced minor economic impact from chemical incidents.
Public Confidence in the Jurisdiction's Governance	Greene County has experienced no impact on the public confidence in governance due to a chemical incident.

*For more details on Consequence Analysis, refer to Appendix B.

3 - RISK ASSESSMENT

Hazard Summary by Jurisdiction

The entire planning area is at risk for experiencing a chemical incident. There is not one jurisdiction that is more vulnerable to a chemical incident. Greene County has a high volume of traffic, especially along I-44, it is highly likely that a chemical event could happen. Due to the number of companies in the area that house large quantities of hazardous materials on site, it is likely that a spill or accident may happen.

PROBLEM STATEMENT

Chemical events can be accidental or intentional. They can be extremely dangerous to the people around the chemicals. If the chemicals cause an explosion, it can be even more devastating to public health and property around the explosion. Chemicals can be a health hazard and physical hazard. Chemical hazards will continue to be a hazard in Greene County and around the United States. Mitigation solutions for chemical attacks include preparedness actions from the local emergency management office and planning. The planning should be detailed and cover multiple different aspects of the disaster. Other solutions involve public education and awareness and purchase of PPE for responders and citizens. No participating jurisdiction chose to create a mitigation project involving chemical events in this Hazard Mitigation Plan.

3 - RISK ASSESSMENT

3.6.3 HUMAN CAUSED HAZARD: CIVIL UNREST

HAZARD PROFILE

Hazard Description



Civil unrest, previously referred to as civil disorder, is a broad term used to describe varying disturbances caused by a group of people. A key component of civil unrest is that law enforcement must intervene to establish and maintain public safety. A protest, riot, sit-in or an out of control crowd are a few examples of when civil unrest may occur. It should be noted, however, that citizens not directly involved in an event may have their lives significantly disrupted. Their ability to work, enjoy recreational activities or the ability to obtain necessities (e.g. groceries) may be jeopardized by civil unrest.

Civil Unrest has the potential of becoming a pervasive hazard as more and more citizens face the perils of today's economy as many businesses are downsizing or closing their doors. This creates a dangerous environment whereby disgruntled workers may retaliate against their employers (e.g. workers in France held Caterpillar executives hostage after being let go).

Dr. Michael Carlie, professor at Missouri State University, explains, "The rate of property crimes or crimes for profit has increased substantially as individuals struggle to find a way to cover their basics, but what people often leave out of the discussion are crimes of stress. Upon losing employment, or when the person a household depends on for income loses employment, families get stressed. That's when we see increases in spousal, child and substance abuses, hangings and self-mutilation."

For the purposes of identifying the events that are dangerous in Greene County, it necessary to discuss two areas within civil unrest: crowd management and control and radical groups.

Crown Management

Crowd management is the systematic planning, supervision, orderly movement and assembly of people. Crowd management often occurs in the event planning stage. This includes providing internal and external security, contacting local government agencies to inform them of the event (e.g. police), ensuring an adequate quantity of restroom facilities are available, as well as making sure exits are unlocked.

On the other hand, crowd control is a defensive tool. This typically occurs when a crowd begins to lose control and the safety of all parties is in jeopardy. Crowd control attempts to restrict inappropriate or dangerous behavior. Unfortunately, many injuries and deaths are caused by ineffective crowd control. The controllers are typically placed near the front of the crowd and unable to effectively communicate with the individuals in the back. As the back of the crowd pushes forward, individuals in the front fall down creating a false perception of moving forward. The back of the crowd keeps pushing forward, ultimately causing more injuries and fatalities. Crowd forces can reach levels that are almost impossible to control. Evidence of bent steel railings after fatal crowd incidents show forces of more than 4500 N (1,000lbs) occurred.

3 - RISK ASSESSMENT

Radical Groups

Radical groups have strong convictions to extreme principles that they follow. Generally, the groups are advocates for fundamental political, economic and social reforms and often promote their desired changes through direct and uncompromising methods. Radical groups exist across the political spectrum; every political party is prone to having extreme followers who want drastic reform.

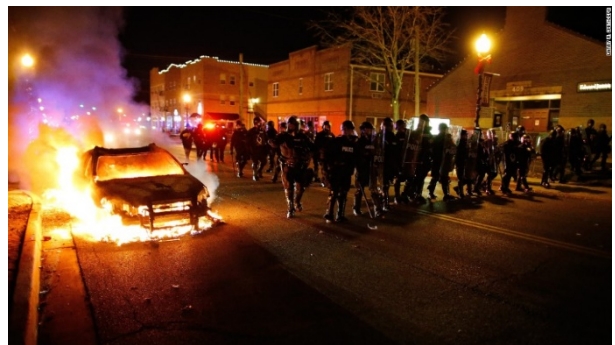
Radical groups often demonstrate in public manor. Demonstrations may occur in person at community events or through impersonal means such as editorials, commercials and direct mail campaigns. The concern with radical group demonstrations is that it will cause those who disagree to be just as vocal as the radical groups, ultimately escalating the situation into civil unrest.

Geographic Location

Civil unrest could happen anywhere in Greene County at any given time. Depending on the focus on the unrest it could happen at government offices, businesses, or even in the streets. Typically civil unrest is usually preceded by periods of increased tension fueled by questionable social and political events. Government facilities, landmarks, prisons, and universities are popular locations that civil unrest can occur.

Strength/Magnitude/Extent

Civil unrest can include violence and large amounts of property damages. In previous civil unrest incidents, police cars and buildings were burned and people have been attacked. In Ferguson, the amount of buildings being burned out numbered the amount of firefighters available to control them, leading to more damages across the city. The extent of civil unrest depends on the size of the event and crowd that the unrest happens in. Two types of large gatherings typically are associated with civil disturbances: a crowd and a mob. A crowd can be identified as casual, sighting, agitated or mob-like:



- A casual crowd is identified as individuals or small groups with nothing in common to bind them together. If each has an agenda, it is his/her own. Casual crowds are made up of individuals or small groups occupying the same common place.
- Sighting crowds are similar to casual crowds; however, they gather for an event. People migrating as a crowd to sporting events, a group of people attracted to fires and accidents, and those attending music concerts are all types of sighting crowds. Individuals or small groups gather at these events for the same purpose. It is the event and/or individuals curiosity that compels a crowd to come together
- Agitated crowds add responses based on the elements (people, space, and event). Individuals with strong emotional feelings within a crowd can quickly spread and infect the rest of the crowd. As more people within the crowd become emotionally involved, a sense of unity may develop, causing changes in the overall demeanor of the crowd. Yelling, screaming, and name-calling all are associated with an agitated crowd.
- Mob-like crowds have all the elements of crowd types described above, in addition to aggressive, physical, and sometimes violent actions. Under these conditions, individuals within a crowd will often say or do things they usually would not do. Extreme acts of violence and property damage are often part of mob activities. These consist of, or involve elements of people and groups mixing together and becoming fluid (U.S. Army 2005).

3 - RISK ASSESSMENT

A mob can be defined as a large disorderly crowd or throng. Mobs are usually emotional, loud, violent, and lawless. Similar to crowds, mobs have different levels of commitment, and can be classified in the following four categories:

- **Aggressive Mob:** An aggressive mob attacks, riots, and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.
- **Escape Mob:** An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control and can be characterized by unreasoning terror.
- **Acquisitive Mob:** An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits an authority's lack of control in safeguarding property.
- **Expressive Mob:** An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent up emotions in highly charged situations.

Civil unrest events can range from peaceful sit-ins to a full scale riot.

Previous Occurrences

While far from recent, one of the most notable events in Greene County occurred the night before Easter in 1906. After hearing a rumor of a white woman's rape, a mob of 6,000 individuals beat down the jailhouse doors and kidnapped three black men. The mob took the men to the square and hung them. Within a few hours, new rumors spread that the black neighborhoods were going to be destroyed. As a result, hundreds of residents fled before the state militia arrived to restore order. A grand jury indicted more than a dozen people of the hangings and the story of the woman's rape proved to be untrue. One person went to trial, but the jury could not reach a verdict.

Protests and Demonstrations

Greene County frequently has protests and demonstrations that occur throughout the county. Many of these events occur in Springfield, due to the number of employers, elected officials and guests (e.g. Presidential Visits) that occur in the city. However, not all demonstrations are peaceful, which the city was reminded of on April 24, 2001.

April 2001

Joe Hurley, a 51 year old man from Urbana, pulled his pickup truck into a circle drive in front of the U.S. Federal Courthouse located in Springfield, Missouri. He had three dummies, and each dummy was labeled with the name of a federal organization. The organizations were the Federal Bureau of Investigation (FBI), Bureau of Alcohol, Tobacco and Firearms (ATF) and the Department of Justice (DOJ). Police said the dummies were soaked with gasoline, although Hurley had several containers of water and a fire extinguisher in his truck in case things got out of hand. There were several other items in Hurley's pick-up truck. Police reported an empty mortar shell, a crate marked "Explosives" that was filled with newspapers, and many gas containers filled with water. Hurley was an informant for federal and state agencies, but felt his concerns were being ignored about other individuals being involved in the Oklahoma City bombing. Hurley was disabled after being shot with beanbag rounds and was taken into custody for mental evaluation. He was later released and charges were not filed.

3 - RISK ASSESSMENT

May 2019

After the State of Missouri decided that no abortions would be allowed in the state, protests began in the square of downtown Springfield. During the protest, things got heated and yelling and shoving began happening towards police officers. Someone was arrested.

June 2019

A pro-choice demonstration that took place in the square in Springfield turned when a group of people started touching and pulling officers. Officers ended up having to take citizens to the ground. One person was arrested but later released from the jail.

National Occurrences

Ferguson, Missouri 2014



Recently, national attention has been focused on Ferguson, Missouri, where the fatal shooting of an unarmed Black teenager by a White police officer on August 9, 2014 has sparked more than three months of continuing protests and civil unrest as of the time of this documentation (November 2014). Although by all accounts the protests have been largely peaceful, there have been instances of shootings, violent clashes with police and property damage, including the burning of a Quik Trip convenience store on August 10. Police and local officials have faced persistent criticism of their incident management efforts from both media and government, particularly over the deployment of military-style equipment and the arrests of journalists. The ongoing dialogue concerning police tactics in Ferguson highlights the necessity for emergency planning that is tailored to the needs and realities of local communities.

Dallas, Texas 2016

A protest was organized in Dallas in response to the killing of two men by police officers in Louisiana and Minnesota. The Dallas protest was one of several held across the United States held on the night of July 7th. Around 800 protestors were involved and around 100 police officers were assigned to protect the event and the surrounding area. A shooter began firing his weapon towards a group of police officers and protestors. 3 police officers were killed in the initial shooting and civilians were injured. The shooter, on his way to Lamar Street, shot and killed another police officer. The shooter fired more shots into the crowd injuring more protestors and killing another police officer before being killed in a multiple hour standoff with police.

Probability of Future Occurrences

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is probable for a small, isolated civil unrest event to occur within the next three years in Greene County. For a full description of the CPRI for civil unrest, refer to Appendix B.

Changing Future Considerations

Climate change will not affect Civil Unrest.

3 - RISK ASSESSMENT

VULNERABILITY

Vulnerability Overview

Protests are frequent events that happen in the planning area. Protests can bring large crowds and can lead to civil unrest. Civil unrest may range from a sit in- to a full out riot. Most dangerous incidents escalate over a period of time which provides law enforcement the ability to intervene before the event becomes serious. The more unstable an environment is the more likely civil unrest, albeit in groups or individually, will occur. Crimes and outbursts can be caused by stress, especially stressed caused by a lack of employment.

Civil unrest can include violence and property damages. In previous riots around the United States, police cars, buildings and other property has occurred. Protests can lead to road closures including large interstates and highways. Death and injury has even occurred in some protests. International protests typically have a higher injury and death rate than protests that happen within the United States.

Civil unrest can occur at any time. However, civil unrest is usually preceded by periods of increased tension fueled by questionable social and political events (trials and elections). This can be sudden, or take time to organize. Most are organized directly following the incident provoking the unrest. This helps give police time to plan and help protect the protest.

Potential Losses to Existing Development

Civil Unrest can cause large amount of property damage if not controlled quickly. Typically, civil unrest happens in Downtown Springfield at the Square. They also happen on busy streets around the Springfield areas to attract more people. Critical facilities can be targets for civil unrest. Civil unrest around Greene County does not have a large history of causing large amounts of damage around the planning area.

Previous and Future Development

Increase of population can affect civil unrest. More people in the planning area could lead to larger protests. Protests are trending in the planning area and with the new laws and government changes, more protests can be expected in the area.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Civil Unrest

SUBJECT	DETRIMENTAL IMPACTS
Public	Civil unrest could result in a severe number of injuries and minimal deaths. There are also multiple instances of safety concerns.
Responders	Civil unrest creates a potential for life safety issues. Response functions are also greatly impacted and may be delayed due to safety concerns.
Continuity of Operations	Civil unrest can result in service operation interruptions or delays depending on size and duration or unrest.
Property, Facilities, and Infrastructure	Civil unrest could create widespread minor damages or multiple instances of severe damage through riot caused fires and destruction as demonstrated in Ferguson Missouri. Civil unrest can also cause damage to multiple critical infrastructures throughout the entire planning area. It can also cause widespread damage to facilities.
Environment	Civil unrest in Greene County may cause minor isolated instances of damage to the environment.
Economic Condition of Jurisdiction	Civil unrest can cause the economic condition to be greatly impacted through-out the jurisdiction through theft and damages.
Public Confidence in the Jurisdiction's Governance	Civil unrest can greatly impact public confidence in governance throughout the jurisdiction.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

Civil unrest can happen at any given location in the planning area. The City of Springfield is more at risk for experiencing civil unrest because of the larger population. Many protests happen in Downtown Springfield. The City of Springfield also has a larger government plaza. Protests can be created because of court cases, elections and other political reasons. Other popular areas that protests take place are around the large college campuses including Missouri State University.

PROBLEM STATEMENT

Civil unrest can cause large amounts of property damage in the planning area if they are not controlled quickly. Many protests take place in Springfield. There is not a large destructive history of civil unrest in Greene County but many protests take place year round. Around the world, civil unrest causes death and injury to people and large property damage. With the political world constantly changing and people having the right to protest and express their opinion, civil unrest is a risk for the planning area. Mitigation solutions for civil unrest include more presence of police, more training for first responders, higher level of security at schools, more officers at schools and riot equipment for police officers. Several school districts created projects enhancing their security, these projects can be used for civil unrest or targeted violence.

3 - RISK ASSESSMENT

3.6.4 Human Caused Hazard: Cyber

HAZARD PROFILE

Hazard Description



Cyber security is protecting the infrastructure by preventing, detecting and responding to cyber incidents. Physical threats prompt immediate action but unlike cyber incidents it is often hard or difficult to identify these dangers happening. The spectrum of risks are limitless as the threats can be more serious or sophisticated than others and can have a wide range of varying effects on an individual, community, organization or even the national level. Below is a table showing an example of different types of dangers and risks.

Classifications

Financial Fraud Crimes

Computer fraud is any dishonest misrepresentation of fact intended to let another to do or refrain from doing something which causes loss. In this context, the fraud will result in obtaining a benefit by:

- Altering in an unauthorized way. This requires little technical expertise and is a common form of theft by employees altering the data before entry or entering false data, or by entering unauthorized instructions or using unauthorized processes.
- Altering, destroying, suppressing, or stealing output, usually to conceal unauthorized transactions. This is difficult to detect.
- Altering or deleting stored data.

Other forms of fraud may be facilitated using computer systems including, bank fraud, carding, identity theft, extortion, and theft of classified information.

Cyber Terrorism

Government official and information technology security specialist have documented a significant increase in internet problems and sever scans since early 2001. Bu there is a growing concern among government agencies such as the FBI and CIA that such intrusions are part of an organized effort by cyberterrorists, foreign intelligence services, or other groups to map potential security holes in critical systems. A cyberterrorist is someone who intimidates or coerces a government or an organization to advance his or her political or social objectives by launching a computer-based attack against computers, networks, or the information stored on them.

Cyberextortion

Cyberextortion occurs when a website, email server, or computer system is subjected to or threatened with repeated denial of service or other attacks by malicious hackers. These hackers demand money in return for promising to stop the attacks and to offer “protection”. According to the FBI, cybercrime extortionists are increasingly attacking corporate websites and networks, crippling their ability to operate and demanding payments to restore their service

3 - RISK ASSESSMENT

Computer as a Target

These crimes are committed by a selected group of criminals. Unlike crimes using the computer as a tool, these crimes require the technical knowledge of the perpetrators. As technology evolves, so too does the nature of the crime. These crimes are relatively new, having been in existence for only as long as computers have-which explains how unprepared society and the world, in general, is towards combating these crimes. These are numerous crimes of this nature committed daily on the internet.

Crimes that primarily target computer networks or devices include:

- Computer viruses
- Denial-of-service attacks
- Malware

Computer as a Tool

When the individual is the main target of cybercrime, the computer can be considered as the tool rather than the target. These crimes generally involve less technical expertise. Human weaknesses are generally exploited. The damage dealt is largely psychological and intangible, making legal action against the variants more difficult. These are the crimes which have existed for centuries in the offline world. Scams, theft, and the likes have existed even before the development in high tech equipment. The same criminal has simply been given a tool which increases their potential pool of victims and makes them all the harder to trace and apprehend.

Crimes that use computer networks or devices to enhance other ends include:

- Fraud and Identity Theft
- Information Warfare
- Phishing Scams
- Spam

Security Practices

Between 2004 & 2011 much of the data lost was due to poor security practices, inside jobs and lost computers/removable media (CDs, flash drives, etc.). After 2011, the trend indicates more data loss from companies & government agencies being targeted by very intelligent hackers with specific information they are looking for. There has also been a recent trend to encrypt information to make it inaccessible and then demand a ransom for it to be unencrypted. Many of the worst breaches began by employee account information being stolen which allowed access into the network of a company that was later exploited to get the information they wanted...mostly credit cards, personal identification information like social security numbers, addresses, email addresses, etc.

Geographic Location

Cyber attacked have no geographical boundaries. Cyber attacks can be targeted at individuals, governmental areas, businesses or any other location that uses a form of technology.

3 - RISK ASSESSMENT

Strength/Magnitude/Extent

The severity of a cyber-attack depends on what information is hacked and how quickly the system can be restored. Detecting a cyber attack can sometimes be challenging. The longer the crime goes undetected, the larger the impact is. Most cyber attacks have little to no warning time and can last weeks to years. Cyber crimes on businesses can be catastrophic and can lead to the following:

- Loss of intellectual property and sensitive data
- Opportunity costs
- Damage to the brand image and company reputation
- Penalties and compensatory payments to customers
- Cost of countermeasures
- Loss of trade
- Distortion of trade
- Job loss

Cyber Risks and Dangers

RISKS	DANGERS
Organized cybercrime, state-sponsored hackers, cyber espionage	Viruses, viruses that erases entire systems
Transportation, power, and other services breached	Systems being broken into and files altered
Data breach and increased loss of an organizations network	Your computer being used to attack other devices
Individually owned devices that are connected to in the internet are vulnerable to intrusion: personal information at risk	Stealing of confidential information

Previous Occurrences

February 2009

In February, 2009 the City of Springfield was hit by a computer virus that corrupted the operating system on over 1000 machines. The recovery effort took 2 months while the entire Information Systems staff, with assistance from other departments and City Utilities, tackled the job. All of the computers on the City network were reimaged and Internet access was unavailable for days after the virus was detected.

February 2012

In February, 2012 the City's website was hacked using an SQL injection attack and more than 2000 SSNs were retrieved from a database that contained HR records and posted to a website. The City website was offline temporarily and all of the online applications were rewritten to remove the vulnerability in order to prevent another breach. The FBI was involved with the tracking of the malicious actor and was able to successfully prosecute him and obtain a plea agreement to repay the City for its cost to recover from the incident.

December 2014

On December 25, 2014 a "hacktivist" successfully made the City's website unavailable by utilized a Distributed Denial of Service (DDOS) attack against the CivicPlus hosting company's Internet connection. CivicPlus was able to prevent the DDOS attack and have the website back online soon after the attack. The hacktivist posted to their Twitter account that they attacked the City's website for retaliation against cruel treatment of a pit-bull by the City.

3 - RISK ASSESSMENT

July 2018

The City of Springfield experienced a large and critical outage to main servers in July 2018. The servers that authenticated employee usernames and passwords were down slowly many daily work processes. The outage did not affect 911 or other emergency responses, but police officers in the field had to do hand written reports.

Many cyber incidents go unreported or cannot be released to the public.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is highly likely for a cyber incident to occur within the next year in Greene County. For a full description of the CPRI for cyber events, refer to Appendix B.

Changing Future Conditions and Considerations

Climate change will not affect cybercrimes.

VULNERABILITY

Vulnerability Overview

Most of the planning area is vulnerable to cybercrime if technology, like computers, are used in either personal life or for business. Children using technology can be more vulnerable to cyber crimes because they are not as educated as adults on the risks of surfing the web. Larger businesses, government facilities, education facilities and other large facilities are at risk for experiencing cybercrimes. According to the FBI, these are the things that can be done to reduce vulnerability to cybercrime.

- Keep firewalls turned on
- Install or update antivirus software
- Install or update antispyware technology
- Keep operation system up to date
- Be careful downloading
- Turn off computer

Potential Losses to Existing Development

Cybercrimes can cause a large amount of data loss to a business or government facility if the crime is not caught quickly. Cyber-attacks can go unnoticed for long periods of time. Cybercrimes can lead to critical facility shutdown across the planning area. Most of cybercrimes do not cause large amount of money loss, but more data and sensitive information. There are incidents where banks or individual accounts are targeted which can cause financial loss.

Impact of Previous and Future Development

Development of more technology can lead to more cybercrimes around the planning area. More and more of people's personal information and business work is going electronic putting this information at risk for cybercrimes. As the City of Springfield continues to grow, the government buildings become more at risk for being targeted.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Cyber

SUBJECT	DETRIMENTAL IMPACTS
Public	A cyber incident would have few safety concerns, including bank account information, medical records and availability of prescription if system is destroyed.
Responders	There are no potential life safety issues for responders; however the impact to response functions could be critical.
Continuity of Operations	Cyber incident can lead to critical services that are hampered or even suspended across the jurisdiction.
Property, Facilities, and Infrastructure	A cyber incident could cause minor isolated instances of property damage if malfunctions occur in electronic systems. Major critical infrastructures sectors can be impacted through-out the jurisdiction because of the dependence on information technology. A cyber incident could cause minor isolated instances of facility damage if malfunction occur in electronic systems.
Environment	Cyber incidents would have little to no impact on Greene County's Environment.
Economic Condition of Jurisdiction	A cyber incident could cause major economic impact on the economy. Especially cyber threats to information about money, accounts, or company information.
Public Confidence in the Jurisdiction's Governance	A cyber-attack could cause a catastrophic impact on public confidence in governance. Major widespread significant loss will occur when personal information and company information is lost or compromised.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

The entire planning area is at risk for experiencing cybercrimes. Larger businesses and government facilities are more vulnerable to experiencing cybercrimes. The City of Springfield has the most large businesses and government facilities located within the city limits. The city of Springfield is at a higher risk for experiencing cyber attacks and crimes, but all areas and citizens are at risk.

PROBLEM STATEMENT

Cybercrimes and issues are on the rise nationwide. Cybercrimes can cause loss of sensitive information and data that could be damaging to a government facility or business. Cybercrimes can be extremely expensive to the targeted location. The entire planning area is at risk for experiencing cyber issues at all times of the year with sometimes no warning times. Cybercrimes can go unnoticed and last for weeks, even years. Individuals and businesses should protect themselves from cybercrimes as much as possible to avoid large losses of personal data and information. Some solutions to Cybercrimes include updating their software's to include many different programs like two factor authentication, strict firewalls, more difficult passwords, etc. Several jurisdictions picked projects that are related to cybercrimes. These can be found in the Mitigation Strategy section of this plan.

3 - RISK ASSESSMENT

3.6.5 Human Caused Hazard: Explosives

HAZARD PROFILE

Hazard Description



An explosion is the sudden expansion of material accompanied by the production of heat and large changes in pressure caused by chemically or energetically unstable products. An explosive charge measures the quantity of explosive material. Explosions may be intentional (e.g. IEDs) or unintentional.

There are two general classifications for explosives: high and low. A high explosive is characterized by how quickly decomposition, or detonation, occurs. Decomposition will be nearly instantaneous when it is initiated by a blow or a shock. A low explosive is made of mostly solid combustible materials that decompose rapidly and don't normally explode. While low

explosives do not typically propagate a detonation, they could easily act like a high explosive and detonate. A low explosive will burn rapidly while a high explosive will detonate.

Composition Mixture

Within the high and low classifications, explosives are classified by their composition. An explosive may be a mixture, composed of distinct substances that are carefully prepared and mechanically combined in varying proportions (e.g. black powder).

Composition Compound

An explosive may also be a compound. The compound has homogenous substances, and the substances have molecules that contain oxygen, carbon and hydrogen necessary for combustion (e.g. nitroglycerin).

The single most important property in rating an explosive is its detonation velocity (the speed the detonation wave travels through the explosive). The detonation is a signal that the reaction is moving through the explosive faster than the speed of sound. Deflagration indicates a slower reaction (e.g. burning). A high explosive will detonate; a low explosive will deflagrate. All commercial explosives are high explosives, with the exception of black powder.

Improvised Explosive Devices

An improvised explosive device (IED) is a bomb that is constructed and deployed using unconventional techniques and materials. An IED may be partially composed of conventional military explosives (e.g. an artillery round attached to a detonating mechanism). These devices are designed to destroy or incapacitate personnel and vehicles.

3 - RISK ASSESSMENT

Types of IED's

NAME	DESCRIPTION
Improvised Explosive Device (IED)	A device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic or incendiary chemicals. Designed to destroy, incapacitate, harass or distract.
Improvised Nuclear Device (IND)	A device incorporating radioactive materials designed to disperse radioactive material or form a nuclear-yield action.
Improvised Chemical Device (ICD)	A device incorporating the toxic attributes of chemical materials designed to result in the dispersal of toxic chemical materials.
Improvised Biological Device (IBD)	A device incorporating biological materials designed to disperse vector borne biological materials.
Improvised Radioactive Device/Radiological Dispersion Device (RDD); Dirty Bomb	A device incorporating radioactive materials designed to disperse radioactive materials to cause death, fear and behavior modification.
Improvised Incendiary Device	A device that uses exothermic chemical reactions to rapidly spread fire (e.g. Molotov Cocktail).

Source: The Dictionary of Military and Associated Terms and CBRNe World

IED Delivery Methods

DELIVERY MECHANISM	DESCRIPTION
Car Bomb/Vehicle-Borne (VBIED)	Vehicles may be laden with explosives, set to explode by remote control or by passenger/driver. VBIEDS can carry thousands of pounds of explosives.
Boat-Borne	Boats laden with explosives can be used against ships and areas connected to water.
Collar Bombs	IEDS strapped to the neck of individuals.
Homicide Bombers	An individual may wear and detonate explosives in order to kill others, including himself or herself.
Platter Charges	Rectangular or circular pieces of flat metal with explosives pressed into one of the sides of the platter.
Improvised Rocket Assisted Munitions (IRAM)	Propane tanks packed with explosives and powered by 107mm rockets.

Source: Greene County Multi-Jurisdictional Hazard Mitigation Plan 2015-2020

Electromagnetic Pulse Bomb

An Electromagnetic Pulse Bomb (EMP) is designed to overwhelm electrical circuitry with an intense electromagnetic field. Due to the growing dependency on technology for day to day functions, an EMP attack would be devastating. The EMP would destroy most machines that use electricity. Generators would be useless, cars wouldn't run and the ability to make phone calls would be gone. Emergency response would be severely hindered, companies could lose millions of dollars due to loss of productivity, food in residential and commercial facilities would spoil and the electronic networks that keep government and military operations functioning would be gone. These are just some of the many examples of how an EMP may cripple a military unit or set a city back hundreds of years.

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Geographic Location

Explosives can be used/detonated anywhere in Greene County.

Strength/Magnitude/Extent

The magnitude of an explosive event in Greene County largely depends on what type of explosive is used and where the explosion happens. Explosion events can cause large amounts of property damage and death or injury to people.

Explosive materials may be categorized by the speed at which they expand. Materials that detonate (the front of the chemical reaction moves faster through the material than the speed of sound) are said to be "high explosives" and materials that deflagrate are said to be "low explosives". Explosives may also be categorized by their sensitivity. Sensitive materials that can be initiated by a relatively small amount of heat or pressure are primary explosives and materials that are relatively insensitive are secondary or tertiary explosives.

High Explosives

High explosives detonate under the influence of the shock of the explosion of a suitable primary explosive. They do not function by burning; in fact, not all of them are combustible, but most of them can be ignited by a flame and in small amount generally burn tranquilly and can be extinguished easily. If heated to a high temperature by external heat or by their own combustion, they sometimes explode. They differ from primary explosives in not being exploded readily by heat or by shock, and generally in being more brisant and powerful. They exert a mechanical effect upon whatever is near them when they explode, whether they are confined or not. A high explosive compound detonates at rates ranging from 1,000 to 9,000 meters per second, and are, conventionally, subdivided into two explosives classes, differentiated by sensitivity:

- Primary high explosives are extremely sensitive to mechanical shock, friction, and heat, to which they will respond by burning rapidly or detonating.
- Secondary high explosives, also called base explosives, are relatively insensitive to shock, friction, and heat. They may burn when exposed to heat or flame in small, unconfined quantities, but detonation can occur. These are sometimes added in small amounts to blasting caps to boost their power.

Previous Occurrences

October 1970

In early October, 1970, two union truck drivers, who were on strike, shot a semi-truck hauling dynamite approximately 9 miles west Springfield. The bullet caused the truck to explode which created a 40-foot crater in the east bound lanes of I-44. The effects were felt all over Springfield including the downtown area where many windows were blown out.

June 2003

An Ozark Empire Fairgrounds employee was killed in an explosion on June 18, 2003. Springfield Fire Department and City Utilities officials confirmed the explosion was caused when the deceased attempted to illuminate some breakers in the wall with a lighter in a facility that had a gas leak.

June 2008

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On June 19th, 2008, a homemade bomb was thrown at a Springfield home. Fire investigators found a Molotov Cocktail outside of a residence. There was a juvenile in the home at the time of the attack. Had the bomb entered the home, firefighters would have had a major house fire on their hands.

February 2015

Bomb Technicians were called to Gas Trip on Kearney, as a driver had observed a possible hand grenade in the gas station's parking lot. Upon arrival, bomb technicians investigated and followed procedures to deal with a potential threat.

November 2018

A home explosion happened at Shady Acres Mobile Home Park after someone was working on a propane heater inside. A man escaped with only burns on his face and arms. The home was a total loss.

February 2019

Two contract workers were injured after an explosion and fire at the Southwest Wastewater Treatment Plant in Springfield. The incident was a low order explosion with flash fire. A digester tank at the facility received damages and partially collapsed.

May 2019

Greene County Deputies were dispatched to the 10,000 block of West Farm Road 194, regarding suspicious activity. Deputies discovered numerous vehicles, trailers and equipment that was stolen. Deputies also located commercial grade explosives "that could have caused seriously bodily harm or death" says the Springfield Fire Department.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is somewhat likely for an explosive event to occur within the next five years in Greene County. For a full description of the CPRI for explosives, refer to Appendix B.

Changing Future Conditions and Considerations

Climate change will not affect explosive incidents in Greene County.

VULNERABILITY

Potential Losses to Existing Development

Explosives can cause large amounts of destruction to property if the explosion is large. The degree of impact would be directly related to the type of incident. Potential losses would include cost of repair or replacement of damaged facilities, lost economic opportunities for businesses, loss of human life and injuries to persons. Secondary effects of infrastructure failure could include public safety hazards, like public panic.

Impact of Previous and Future Development

Areas of dense population and large public venues may make attractive targets for an explosive attack. More and more large events like concerts and festivals are coming to the Greene County area. Tourist attractions, like Wonders of Wildlife and Bass Pro can also bring large amounts of people together in one small place.

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EMAP Consequence Analysis

EMAP Impact Analysis: Explosives

SUBJECT	DETRIMENTAL IMPACTS
Public	An explosive has the potential to cause multiple injuries and fatalities. There has only been one recorded fatality due to an explosion in Greene County. Explosives can also cause significant safety concerns.
Responders	Functionality and safety of responders has not been impacted in Greene County due to an explosive. There is a potential for life threatening issues if structural integrity is compromised or another explosive device is present that has not been detonated. This would also greatly impact response functions.
Continuity of Operations	Explosive in Greene County have caused little to no impact of the delivery of services.
Property, Facilities, and Infrastructure	Greene County has experienced limited property damage from explosives. An explosive could possibly create multiple instances of property damage, but this has not occurred at this time within Greene County. Explosives in Greene County have caused little to no damage to infrastructure and facilities. Depending on where the explosive were to detonate, there is a chance that damage could occur at critical facilities and infrastructure.
Environment	Explosives in Greene county have caused little to no impact on the environment.
Economic Condition of Jurisdiction	Explosives in Greene County have caused little to no impact of the economy.
Public Confidence in the Jurisdiction's Governance	Explosives in Greene County have caused little to no impact on public confidence in governance if the situation is handled appropriately.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

All areas of Greene County are at risk for experiencing an explosion event or attack. Areas with a dense population are more at risk like the City of Springfield. All jurisdictions host events throughout the year like Forth of July Festivals, Christmas Parades, Halloween events, and many other festivals year round. These large events can be targets for explosive attacks. It is difficult to say that one jurisdiction is more at risk than another.

PROBLEM STATEMENT

Explosive attacks or events can happen at any given moment, anywhere in the county. Many of these events come with no warning time. Explosives can cause large amounts of property destruction and can even cause injury and death to people. The magnitude of an explosion depends on the location and type of explosion. Though Greene County has not seen a devastating explosion, the nation has seen many. Explosions can be a targeted threat to dense populations and events across the planning area. Mitigation Solutions for explosions include enhanced first responder training, hospital training, public event planning and other detailed planning. No participating jurisdiction chose to create a mitigation project for explosions in this Hazard Mitigation Plan.

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3.6.6 Human Caused Hazards: Nuclear

HAZARD PROFILE

Hazard Description

Depleted uranium, radiation, x-rays, nuclear power and nuclear waste are examples of nuclear materials. The science behind nuclear energy and weapons is complex and the damage sustained would be devastating.



Atoms

Everything is made of atoms. Atoms bind together to make molecules (e.g. water, or H₂O, is a molecule made of two hydrogen atoms and one oxygen atom). Each atom has three subatomic parts: protons, neutrons and electrons.

An atom can have a variety of these subatomic parts in varying proportions, which is how the atoms differentiate themselves on the periodic table. Because the proportion of subatomic parts varies, many atoms have different forms or compositions. The

different forms are called isotopes. An isotope may be stable; this means the composition will not change over time. Other isotopes are unstable, which means they change composition over time. The process of changing composition is called radioactive decay. An atom may have many isotopes.

When the atom loses energy (via emitting ionizing particles and radiation), decay changes the base atom. The base atom is a parent nuclide, and when it's changed into a different atom, it's renamed. So, a parent nuclide may change into a daughter nuclide.

The process of changing may cause an atom to go through alpha decay, beta decay or spontaneous fission. Alpha and beta decay cause an atom to lose subatomic parts. Spontaneous fission means the atom splits. This creates more energy and is often common with gamma rays.

Types of Rays

After going through the process of radioactive decay, an atom may emit different types of rays. The image on the left shows four types of rays and their strength. From top to bottom, alpha rays can be stopped by a sheet of paper. Beta rays can be stopped by an aluminum plate. Gamma rays are very strong and must be stopped by a strong substance, like lead. Neutron particles/rays can be stopped by a thick wall of water

For more information on rays, please see the Radiological Hazard Profile

Fusion

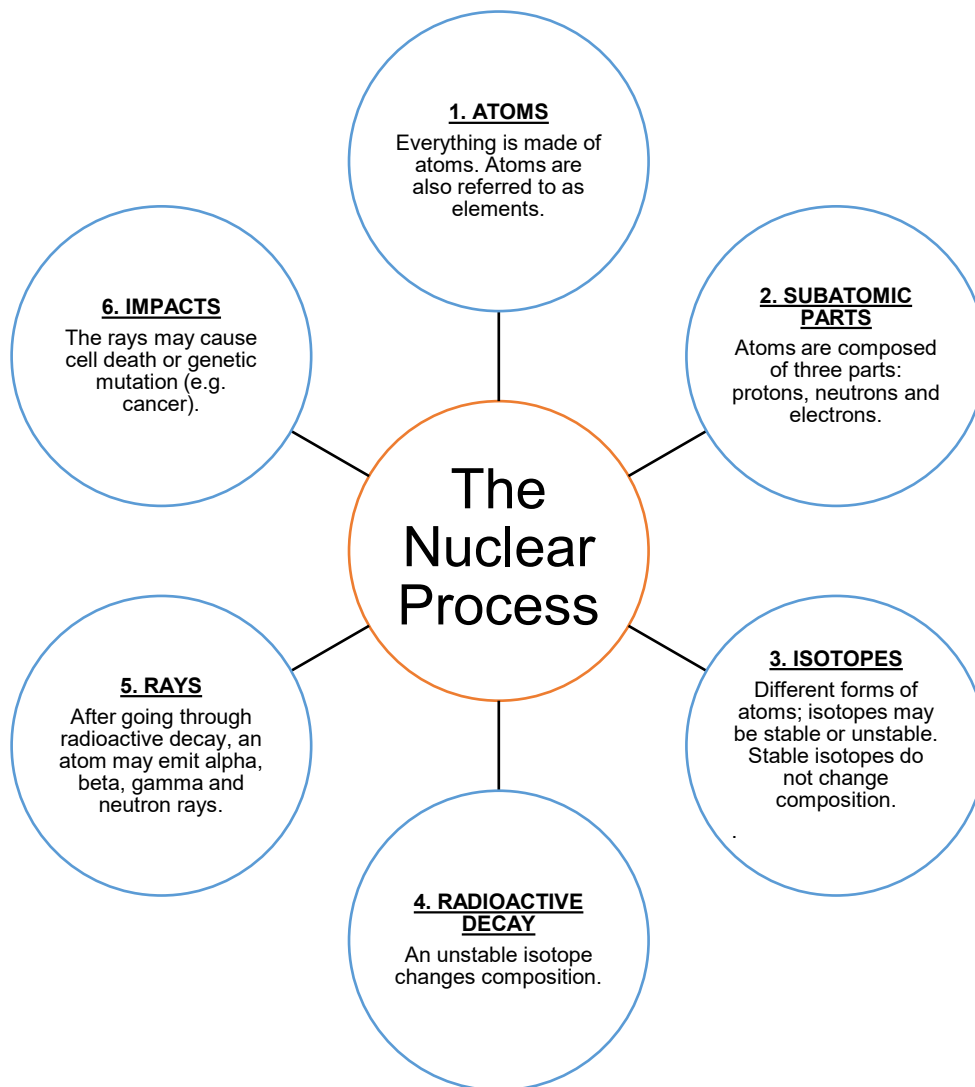
When two light nuclei combine to form a single heavier nucleus, it is referred to as fusion.

Fusion reactions are used to develop thermonuclear weapons and nuclear reactors (e.g. two hydrogen isotopes fused to form an isotope of helium). Fusion is difficult to do because the two nuclei want to repel; only a great force can unite them and create the large burst of energy. Fusion is a process used by the sun to produce heat. An early fusion induced supernova explosion caused debris like lead, gold and silver to be distributed across the Earth.

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Fission

When a heavy nucleus splits into two smaller nuclei it is called fission. This is similar to bowling, because a large isotope (bowling ball) is used to split or reduce other elements (the number of pins). When you compare the sum of the mass of the atoms you started with and the mass of the atoms you ended with, the mass will be less than when you started. The missing mass is converted into energy and is called the mass defect. However, the energy will be greater, even though the numbers appear to be telling a different story. This can be explained by Einstein's famous $E=MC^2$. The amount of mass missing is multiplied by the speed of light squared. This is the amount of energy produced through the fission process.



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Geographic Location

If a nuclear device was detonated, it would be difficult to predict which areas would be affected. Radioactive fallout paths depend on weather, which is, of course, unpredictable. No locality in the United States, Greene County included, is free from risk of receiving dead radiation levels after an attack.

Strength/Magnitude/Extent

A nuclear detonation would cause substantial damage and several casualties. A nuclear attack has the potential to affect the total population in the vicinity of the impacted area. While portions of the area would experience the direct effects (blast, heat and initial radiation), areas further away from the impacted area would experience indirect effects, which would primarily be radioactive fallout. Some areas may experience non-life-threatening levels of radiation while other areas may experience lethal levels of exposure. A transportation incident is far more likely in Greene County. If nuclear waste were spilled in Greene County travelling down any of the roadways or railroads, it would be a serious incident.

Weapons

A nuclear weapon is an explosive device that obtains its destructive force from nuclear reactions using fission and/or fusion. Weapons are typed based upon the type of nuclear energy used.

Fission reactions produce weapons commonly referred to as atomic bombs or atom bombs (A-Bombs).

The amount of energy released by a fission bomb equates 1 kiloton of Nuclear weapon to 1 kiloton of TNT. Most weapons, including those that use fusion, derive the majority of their energy from fission

Fusion reactions produce weapons that are generally referred to as thermonuclear weapons or hydrogen bombs. They derive their energy from fusion reactions between isotopes of hydrogen (deuterium and tritium). While fission weapons have a limit or range of energy release, fusion weapons do not; there is no limit to the amount of energy a fusion weapon can release. The United States, Russia, the United Kingdom, China, France and India are the only six countries that have conducted thermonuclear weapon tests.

Modes of Transportation

Developing and maintaining the delivery of a nuclear weapon is one of the most resource-intensive components. It is estimated that approximately 57% of the United States total financial resources used for nuclear weapons has been spent on deployment since the 1940's. The preferred mode of transportation for a nuclear weapon is to mount it on a missile. The missile may be short range, which allows a warhead to be delivered over the horizon. While these missiles allow for a faster delivery, intercontinental ballistic missiles (ICMBs) and submarine-launched ballistic missiles (SLBMs) allow for global delivery with a high chance of success.

Transportation

The Missouri State Mitigation Plan (2013) identifies Missouri as a crossroads for rail and truck transport of nuclear waste to the Yucca Mountain, Nevada, testing site. One of the most commonly traveled interstates, I-44, runs through Greene County. Further, the United States Department of Energy is shipping radioactive waste by truck to repositories in Texas and Utah. The trucks cross portions of Missouri, including Springfield, on I-44.

MAD

Mutually Assured Destruction (MAD) used to provide enough assurance and deterrence that nation states would not use nuclear weapons in an attack. This device was a concept during the Johnson administration. According to

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the Army the concept has declined and the Bush administration has withdrawn its Anti-Ballistic Missile Treaty based on the MAD. The desire to develop smaller nuclear devices that would be more accurate and reduce the number of innocent civilians killed in the process.

Previous Occurrences

World War II

During World War II, the United States dropped two atomic bombs on Japan; one was in Hiroshima and one was in Nagasaki. The City of Hiroshima was obliterated, killing approximately 66,000 people. Approximately one half of the City of Nagasaki was destroyed, killing approximately 39,000 people. Since WWII, nuclear weapons have been detonated over two thousand times for testing and demonstration purposes. Countries known to have detonated nuclear weapons include the United States, Russia, the United Kingdom, France, China, India, Pakistan and North Korea.

According to the Missouri State Mitigation Plan (2013) seven nations have declared their nuclear capability and five additional nations are suspected of having developed nuclear weapon technology, including North Korea and Iran. Fifteen other nation states have either had weapons or programs to develop nuclear weapons, and have allegedly abandoned their efforts.

A nuclear event has not occurred in Greene County therefore, there are no historical incidents to report.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely that a nuclear event will occur within the next ten years in Greene County. For a full description of the CPRI for nuclear events, refer to Appendix B.

Changing Future Conditions and Considerations

Climate change will not affect nuclear attacks or incidents on Greene County.

VULNERABILITY

Vulnerability Overview

A strategic nuclear attack on the United States could have the most devastating and far-reaching consequences. The use of these weapons against the United States is unlikely. Unfortunately, however, as long as such weapons exist, there is always a chance that they could be used. The potential for traditional war-related attacks, using conventional weapons, is a scenario that is more likely to occur, based on currently available information. Nuclear attacks or a nuclear transportation incident would come with no warning time for the county. The clean up work could take days or weeks in transportation incidents.

According to the Missouri State Hazard Mitigation Plan, direct effects from a nuclear incident include intense heat, blast energy, and high intensity nuclear radiation. These effects generally will be limited to the immediate area of the detonation (up to 22 miles), depending on the size of the weapon, altitude of burst and atmospheric conditions. The indirect effects are much more catastrophic. When a nuclear weapon detonates, intense heat, blast, and overpressure will cause severe injuries and fatalities in the surrounding area and radiation poisoning at more distant locations. A detonation near or on the ground draws up large quantities of earth and debris into a mushroom cloud. This material becomes radioactive, and the particles can be carried by wind hundreds of miles before they drop back to earth as "fallout." In an attack, many areas of the United States would probably escape fallout altogether or experience non-life-threatening levels of radiation. However, because weather that determines where fallout will land is so unpredictable, no locality in the United States is free from the risk of

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receiving deadly radiation levels after a strategic attack. Less than lethal exposures will result in longer-term effects on health and contamination of food, water, and food production.

Potential Losses to Existing Development

Potential losses to a large nuclear incident include losses to infrastructure, critical facilities and lifelines, humans and animals. The degree of impact would largely depend on the size of the incident. A transportation spill would not cause as much damage as a nuclear weapon incident.

Impact of Previous and Future Development

According to the Missouri State Hazard Mitigation Plan, As time passes, relationships between countries across the globe evolve from adversarial conditions to friendship and back; these relationships can be strained by a variety of factors, including energy shortages, water availability and changing weather patterns. No matter the cause, increasing volatility of relations on the national stage can increase the risk of attacks on the homeland.

EMAP Consequence Analysis

EMAP Impact Analysis: Nuclear

SUBJECT	DETRIMENTAL IMPACTS
Public	There are no reported nuclear incidents in Greene County. Therefore, there are no recorded injuries or deaths. A nuclear spill would have significant safety concerns. A nuclear attack however, would easily prove catastrophic.
Responders	Responders would face some safety concerns in a nuclear incident, but are protected if they possess proper personal protective equipment.
Continuity of Operations	Delivery of services would be catastrophic in a large-scale incident. Greene County has not experienced no impact on delivery of services.
Property, Facilities, and Infrastructure	There are no records of property damage due to a nuclear incident in Greene County. A nuclear spill on the highway would result in minor isolated damaged. A large-scale nuclear attack could be catastrophic. Damage to infrastructure and facilities would be catastrophic in large-scales incidents. Greene County has not experienced damages from nuclear incidents for facilities or infrastructure.
Environment	The environment would be destroyed in the event of an attack; however, Greene County has no records of damage to the environment due to a nuclear incident.
Economic Condition of Jurisdiction	The economy would have catastrophic damage in a large-scale nuclear incident. Greene County has experienced no impact on the economy.
Public Confidence in the Jurisdiction’s Governance	The public confidence in Governance would be catastrophic in large-scale incidents. Greene Count has not experienced impact on the public confidence in governance.

*For more details on Consequence Analysis, refer to Appendix B.

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Hazard Summary by Jurisdiction

The entire planning area is at risk for experiencing nuclear attacks and incidents. Nuclear waste does travel through Greene County on both railroad and interstate. Jurisdictions that are at risk for train derailment (Section 3.5.6) could be more at risk to experience a nuclear waste spill in their jurisdiction. Also areas along I-44 could also be more at risk due to the travel of nuclear waste on the interstate as well. Though these events would be unlikely, they are still a risk.

PROBLEM STATEMENT

Nuclear incidents or attack have the possibility of causing devastating damage and major health effects on human and animal life. Nuclear incidents can come from a weapon or they can be caused from a nuclear waste accident. Though there have not been an incident in Greene County, as long as nuclear weapons and materials exist, it will be a hazard for the planning area. Nuclear events are hard to mitigate. One of the best solutions is detailed planning and training. Relocating critical facilities farther from railroads could be a solution, but difficult to do. In this Hazard Mitigation Plan, no participating jurisdictions created mitigation projects for nuclear events.

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3.6.7 Human Caused Hazard: Radiological

HAZARD PROFILE

Hazard Description

Radiological materials are used every day; many people encounter items that are made of radioactive material and do not even know it. Laboratories, medical centers, food irradiation plants and industrial companies routinely use these materials. While limited exposure to low levels of radioactive material may not be harmful, exposure to material with high levels of radiation could endanger the health and wellbeing of animals, humans and the environment.



Types of Radiation

Radioactive material is emitted and classified by the type of ray (or energy) produced. There are four types: alpha, beta, gamma and x radiation. The image on the right demonstrates the different strengths of each ray and their ability to break through an object.

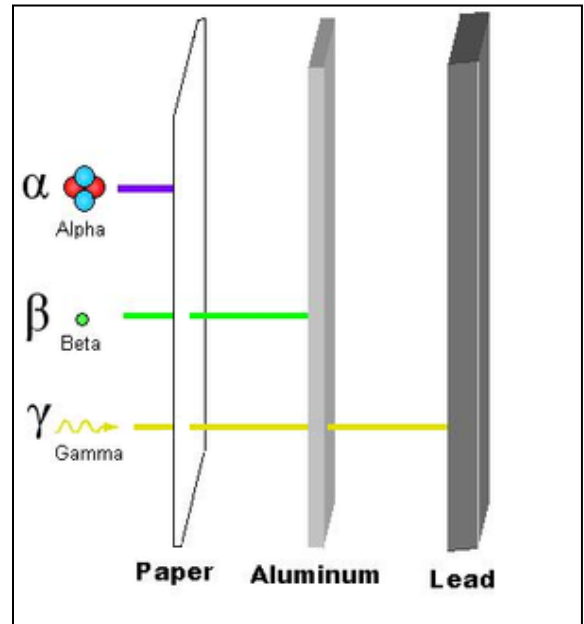
Neutron radiation is also encountered in nuclear power plants and high-altitude flight and emitted from some industrial radioactive sources. For more information please see the nuclear hazards profile and vulnerability.

Alpha Radiation

Alpha radiation is a heavy, very short-range particle and is actually an ejected helium nucleus. Most alpha radiation is not able to penetrate human skin but some alpha-emitting materials can be harmful to humans if the materials are inhaled, swallowed, or absorbed through open wounds. Instruments cannot detect alpha radiation through even a thin layer of water, dust, paper, or other material, because alpha radiation is not penetrating. Alpha radiation travels only a short distance (a few inches) in air, but is not an external hazard. Alpha radiation includes radium, radon, uranium, and thorium.

Beta Radiation

Beta radiation is a light, short-range particle and is actually an ejected electron. Beta radiation may travel several feet in air and is moderately penetrating. Beta radiation can penetrate human skin to the "germinal layer," where new skin cells are produced. If high levels of beta-emitting contaminants are allowed to remain on the skin for a prolonged period of time, they may cause skin injury. Beta-emitting contaminants may be harmful if deposited internally. Beta radiation examples include hydrogen-3 (tritium), carbon-14, sulfur-35, and strontium-90.



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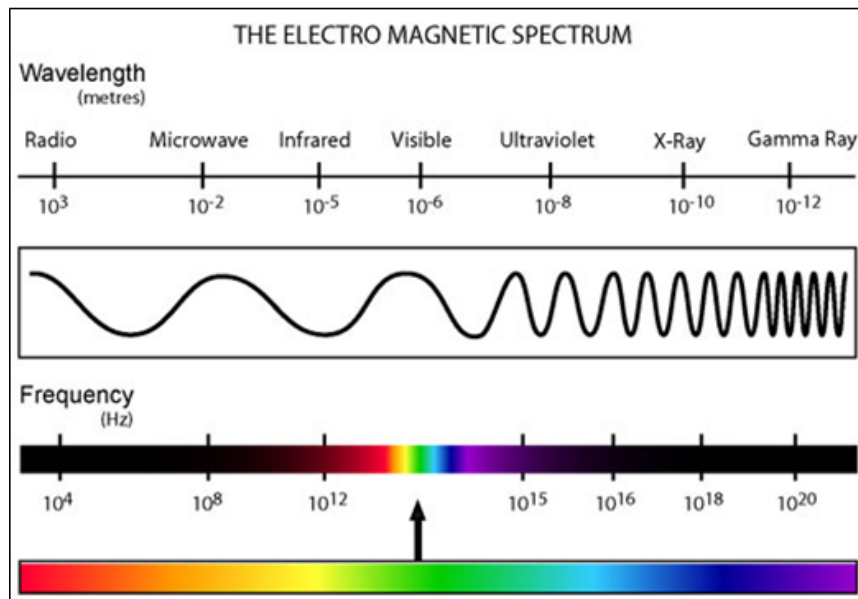
Gamma Radiation

Gamma radiation is highly penetrating electromagnetic radiation. Gamma radiation is able to travel many feet in air and many inches in human tissue. They readily penetrate most materials and are sometimes called "penetrating" radiation. Gamma radiation examples include iodine-131, cesium-137, cobalt-60, radium-226, and technetium-99m.

X-Ray Radiation

X-rays are like gamma rays. X-rays, too, are penetrating radiation. Sealed radioactive sources and machines that emit gamma radiation and x-rays respectively constitute mainly an external hazard to humans.

Gamma radiation and x-rays are electromagnetic radiation like visible light, radio waves, and ultraviolet light. These electromagnetic radiations differ only in the amount of energy they have. Gamma rays and x-rays are the most energetic of these.



Geographic Location

Universities and laboratories use radiation to conduct scientific research. Medical and veterinary hospitals and clinics use radiation to diagnose and treat humans and animals. Nuclear pharmacies use radiation manufacture and distribute radiopharmaceuticals. Blood banks use it to sterilize blood. Companies that provide services, such as sterilization of medical supplies, facility decontamination, and waste processing use radiation.

The closest nuclear radiation sites to Greene County are in St. Louis, Missouri, Lawrence, Kansas, and Jonesboro, Arkansas.

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Strength/Magnitude/Extent

The amount of damage that exposure to radiation can cause depends on several factors, including:

- Type of radiation
- The dose (amount) of radiation
- How the body was exposed, such as through skin contact, swallowing or breathing it in, or having rays pass through your body
- Where the radiation concentrates in the body and how long it stays there
- How sensitive the body is to radiation

Being exposed to a lot of radiation over a short period of time can cause skin burns. It may also lead to Acute Radiation Syndrome (ARS). The symptoms of ARS include headache and diarrhea.

Intentional Release

An intentional release is defined as a radiological attack. A radiological attack is the spreading of radioactive material with the intent to do harm. A Radiological Dispersal Device (RDD), also known as a dirty bomb, disburse radiological material over a targeted area using conventional explosives. This is different from a nuclear bomb that has radioactive fallout. A dirty bomb that explodes would disperse radioactive particles within a few city blocks or miles of the explosion. A nuclear bomb would disburse radioactive material over tens to hundreds of square miles. Another way of intentionally using radioactive materials includes using small dosages to poison a small population.

Unintentional Release

An unintentional release may include a spill, improperly disposing of hazardous waste or obtaining material from a waste site and using it without proper knowledge of the material and its effects.

Naturally Occurring Radiological Hazards

Naturally Occurring Radioactive Material (NORM) is found in virtually all rocks, minerals and soils. The Health Physics Society explains they naturally contain small amounts of uranium, thorium and a radioactive isotope of potassium. Plants and animals are naturally radioactive because they contain small (but measurable) levels of radioactive potassium, radioactive carbon (C-14) and hydrogen (tritium or H-3). The radioactive levels are formed by cosmic ray interactions in the atmosphere.

Commonly Encountered Radionuclides

The Environmental Protection Agency (EPA) explains there are 12 commonly encountered radioactive nuclides, also called radionuclides. A radionuclide is an atom with an unstable nucleus that has excessive energy. The energy may go to a newly-created radiation particle within the nucleus or to an atomic electron. Through moving process the radionuclide undergoes radioactive decay and emits radioactive energy in the form of the aforementioned rays.

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NAME	TYPE	USES
Americium-241	Alpha Gamma	Smoke detectors; diagnostic device; gauges
Cesium-137	Beta Gamma	Density gauges; leveling gauges
Cobalt-60	Beta Gamma	Leveling devices; radiotherapy, sterilization for spices and foods
Iodine-129 & 131	Beta Gamma	Tracks the metabolism of drug compounds; helps diagnose and treat thyroid problems
Plutonium	Alpha Beta Gamma	Nuclear weapons; power source
Radium	Alpha Gamma	Radiography devices; tips of lightning rods
Radon	Alpha	Radon has very little practical use
Strontium-90	Beta	Radioactive tracer in medial and agricultural studies; can be converted into energy for long-lived portable power supplies
Technetium-99	Beta Gamma	Found in radioactive wastes from defense-related facilities, nuclear reactor and fuel cycle facilities, academic institutions, hospitals and research establishments.
Tritium	Beta	Used as a component for a trigger mechanism in thermonuclear weapons; produced commercially in reactors; used in self-luminescent devices
Thorium	Alpha Gamma	Has coloring properties used in ceramic glazes; widely used in lantern mantles for brightness; metals in the aerospace industry
Uranium	Alpha Gamma	Depleted uranium is used as shielding to protect army tanks; parts of bullets and missiles; to propel Navy ships and submarines; nuclear weapons

Source: Commonly Encountered Radionuclides

The previously-listed radionuclides are important for understanding how hazardous material interacts with communities on a regular basis. These materials could be released intentionally or unintentionally.

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Previous Occurrences

In 2008, an accidental exposure occurred in Greene County Missouri. A construction worker operating a motor grader accidentally hit a soil compression gauge. The gauge uses alpha and gamma rays to determine the depth and composition of soil. When the motor grader ran over the gauge, it broke the alpha source and locked the gamma source in a position outside of the cast iron box. The gamma source is kept in the cast iron box to protect workers from unsafe levels of radiation. The construction worker manually hammered the gamma source back into the cast iron box. The entire device was then placed in a larger cast iron box and transported to a safe facility. Throughout this process, the construction worker's exposure was monitored and was within a "safe" range of exposure. Additionally, the emissions from the gauge were also measured as it was transported, and did not pose a risk to the public.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely for a radiological event to occur within the next ten years in Greene County. For a full description of the CPRI for radiological events, refer to Appendix B.

Changing Future Conditions and Considerations

Climate change will not affect radiological events in Greene County.

VULNERABILITY

Vulnerability Overview

Radiation exposure can cause potential health risk to all the population depending on the amount and type of radiation exposure. Children and fetuses are especially sensitive to radiation exposure. The cells in children and fetuses divide rapidly, providing more opportunity for radiation to disrupt the process and cause cell damage. There are several sites that house radioactive materials in the area, like hospitals with x-ray machines or construction sites with gauges. Because of this, some citizens may encounter radioactive materials at varying levels.

The risk of a dirty bomb or a large release of radioactive material in the county is unlikely. A large radioactive material incident would be devastating to Greene County. A small bomb could explode in the center of a small community and cause significant property and health damage.

Radiation is especially frightening to the public because it is something people cannot see or feel; it is an unknown source of danger.

Potential Losses to Existing Development

The major potential losses of radiological incidents are humans, animals and critical facilities. The degree of impact would be directly related to the type of incident. Potential losses would also include the cost of repaired or replacement on damaged facilities, lost economic opportunities for businesses, loss of human life, and injuries to person. Radiological incidents are rare and specific amounts of estimated losses for previous occurrences are not available.

Impact of Previous and Future Development

Population growth could affect how many people could be affected by a large radiation attack. Springfield is a growing city and is most at risk in the planning area for a radiological attack. Though this attack would be unlikely, if the population continues to grow, so could the risk.

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EMAP Consequence Analysis

EMAP Impact Analysis: Radiological

SUBJECT	DETRIMENTAL IMPACTS
Public	The only recorded radiological incident resulted in no injuries or deaths. An attack however, could have catastrophic damages.
Responders	Responders face some safety concerns, but are protected if they possess proper personal protective equipment.
Continuity of Operations	Delivery of services would be catastrophic in a large-scale incident. Greene County has not experienced an impact of delivery of services.
Property, Facilities, and Infrastructure	The only radiological incident in Greene County left no property, facility or infrastructure damage. A large-scale attack could be catastrophic to property, facilities and infrastructure.
Environment	The environment would be destroyed in the event of a large-scale radiological attack; however history shoes radiological incidents have caused no damage to the environment.
Economic Condition of Jurisdiction	The economy would have catastrophic impacts in a large scale incident. Greene County has not experienced impact to the economy.
Public Confidence in the Jurisdiction's Governance	The public confidence in Governance could be catastrophic in a large-scale incident. Greene Count has not experienced an impact on public confidence in governance because of a radiological incident.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

Radiation could be a risk for the entire planning area if it was used as an intentional release or as an attack. These would be used to target a specific location. In the planning area, the City of Springfield would be at higher risk for a planned attack because of large amount of population in condensed areas. An unintentional release could come from a spill or improperly disposing of hazardous waste. A spill would put areas along I-44 at risk. Those areas would include Strafford, including the Strafford School District, and the City of Springfield. Other jurisdictions that would be at risk would be areas along railroad tracks in the planning area. The map below shows the different locations of railroads in the planning area.

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PROBLEM STATEMENT

Radiation is a common thing that the planning area may come into contact with day to day activities. Large amounts of radiation exposure can cause serious harm to human and animal health. Though a large radiation incident is unlikely in Greene County, it is still a possibility. A radiation attack in the planning area, though unlikely, would be devastating. The impact of radiation depends greatly on the type, location and amount of radiation that is exposed. Mitigation solutions for Radiological events are scarce, some solutions could involve keeping large groups of people to a minimum. No participating jurisdiction created a project involving radiological events.

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3.6.8 Human Caused Hazard: Targeted Violence

HAZARD PROFILE

Hazard Description

Targeted violence is an act to harm or kill someone due to an act of that person. The secret service has stated that with targeted violence the perpetrator and target(s) are identifiable prior to the incident. There are several different types of targeted violence.



Types of Targeted Violence

- Schools: Over the last decade there have been many incidents where schools from elementary to college that students have planned to cause harm or killed many students.
- Bombing: Bombing of American embassies from terrorist groups. (See sections 3.6.2, 3.6.5, 3.6.8 for more information)
- Hijacking of airlines: See technological hazard (3.5.1)

The problem with this human-made hazard is that it is unpredictable. There is almost never warning time, or knowledge of where this tragedy could take place. Targeted violence can occur in a public space or a private home. Workplaces, schools, religious and government buildings are the most targeted spaces in public. However, the threat can come from anywhere and strike anywhere. Efforts to prevent and mitigate targeted violence stumble upon difficult obstacles. Debates about gun rights and invasion of privacy hobble these efforts. Navigating the intricacies of privacy laws, preserving academic freedoms, complying with civil rights laws, and simultaneously ensuring a safe campus and workplace environment are tasks not easily accomplished.

Some targeted attacks are launched by people who claim to adhere to a cause or violent ideology, some have a more personal grievance, and in other cases the attacker seems to regard the act as an end unto itself. This is a list of the most common reasons for targeted violence.

- Related to an intimate relationship
- Retaliation for specific actions
- Refused advances or obsession with target response to academic stress/failure
- Acquaintance/stranger based sexual violence
- Psychotic actions
- Workplace dismissal/sanction
- Need to kill/specific victimology
- Draw attention to self/issue
- Bias related

Sabotage

Sabotage is taking a deliberate action to destroy, damage, or incapacitate someone or something else. This can happen for political purposes, military advantage, or in the workplace.

According to the FBI, previous workers are taking revenge on their employers by using their access to the company computers to destroy data, steal customer information, make unauthorized charges to company accounts and steal trade secrets. The financial damage varies with some being more than \$3 million.

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Public offices, centers of government and government depots are easy targets for sabotage.

Workplace sabotage can come in many different forms. Organizations do not frequently like discussing previous occurrences in fear of copycat actions or bad publicity. Employee saboteurs inflict damage to the property, reputation, product or service of an organization. Some of the different forms of sabotage are: equipment destruction, computer viruses, poisoning, working slowly, stealing or purposely treating a customer rudely. Sometimes acts of sabotage are harder to recognize, like viruses. Security or police can catch more serious sabotage acts like fire.

The severity of sabotage can change depending on the type of sabotage and how widespread the incident is.

Geographic Location

The entire planning area is at risk for experiencing targeted violence. Targeted violence is known in busy or popular locations such as schools, universities, churches, malls, movie theatres, etc. There are over 17 colleges and universities located in Greene County, Missouri. Missouri State University has the highest enrollment of 22,000 followed by OTC with 15,000, and Drury with a student population of 5,000. Greene County has one of the highest K-12 populations in Missouri. There are roughly 92 public schools for students in grades K-12. In addition, there are over 19 private and alternative schools. Major religious sites in Greene County: Temple Israel (synagogue) Rogersville and Islamic Center of Springfield (mosque).

Strength/Magnitude/Extent

The effects of targeted violence can vary depending on the type of targeted violence and what method is used. Violence cannot be attributed to a single factor. Its causes are complex and occur at different levels. To represent this complexity, the ecological, or social ecological model is often used. The following four-level version of the ecological model is often used in the study of violence:

1. The first level identifies biological and personal factors that influence how individuals behave and increase their likelihood of becoming a victim or perpetrator of violence: demographic characteristics (age, education, and income), genetics, brain lesions, personality disorders, substance abuse, and a history of experiencing, witnessing, or engaging in violent behavior.
2. The second level focuses on close relationships, such as those with family and friends.
3. The third level explores the community context—i.e., schools, workplaces, and neighborhoods.
4. The fourth level looks at the broad societal factors that help to create a climate in which violence is encouraged or inhibited: the responsiveness of the criminal justice system, social and cultural norms regarding gender roles or parent-child relationships, income inequality, the strength of the social welfare system, the social acceptability of violence, the availability of weapons, the exposure to violence in mass media, and political instability.

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Mass Shooting

Unfortunately, in the last 5 years, mass shooting have become more popular around the nation. A mass shooting is an act of violence with a firearm involving the killing of 4 or more victims. A targeted violence shooting event is any act of violence in which a perpetrator attacks a particular individual or group with a firearm regardless of the number of casualties. Some reasons why a mass shooter may decide to act are:

- Low capability for coping with rejection/criticism
- Interprets criticism as a form of bullying or an attack
- Belief they are the victim and should protect themselves
- Sees murder as justifiable homicide/self defense
- Supports the notion of justice through the death penalty
- Belief they are judge, jury or executioner
- Connects their depression to the target
- Refuses to seek out mental health help
- They take comfort in the violent endgame

In the years 2000-2013, 160 national mass shooting events occurred in the United States. There were 486 dead and 557 wounded.

Previous Occurrences

Greene County has not experienced a large targeted attack within the planning area. The amount of targeted attacks across the nation are continuing to increase.

Historical Education Mass Shootings/Killings

SCHOOL NAME	DATE	NUMBER KILLED
Enoch Brown School	July 1764	10
Charles Town, W. Virginia	December 1898	6
Plain Dealing High School	March 1893	4
South Pasadena Junior High	May 1940	5
University of Texas	August 1966	17
Rose-Mar College of Beauty	November 1966	5
Cal State Fullerton	July 1976	7
Cleveland Elementary School	January 1989	6
University of Iowa	November 1991	6
Westside Middle School	March 1998	5
Thurston High School	May 1998	4
Columbine High School	April 1999	15
University of Arizona	October 2002	4
Red Lake Sr. High School	March 2005	10
Virginia Tech	April 2007	33
Northern Illinois University	February 2008	6
Sandy Hook Elementary	December 2012	28
Marysville Pilchuk High School	October 2014	5
Umpqua Community College	October 2015	10
Stoneman Douglas High School	February 2018	17
Santa Fe High School	May 2018	10

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September 11th 2001

9/11 is one of the United States worst targeted violence event in history. There were nineteen al Qaeda terrorists that hijacked four airplanes that day crashing two of them into the north and south towers of the World Trade Center while the third plane crashed into the Pentagon. The fourth plane was crashed into a field after the crew and passengers attempted to regain control after learning what happened to the other planes. That day resulted in almost 3,000 people losing their lives.

September 2010

On September 21, 2010 a power substation was deliberately destroyed causing a power outage in the Willard, Ash Grove and Bois D'Arc area. This resulted in over 2,900 people losing power and traffic lights being impacted at the I-44 and West Bypass interchange.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is probable for acts of targeted violence to occur within the next five years in Greene County. For a full description of the CPRI for targeted violence, refer to Appendix B.

Changes in Future Conditions and Considerations

Climate change will not affect targeted violence in the planning area.

VULNERABILITY

Vulnerability Overview

The entire planning area is vulnerable to targeted violence. Most targeted violence attacks have no warning time and are unpredictable. In some cases, the perpetrator will tell someone or announce over social media their intentions; however, this rarely happens. Many institutions and security officials are attempting to profile at-risk people. While this can identify potential threats, it provides little information on when and where an attack can occur. Greene County is the fourth most populated county in Missouri and has one of the highest student populations. When rioting does break out, it generally proves extremely difficult for first-responder law enforcement authorities to quell the mob promptly. In some cases, police presence is there from the beginning, but in other situations, police may be dispatched to a specific location giving the incident more time to escalate.

Potential Losses to Existing Development

Acts of targeted violence can be extremely costly both in loss of life and in money. During mass shooting attacks some cost factors include:

- Loss of life
- Injured workers
- Hospital trauma resources
- EOC
- Labor Costs
- Property Loss

After a mass shooting attack, post event factors include:

- Psychological Impact
- Resiliency of Faculty
- Insurance Premiums
- Uninsured Losses
- Investigation Costs
- Funeral Costs
- Health Care Premium Costs
- Credit Impact
- Counseling Expense
- Supplies

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Estimated Costs of Active Shooter Events

Name of Event	Cost (Estimated)
Las Vegas Mass Shooting Attack	\$600 Million
Orlando Terror Attack	\$390 Million
San Bernardino Terror Attack	\$125 Million
Century Theatre (Aurora, Colorado)	\$100 Million
Sandy Hook Elementary	\$100 Million
Columbine High School Shooting	\$50 Million
Virginia Tech Shooting	\$48.2 Million

Source: <https://www.acbo.org/files/Conference/2017%20Conference/10-23%201130a%20GS.pdf>

Impact of Previous or Future Development

As mentioned above, Greene County has one of the largest school districts in America. As the population of the county grows, so does the school population. School shootings are not a new threat, but an increasing threat for areas all around the nation. Many schools participate in active shooter drills, but they are still vulnerable to targeted threats. Greene County also has many popular Universities which are also vulnerable to an attack. As the population and recognition of Greene County grows, the threat of experiencing an attack also grows.

EMAP Consequence Analysis

EMAP Impact Analysis: Targeted Violence

SUBJECT	DETRIMENTAL IMPACTS
Public	Targeted violence can result in injuries and fatalities. The number of people injured or deceased depends on the situation. However, history has shown targeted violence typically ends in a severe number of injuries and minimal deaths.
Responders	There may be a potential for life safety issues for responders depending on the situation. Response functions may also be impacted depends on number of attackers, amount of public at risk, types and amounts of weapons, etc.
Continuity of Operations	Targeted violence would have little to no impact on the delivery of services.
Property, Facilities, and Infrastructure	Targeted violence could have isolated instances of property damage, depending on location and the type of attack experienced. Targeted violence could have isolated instances of facility damage and infrastructure damage.
Environment	The environment would experience little to no impact from targeted violence.
Economic Condition of Jurisdiction	Targeted violence would have little to no impact on the economy.
Public Confidence in the Jurisdiction's Governance	Targeted violence would have a limited effect on public confidence in governance. The public can lose this confidence if it believed responders did not arrive quickly enough or take appropriate actions to prevent, contain, or end violence.

*For more details on Consequence Analysis, refer to Appendix B.

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Hazard Summary by Jurisdiction

All areas in Greene County are at risk for experiencing targeted violence. Our most vulnerable jurisdictions are our school districts and our universities. Though Greene County does not have a history of experiencing large threats, school shootings are occurring more frequently across the Nation. Other areas at risk are areas of dense population or popular areas in the county. Examples would be: movie theatres, malls, government facilities, court house, etc. Most of these places reside in the City of Springfield.

PROBLEM STATEMENT

Targeted threats can come in many forms including mass shootings, high jacking's, bombings etc. Depending on the form of attack and location, targeted threats can cause large amounts of property and human life loss. Targeted Violence can also cause public panic. Targeted threats are unpredictable and come with little to no warning. Though no major events have happened in Greene County, they are happening all over the nation and will continue to be a threat for the planning area. Mitigation solutions include trainings for staff who work in schools or large workplaces, secure entrances in schools and exercises for staff and students in schools. Many school districts created projects mitigating targeted violence. These projects can be found in the Mitigation Strategy Section of this Mitigation Plan.

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3.6.9 Human Caused Hazard: Waste

HAZARD PROFILE

Hazard Description

More than 40 million tons of hazardous waste is produced in the United States each year. It may be produced by large industrial facilities (e.g. chemical manufacturers) or small businesses (e.g. dry cleaners). It is estimated that a city with a population of 100,000 will discharge the following quantities into city drains each month:

- 23.5 tons of toilet bowl cleaner;
- 13.5 tons of liquid household cleaner; and
- 3.5 tons of motor oil.



These substances will eventually enter the local water systems. Because waste can easily infiltrate and harm the environment, the Environmental Protection Agency (EPA) closely with local agencies to ensure the wastes are properly treated and disposed of. Hazardous waste has the potential to irreversibly damage the environment.

The EPA defines waste as an unwanted substance or material. Before waste can be classified as hazardous, it must be defined as a solid waste. A solid waste includes any discarded material that is abandoned by being disposed of, burned or incinerated, recycled or considered "waste-like". A solid waste can physically be a solid, liquid, semi-solid or container of gaseous material.

There are three common sources of hazardous waste:

1. Agriculture: Pesticides and herbicides; fluoride wastes (by-products of phosphate fertilizer production); and soluble nitrates from manure may dissolve into groundwater and contaminate groundwater drinking wells and cause health problems.
2. Medical: "Sharps" or needles, scalpels and glassware; outdated and unused drugs; testing laboratories' chemical waste; and radioactive isotopes.
3. Household: Toxic paints; flammable solvents; caustic cleaners; toxic batteries; pesticides; drugs; and mercury from broken fever thermometers.

Categories of Waste

There are three official categories of known hazardous waste. They are:

- The F-List (Non-Specific Source Wastes): Wastes from common manufacturing and industrial processes, like solvents, that are used in cleaning or degreasing operations. They're listed as non-specific sources because they can occur in different sectors of industry.
- The K-List (Source-Specific Wastes): Wastes from specific industries, like petroleum refining or pesticide manufacturing. Sludge and wastewater from treatment and production processes are examples of source-specific wastes.

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- The P-List and U-List (Discarded Commercial Chemical Products): These lists include specific commercial chemical products in an unused form. For example, some pesticides and pharmaceutical products become hazardous wastes when discarded.

Properties of Waste

Waste that is not specifically listed on the above-referenced categories may still be considered a hazardous waste if it exhibits one of the following four characteristics:

- Ignitability: Wastes that can create fire under specific conditions, are spontaneously combustible or have a flash point less than 60°C (140°F).
- Corrosivity: Wastes that are acids or bases and are capable of corroding metal containers like storage tanks, drums and barrels (e.g. battery acid).
- Reactivity: Unstable under “normal” conditions. They may cause explosions, toxic fumes, gases or vapors when heated, compressed, or mixed with water (e.g. lithium-sulfur batteries and explosives).
- Toxicity: Wastes that are harmful or fatal when ingested or absorbed (e.g. contains mercury or lead). When land-disposed, waste may reach and pollute groundwater.

Mixed Waste

In addition to solid waste being hazardous, the waste may also be classified as mixed waste, which means it includes radioactive components. The treatment of mixed waste is complex. Most commercially mixed waste is classified as low-level mixed waste, which means it has low-levels of radioactivity and low-levels of hazardous substances. The United States Department of Energy identifies three types of mixed waste:

- Low-Level Mixed Waste (LLMW): Waste generated from research, development and production of nuclear weapons.
- High-Level Mixed Waste (HLW): Waste generated from reprocessing spent nuclear fuel and irradiated targets from reactors. This waste often includes highly-corrosive components, organics or heavy metals regulated by the RCRA.
- Mixed-Transuranic (MTRU): Contains radioactive elements heavier than uranium and a hazardous waste component.

Classification of Waste Disposal Sites

CLASS	DESCRIPTION
1	Sites that are causing or presenting an imminent danger of causing irreversible or irreparable damage to the public health or environment – immediate action required.
2	Sites that are a significant threat to the environment – action required.
3	Sites that do not present a significant threat to the public health or environment – action may be deferred.
4	Sites that have been properly closed – require continued management.
5	Sites that have been properly closed with no evidence of present or potential adverse impact – no further action required. (Any site listed as Class 5 will be removed from the registry according to state law).

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Geographic Location

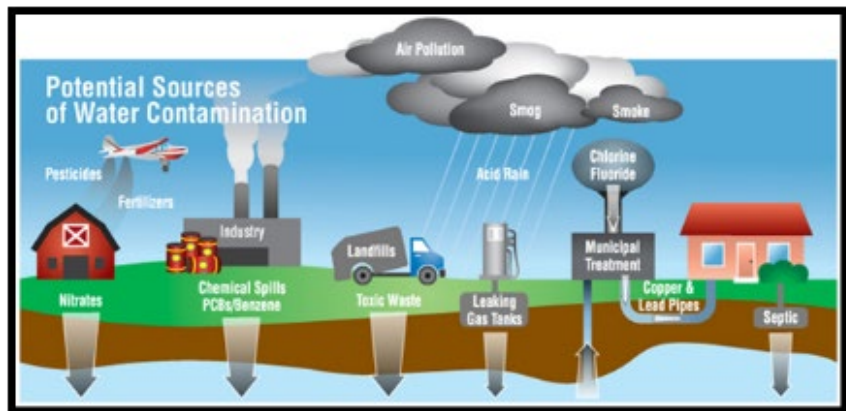
There are multiple waste sites throughout Greene County including: Ash Grove, Springfield, Strafford and Willard. Please see the critical facility appendix for specific locations.

Strength/Magnitude/Extent

Missouri homes, businesses and industry generate millions of tons of solid waste annually. While landfill disposal continues to be an option, new disposal facilities face strong public examination and are costly to site, build and operate. The department is constantly seeking alternatives to landfill disposal that are both environmentally protective and cost-effective for the consumer. Solid waste management permitting, monitoring and enforcement efforts can prevent illegal dumping and other factors that may cause long-term social, economic and environmental problems.

Environmental

Groundwater and soil are the most frequently affected pathways that facilitate the general public's interaction with hazardous waste. The Groundwater Foundation explains that groundwater contamination occurs when man-made products (e.g. gasoline, oil, road salts, etc) get into the groundwater making it unsafe or unfit for human use. Some major sources of these products/contaminants include storage tanks, septic systems, hazardous waste sites, landfills and the use of road salts, fertilizers, pesticides and other chemicals. Soil contamination is the presence of man-made chemicals or other alterations to the natural soil environment. The primary concern regarding soil contamination is health risks either directly (e.g. residences, parks or schools) or indirectly (via water contamination) facilitated. Once the water or soil is contaminated, there is a greater chance that the environment and habitats, both animal and human, may experience the detrimental effects associated with hazardous waste.



Health

Health effects caused by exposure to hazardous waste may be acute or chronic. Acute effects are felt within 24 hours of exposure and include skin burns and disfigurement from substances (e.g. contact with battery acid). Chronic effects are gradual and occur from a repeated exposure over an extended period of time. Carbon monoxide leakage may cause headaches and concentration problems, allergic reactions may occur from cleaning productions; most of the chronic health effects are liver and/or kidney damage, central nervous system damage, cancer and birth defects.

Previous Occurrences

In 1983, Times Beach, Missouri, was completely evacuated due to a dioxin scare that made national headlines; it was the largest civilian exposure to dioxin in the United States. The town was plagued with dust problems throughout the 1970's because it lacked funding to pave the 23 miles of dirt roads. The town hired a waste hauler to oil the roads to reduce the volume of dust. The oil contained high levels of dioxin; soil samples identified dioxin levels 100 times higher than one part per billion that is considered hazardous to humans. Dioxin can cause many

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health problems including but not limited to: chlorine, sarcoma, thyroid disorders, diabetes and endometriosis. The government bought out the town for \$32 million. The total cost for clean-up of the area, which included incinerating debris and soil from the town and surrounding areas, was \$110 million. The government paid \$100 million and \$10 million was supplemented by a company responsible for the contaminated oil.

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is unlikely for a large waste event to occur within the next ten years in Greene County. For a full description of the CPRI for waste, refer to Appendix B.

Changing Future Conditions and Considerations

Climate change will not affect waste disposal in Greene County.

VULNERABILITY

Vulnerability Overview

A hazardous materials waste incident could cause health and environmental damage to Greene County. The severity of the incident could cause small amounts of property damage. There is typically no warning time with this hazard and it could take days to clean up depending on how large the incident was.

In Springfield, there are two licensed infectious waste transporter facilities, Stericycle Inc. and Sunbelt Environmental Services. Many other licensed waste transporters may be pass through Greene County to reach their destination.

Waste Disposal Sites in Greene County

SITE NAME	SITE LOCATION	CLASSIFICATION	AGENCY INVOLVED	SITE DESCRIPTION
HCI Chemtech	Springfield	Class 2	EPA	A chemical distribution facility has operated at the site since 1975.
Syntex	Springfield	Class 3	EPA/DNR	An active chemical manufacturing facility.
Solid State Circuits	Republic	Class4	DNR	Solid State Circuits Site (SSC) .5 acres in downtown Republic
Sac River Landfill	Springfield	Class 4	EPA	An inactive landfill adjacent to the Fulbright Lanfill; industrial waste containing hazardous materials and heavy metals were deposited during the landfill's operation.
Fulbright Landfill	Springfield	Class 4	EPA	Located in the South Dry Sac River flood plain, north of Springfield.

Former manufactured Gas Plants

Industrial gas plants generate coal tar as the gas is manufactured from coal. Coal tar is composed of thousands of different chemicals, but coal tar is composed of potentially carcinogenic polycyclic hydrocarbons and volatile

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organic compounds. Cyanide and other metals may also be on site. There is one former manufactured gas plant site located in Greene County, the Springfield Gas & Electric Company.

Smelter Sites

Smelting is a process that is used to produce a metal from its ore. Smelting uses heat and a chemical reducing agent to change the oxidation state of the metal ore. The chemical agent removes the oxygen from the ore to leave the metal. For the past 150 years, the state of Missouri has been one of the world's largest producers of lead and zinc metals. The lead and zinc ores were mined, milled by crushing and separation, and then transferred to smelters to be processed into raw materials. The most common contaminants found at smelter sites include lead, zinc, cadmium, barium, nickel and chromium. The contamination is most frequently caused by dust escaping from the furnace in the smokestacks during the production process. The Slogdill & Wilson Furnace in Brookline, Missouri, is the only site listed in Greene County by the Missouri Department of Natural Resources.

Wood Treatment Inventory

Wood preserving is used to extend the life of wood products, especially if the products are used in the construction, railroad and utilities industries. The preservation provides long-term protection from weather, fungi, insects and marine borers. Mismanagement of wood preservation chemicals has caused significant contamination of soil and groundwater at various locations. There are two wood treatment sites in Greene County. The Kerr-McGee Chemical Corporation and the Robert E. Lee Lumber Site are both located in Springfield.

Brownfields

Like most communities, Springfield has properties that are abandoned or under-used. These properties are called Brownfields, and are located in both rural and urban areas. From former lumberyards to old, abandoned feed mills, Brownfields can be found across Greene County. Brownfields are cause for concern because there may be the presence, or potential presence, of a hazardous substance, pollutant or contaminant. Environmental testing is conducted to determine if an environmental threat is present.

One of Greene County's greatest success stories is Jordan Valley Park located in Springfield. Prior to developing the park, there was a 300-acre former industrial area in downtown Springfield. Now, instead of vacant factories and used-car dealerships, there is a 12-acre public park and an ice area, including an arts center, an Exposition Center and a minor league baseball stadium.

Potential Losses to Existing Development

According to the Missouri State Hazard Mitigation Plan, cost information pertaining to water quality improvement and protection efforts is difficult to calculate exactly, but can be estimated to some degree. While the Department tracks its own programmatic costs, those representatives of municipal, private, and industrial treatment facility operations, and in some cases, the implementation of BMPs, are typically not readily available. Economic benefits, in monetary terms, resulting from water protection efforts are even more difficult to calculate. An overview of the amount of funding the department spends on various aspects of water pollution control and prevention includes the following:

- USGS ambient water quality monitoring network: \$1.2 million annually. Annual costs for permit issuance averaged approximately \$2.96 million for fiscal years 2014 and 2015. On average, approximately \$7.6 million is spent each year for other facets of water pollution control and administrative support.
- Non-Point Source (NPS): \$3.9 and \$3.8 million was spent on NPS projects in state fiscal years (SFYs) 2014 and 2015, respectively. Approximately \$200,000 is awarded annually for planning such projects.
- Soil and Water Conservation Program: an average of \$24.1 million each year is distributed directly to landowners to address agricultural NPS pollution and to conserve and protect the quality of water resources in agricultural landscapes. Over FFYs 2014 to 2015, a total of \$48.3 million was spent on SWCP conservation practices aimed at reducing soil runoff from farmland.

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- Missouri’s Clean Water State Revolving Fund (CWSRF) makes low interest loans available to eligible recipients for designing and constructing publicly-owned wastewater systems and other eligible projects including, but not limited to, stormwater infrastructure, non-point source projects, and water conservation or reuse.

Impact of Previous and Future Development

As the population and growth continues in Greene County, so does the amount of waste that is produced. According to the Missouri State Hazard Mitigation Plan, Throughout the State, continuing suburban development impacts streams in several ways. Shortening and culverting of channels leads to the direct loss of streams and riparian areas. The increase in impervious surface area in the surrounding watershed leads to unnatural hydrograph patterns, with lower baseflow and higher stormflow. The altered channel and higher peak flows can increase erosion, while the runoff from the impervious surface carries increased levels of sediment and various chemicals from the urban environment. Elevated nutrient levels or bacterial contamination is also likely if individual or community domestic sewage systems are not well maintained.

EMAP Consequence Analysis

EMAP Impact Analysis: Waste

SUBJECT	DETRIMENTAL IMPACTS
Public	A waste incident creates many safety concerns for the public. Injuries and illnesses are likely, and possibly death if exposed to hazardous waste.
Responders	First responders will have proper equipment and training to handle a waste incident. The safety measures may create a delay of some response functions.
Continuity of Operations	Waste incidents would have little to no impact on the delivery of services in Greene County.
Property, Facilities, and Infrastructure	Greene County would experience minor isolated instances of property damages in the event of a hazardous waste incident. Waste incidents would have little to no impact on facilities and infrastructure damages.
Environment	Hazardous waste is very harmful to the environment. Water contamination also occurs from this type of incident.
Economic Condition of Jurisdiction	Waste incidents would have little to no impact on the economy.
Public Confidence in the Jurisdiction’s Governance	Waste incidents could have a minor effect of loss in public confidence, depending on the situation; and if the government is at fault.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

There are many waste facilities located within the planning area. As listed above, many of the waste facilities are located in Springfield. Springfield also has a denser population that could be affected if a major waste incident would occur. Jurisdiction along I-44 would also be at risk if a waste spill were to happen during transportation.

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PROBLEM STATEMENT

There are many instances where hazardous waste can affect the environment with considerable consequences to either air or water. Waste incidents can also affect public health. Waste incidents come with no warning time and can be difficult to clean up. Though Greene County has not experienced a disaster involving waste, it still is a potential threat to our area. Mitigation solutions for waste are difficult but include, identifying strategies to expedite the removal of disaster related waste, evaluate the community's recycling programs, and finding opportunities for source reduction. No participating community chose a waste related mitigation solution in this hazard mitigation plan.

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3.7.1 Other Hazard: Animal Disease

HAZARD PROFILE

Hazard Description

Animal diseases are diseases that do not typically affect human beings directly. They do, however, have very negative effects on food supplies and the economy. Transboundary animal diseases (TADs) are defined as epidemic diseases which are highly contagious or transmissible and have the potential for very rapid spread, irrespective of national borders, causing serious socio-economic and possibly public health consequences. TADs are a serious threat to the livelihood of livestock farmers and the economy in general. They can threaten food security, result in major production losses, increase the cost of livestock due to costly disease control measures, inhibit trade, and cause serious environmental consequences. A characteristic of transboundary animal diseases (TADs) is that they themselves can be the cause of national emergencies and, as this manual demonstrates, their significance often transcends national boundaries. It is imperative therefore, wherever possible, to limit the socio-economic disruptions resulting from outbreaks of TADs.

Cattle (Bovine)



Cattle bred for meat production are commonly referred to as beef cattle. Beef is a meat product that is high in protein, iron, zinc and B-vitamins. Cattle bred for milk production are referred to as dairy cattle. Dairy products fall into two major categories, fluid milk and manufactured products, such as cheese, yogurt and butter. Cattle and calves are considered to be one of the most valuable agriculture commodity produced by Missouri. In addition, Missouri has traditionally ranked second nationally in relation to number of cattle operations. Missouri also ranks

second in the nation in beef production with 4.25 million head of cattle on 59,000 operations and 15th in milk production with over 1.6 billion pounds of milk produced. In Greene County alone, there are approximately 68,606 cattle and calves on 1,225 farms as inventoried by the Census of Agriculture in 2017. There are approximately 37,691 beef cows on 1,073 farms and 664 milk cows on 29 farms.

Cattle Diseases

Anaplasmosis, also known as yellow bag or yellow fever, is an infectious parasitic disease caused by *Anaplasma phagocytophilum*. This parasite infects the red blood cells in cattle and results in severe anemia, weakness, fever, decreased appetite, depression, constipation, decreased milk production, jaundice, abortion, and death. Adult animals are most susceptible to this disease; symptoms become progressively severe and death often occurs. Transmission of this disease occurs primarily through vectors (including ticks, horseflies, and mosquitoes), but can also occur through contaminated farming tools (such as ear tagging). Once an animal becomes infected with anaplasmosis, they become a carrier of the disease for life and become a source of infection to vulnerable cattle. Because vectors carry the disease, it can also be transmitted to humans through tick bites. Symptoms usually occur 1-2 weeks after infection and are characterized by fever, headache, muscle pain, malaise, chills, nausea, abdominal pain, cough, confusion, and rash. The number of anaplasmosis cases reported to the CDC has increased steadily since the disease became reportable from 348 cases nationwide in 2000, to 1761 cases in 2010. The fatality rate in humans has remained low, at less than 1%. Although information was not found regarding prevalence in animals, increased prevalence in humans indicates a high probability for increased incidence in animals. The impact of anaplasmosis on the community is great. It can lead to human infection and economic losses due to decreased milk production, severe weight loss, poor reproductive ability, abortion, and death.

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Bovine Leukosis Virus (BLV) is a virus that targets lymphocytes in beef and dairy cattle and leads to Bovine lymphosarcoma. Infection is often present without any manifestations, but lymphocytosis (an abnormal increase in white blood cells in the blood) may occur. Bovine Leukosis Virus impairs the immune system and leaves animals vulnerable to other infectious diseases. Malignant tumors are present in 1-5% of all infected cows which may result in protruding eyeballs, weight loss, enlarged lymph nodes, gastrointestinal obstructions, paralysis in the hind limbs, and/or infertility. BLV is typically transmitted in the blood of infected cattle, but can also be transmitted in saliva, semen, and milk. Common needles, blood contaminated syringes, rectal palpation, and drug vials may all be causes of infection. Diagnosis of BLV is performed by testing serum for virus-specific antibodies. Prevalence studies by the National Animal Health Monitoring System (NAHMS) revealed that in 1996, at least one BLV infected cow was found in 89% of the 1,000 farms who participated in the study and an average of 40% of tested cows were infected in the Midwest. The study also showed that larger herds were more likely to both test positive for infection and have a higher percentage of infected cattle. In 2007, a NAHMS prevalence report indicated that BLV may be present in at least 70-80% of Michigan dairy cattle and 83.9% of U.S. dairy operations. BLV can cause significant losses to farmers including increased replacement costs, loss of income from condemned carcasses of full cows, reduced reproductive efficiency, and decreased milk production. The NAHMS study determined that BLV infected herds produce \$59 less in annual production per cow, which equates to 3% less milk. These losses can be substantially more with a higher prevalence of infection within a herd. For example, the average annual cost in a 100 cow herd with a 50% prevalence rate was nearly \$6,400. The Bovine Leukosis Virus Free Program exists in Missouri to help reduce economic losses by decreasing the prevalence of BLV in Missouri's cattle.

Brucellosis (a.k.a. Bang's disease or contagious abortion) is an infectious disease of cattle caused by the *Brucella abortus* bacteria. Although it can also be found in sheep, goats, rams, dogs, rodents, and pigs, it causes the biggest threat to cattle. This disease causes abortions, sterility, reduced milk production, placenta retention, and weak calves. It can also cause epididymitis, seminal vesiculitis, orchitis, and testicular abscesses in bulls. Chronic Brucellosis can result in recurrent fever, arthritis, or udder infection. Death is rare except in the fetus or newborn, and pregnancies are generally normal after the first abortion; thus, the main impact of this disease is economic. Transmission of *Brucella abortus* occurs due to contact with infected birth tissue (such as aborted fetuses or fetal fluid/membranes) or fluids (such as vaginal discharges, semen, urine, and milk). It can also be transmitted by ingestion, direct contact with mucous membranes or breaks in the skin, or fomites (contact with an infected object such as equipment, hay, feed, or water). Brucellosis is also infectious to humans through ingesting contaminated milk products or through direct contact with an infected animal. Indications of Brucellosis in humans include flu-like symptoms (fever, night sweats, headache, and back pain), arthritis, and recurrent fever. The economic impact of this disease can be seen through cost of medications and vaccines, production costs (mandatory testing, reduced milk production, increased abortions, decreased fertility, and non-viable or slow growing calves), replacement costs if a herd is infected, delay in the sale of animals, reduced population (due to abortions), and potential food safety issues. Cattle are required to be tested for Brucellosis upon change of ownership, on the farm and at livestock markets, and at slaughter and exhibitions. Brucellosis is close to being eradicated from the United States, with the exception being bison and elk in the Greater Yellowstone Area. Missouri was classified as a Brucellosis Free state in March 2004.

Johne's disease is a chronic, contagious bacterial disease that affects the small intestines of ruminants such as cattle, sheep, goats, deer, antelope, and bison. It is caused by *Mycobacterium paratuberculosis*. Infection occurs when the bacterium embeds itself into the ileus of the ruminant and an immune response occurs leading to thickened intestinal tissue and decreased absorption of nutrients. Clinical manifestations include weight loss despite a normal appetite, diarrhea, decreased milk production, increased incidence of mastitis, prolonged calving interval, emaciation, and eventual death. Several weeks after the onset of diarrhea, intermandibular edema (bottle jaw) may occur due to protein loss from the bloodstream into the digestive tract. Death is imminent at this point. Transmission occurs through the fecal-oral route via infected manure, through bacteria passed in milk/colostrums, or in utero. The incubation period for this bacterium is long; symptoms of the disease are rarely evident until two or more years after infection. Most animals are exposed to the bacterium shortly after birth, when they are most

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vulnerable to infection. Because Johne's disease can be a herd problem, a Johne's Voluntary Control Program exists to help lower prevalence of the disease. A 2007 NAHMS study of 82.5% of U.S. dairy cows found that 17.4% of small operations (less than 100 cows), 35% of medium operations (100-499 cows), and 34.1% of large operations (500 or more cows) confirmed Johne's disease in their herd during the previous 12 months. The impact of Johne's disease includes decreased milk production (of approximately 675 pounds in 305 days), production losses up to 10% for each affected animal, premature culling, reduced fertility, and reduced slaughter value. This can account for losses of approximately \$1,062 per infected 50-head herd.

Trichomoniasis is a venereal disease of cattle caused by a protozoan parasite called *Tritrichomonas foetus*. While it was virtually unheard of before 2005, it is now becoming a common problem in the Midwest. *Tritrichomonas foetus* is found in the reproductive tract of bulls and cows and is transmitted during breeding from the bull to the cow. Infected cows will experience infertility and early embryonic death, causing the cow to return to heat and subsequently leading to poor pregnancy rates and an extended breeding season. Transmission of this organism during breeding can decrease the calf crop by as much as 50% during the breeding season. The disease is often asymptomatic in bulls while a mild vaginal discharge 1-3 weeks after becoming infected can be seen in cows. The majority of infected cows will clear the disease given 120-150 days of sexual rest. However, immunity is short-lived and re-infection is common because bulls frequently remain carriers for life. Currently, there is no immunization or treatment for Trichomoniasis. This disease can have a severe impact on an agrarian culture due to the devastating financial impact of poor calf crops, infertility, low pregnancy rates, an extended calving season, occasional abortions in cows, and expenses associated with cleaning up an infected herd. This disease began to be a problem in Missouri in 2010 and by 2012, 172 bulls tested positive for Trichomoniasis. In 2013, due to mandated testing for Trichomoniasis in Missouri, only 13 bulls tested positive which equates to a 70% reduction in infection. Missouri is now considered a leading state in Trichomoniasis management due to their scientific approach to identifying, controlling, and eradicating the disease. Regulations require that all non virgin bulls and bulls over the age of 24 months be tested for Trichomoniasis. Positive bulls are sent to slaughter and the herd of origin for the Trichomoniasis positive bull will be quarantined or sent to slaughter. This disease should continue to be monitored due to increased numbers of infected cattle in surrounding states (Kansas) and the severe impact it could have in Missouri.

Tuberculosis (TB) is a contagious disease caused by *Mycobacterium bovis* (*M. Bovis*) that affects cattle, bison, elk, and deer. Tuberculosis by *Mycobacterium bovis* can be transmitted to humans by eating or drinking contaminated, unpasteurized dairy products; through direct contact with a wound; or by inhaling the bacteria in air exhaled by animals infected with *M. bovis*. Symptoms of human infection by *M. bovis* include fever, night sweats, and weight loss. Individuals who work in close contact with cattle, bison, or cervids are at increased risk for developing TB by *M. bovis*. However, this only accounts for approximately 2% of confirmed cases of TB in the United States. There have been several incidences of *M. bovis* causing TB in humans in Southern California, and it has been determined that this is likely originating from infected cattle in Mexico. The Cooperative State-Federal Tuberculosis Eradication Program has nearly eliminated *M. bovis* in livestock in the United States. However, it can still be found in wild animals, such as bison, elk, and deer. Missouri has been considered tuberculosis free in cattle since 1986. However, tuberculosis will remain a potential threat to Missouri's cattle population until it is completely eradicated.

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Hogs



Hogs are a source of high quality animal protein in the form of common meat products such as ham, pork chops, pork sausage and bacon. By-products from hogs play a vital role in maintaining the quality of human life. For example, insulin from hogs is used to treat human diabetes; heart valves are used to replace damaged human heart valves; and hog skin is used to treat severe burn victims. Hogs and pigs constitute one of Missouri's top 5 most valuable agriculture commodities and pork is one of Missouri's top 5 agriculture exports. In fact, Missouri is the 6th largest hog-producing state in the nation with an inventory of nearly three million hogs and pigs. In Greene County there are approximately 382 hogs and pigs on 50 farms.

Hog Diseases

Porcine Epidemic Diarrhea Virus (PEDV) is a coronavirus that affects swine. It causes diarrhea, vomiting, dehydration, and death in 50-100% of infected piglets (especially pigs younger than 10-14 days old). While adult pigs can become infected, death typically doesn't result. Transmission occurs through direct and indirect fecal-oral route. It can be transferred via feces from infected pigs, trucks, boots, clothing, and other contaminated fomites. Incubation only last 12-24 hours and the virus can be shed for 7-10 days. Although this disease

is a serious threat to swine, transmission to humans has not been seen and there are no associated food safety concerns. This is a very serious disease that has been found around the world for more than 30 years. However, the first case was seen in the United States on May 17, 2013. From April 1, 2013 to July 29, 2013, 254 pigs tested positive for PEDV. Positive cases were found in 14 states including Iowa, Minnesota, Illinois, Oklahoma, Ohio, Kansas, Missouri, North Carolina, New York, and Michigan. Infection has been increasing since it was introduced to the United States. On February 15, 2014, a study showed that there were over 300 new cases occurring per week in the United States. This disease could cause major implications for Missouri including decreased hog production, increased morbidity and mortality in piglets, and increased price of pork products for consumers. In the past two years, nearly 8 million piglets died from this disease, which equals approximately 10% of the nation's hog population. While this disease caused major economic implications last year (pork cost \$154.45/cwt), spread of the virus is finally starting to be controlled and pork prices are expected to drop (back to an average of \$99/cwt)

Pseudorabies (PRV), also known as Aujeszky's disease, is a swine disease that can also affect cattle, horses, dogs, cats, sheep and goats. The disease is caused by an extremely contagious herpes virus that causes reproductive problems, including abortion, and stillbirths, and even occasional deaths in breeding and finishing hogs. Missouri has been recognized as pseudorabies free since May 1999, thanks to the cooperation and support of Missouri's swine producers and industry leaders.

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Poultry

Poultry includes domesticated fowl such as chickens, turkeys, ducks, and geese. They are typically valued for their meat and eggs. Turkey constitutes one of Missouri's top 5 agricultural commodities. Greene County alone has over 250 poultry farms and sells over 12,000 broiler and other meat-type chickens each year.



Poultry Diseases

Avian influenza is a disease caused by the Avian Influenza A virus that occurs in poultry (such as chickens, turkeys, pheasants, quail, domestic ducks, geese, and guinea fowl). It is transmitted by infected birds through saliva, nasal secretions, feces, or contact with surfaces/materials that have been contaminated by the virus. Avian influenza can be either "low pathogenic" and spread without any noticeable signs or symptoms, or be "highly pathogenic" and spread rapidly throughout an avian population. In fact, this form could cause mortality rates of 90-100% within 48 hours. On March 10, 2015, the United States Department of Agriculture's Animal and Plant Health Inspection Service confirmed the presence of highly pathogenic H5N2 in two different commercial turkey flocks in Missouri. Although Avian Influenza can be transmitted to humans, the CDC considers the risk to be low; no human infections by H5N1 have been detected at this time. While risk of virulence to humans is low, Avian Influenza could pose a huge threat to poultry farms in southwest Missouri in regards to both economy and food supply.

Pullorum Disease is an infectious disease in poultry caused by *Salmonella pullorum*. It is an acute systemic disease of young chicks and poults that results in a very high mortality (potentially approaching 100%) within the first 2-3 weeks of age. Transmission occurs by direct or indirect contact with infected birds, through infected parents to young birds via the egg, or through contaminated feed, water, or litter. Although the disease may be seen in all birds, birds younger than four weeks old are most commonly affected. Affected birds huddle near a heat source, are anorectic, appear weak, experience labored breathing, and have a white diarrhea pasted around the vent. Most birds die shortly after hatching. Antibiotic treatment is not recommended because birds may become carriers; control is usually by testing and the removal of infected birds. While this disease was once common, it has now been eradicated from most commercial chicken stock in the USA. However, a risk for infection still exists because it may be seen in other avian species and backyard or hobby flock. The commercial poultry industry is free of pullorum disease after years of dedicated efforts by the states and poultry producers. However, outbreaks of pullorum disease occasionally occur and these outbreaks re-enforce the need for ongoing pullorum surveillance to maintain Missouri's federally granted Pullorum-Typhoid Clean State status. The last outbreak in Missouri was in 2004 and resulted in the direct depopulation of all poultry on 5 Missouri farms and 2 farms in Kansas. Infected poultry were shipped to 11 other states. These shipments resulted in testing and eradication costs for the customers and state agencies and may have potentially resulted in spreading Pullorum disease to clean poultry farms.

Other Diseases

Campylobacteriosis is a contagious disease caused by *Campylobacter* spp. found in both humans and animals that can cause enteritis, abortions, and infertility. It is commonly seen in cattle, sheep, poultry (broiler chickens), cats, dogs, mink, ferrets, and pigs. Transmission occurs via direct contact with infected animals, ingestion of fecally contaminated feed/water (fecal oral route), or by licking/chewing on objects contaminated with feces from infected animals (fomites). It can also be spread to other animals/humans by vectors (rodents or flies). Sheep and cattle may become infected after contact with infected animal feces, vaginal discharge, aborted fetuses, or fetal membranes. Human consumption of contaminated or undercooked poultry and other meats, raw milk or other

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dairy products, contaminated vegetables, or contaminated water can cause transmission to humans. It can also be spread person-to-person. *Campylobacter* can be shed in stool for 2-7 weeks if left untreated and can survive for weeks in water and up to 20 days in soil. Symptoms of the disease can be seen within 3 days of transmission such as diarrhea, decreased appetite, vomiting, fever, and death in severe cases. In cattle, *Campylobacter fetus* can cause bovine genital campylobacteriosis which is indicated by infertility, early embryonic death, and prolonged calving season. *Campylobacter jejuni* can cause late term abortions, stillbirths, and weak offspring in sheep, goats, and cattle. When transmitted to humans, *Campylobacter jejuni* causes diarrhea, fever, nausea, vomiting, abdominal pain, headache, and muscle pain. In 2011, 919 counts of Campylobacteriosis were documented in humans.

Rabies is a severe viral disease that can affect all mammals and can be transmitted to humans. This disease affects the central nervous system and almost always leads to death once symptoms develop. Although all mammals may become infected by the disease, only a few (including dogs, coyotes, wolves, foxes, raccoons, jackals, skunks, and bats) act as reservoirs. Rabies is usually transmitted through saliva when an infected animal bites another animal. However, any contact with infected saliva or neurological tissues through mucous membranes or breaks in the skin can lead to infection (such as consuming infected animals). Transmission can occur from an infected animal before symptoms are present; skunks can spread the virus for up to 14 days before symptoms are present. Signs and symptoms of rabies include fearfulness, restlessness, anorexia or increased appetite, vomiting, diarrhea, low-grade fever, pupil dilation, hyperreactivity to stimuli, and excessive salivation. Infection in a vaccinated animal can be seen by lameness in the vaccinated leg. Animals also often have temperament changes where they either become unusually aggressive or unusually affectionate. After 2-5 days, the paralytic or furious form of rabies is evident. Paralytic rabies is characterized by progressive paralysis, including the throat and masseter muscles. Symptoms include profuse salivation, inability to swallow, hoarse howling, facial paralysis, ataxia, and incoordination or paralysis. Death usually occurs after 2-6 days from respiratory failure. Furious rabies is characterized by restlessness, wandering, howling, polypnea, drooling, and attacks on other animals or people. Death usually occurs during a seizure 4-8 days after appearance of symptoms. Vaccinations are available for both animals and humans to prevent rabies transmission.

Reportable Animal Diseases

The following table includes reportable diseases that must be reported to the state or federal officials within 24 hours of suspicion or diagnosis. Although this information is required to be reported, records have not been able to be obtained showing incidences of the various diseases in Missouri.

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Reportable Communicable Diseases

Aquaculture (Fish)	Avian (Poultry, chickens, turkeys, birds)	Bovine (Cattle and Bison)	Caprine (Goat) - Ovine (Sheep)
Infectious salmon anemia	Avian infectious encephalomyelitis	Bovine babesiosis (Texas Fever, piroplasmosis)	Foot-and-mouth disease
Spring viremia of carp	Infectious laryngotracheitis	Foot-and-mouth disease	Goat and sheep pox
	Avian influenza (High pathogenic, H5, H7)	Rinderpest (cattle plague)	Heartwater
	Newcastle disease (VVND)	Bluetongue	Peste des petits ruminants (kata)
		Bovine spongiform encephalopathy (BSE)	Rift Valley fever
		Contagious bovine pleurpneumonia	Scabies
		Heartwater	Scrapie
		Rift valley fever	
		Trichomoniasis	
Cervidae (Elk and Deer)	Equine (Horses)	Porcine (Swine, pigs and feral swine)	All Species
Chronic Wasting Disease (CWD)	African Horse sickness	African swine fever	Anthrax
Foot-and-mouth disease	Babesiosis (piroplasmosis)	Classical swine fever (Hog cholera)	Brucellosis
	Contagious equine metritis	Foot-and-mouth disease	Pseudorabies
	Dourine (equine trypanosomiasis)	Swine vesicular disease	Rabies
	Eastern equine encephalomyelitis		Screwworm
	Equine infectious anemia (EIA)		Tuberculosis
	Equine piroplasmosis		Vesicular stomatitis
	Equine rhinopneumonitis		
	Equine viral arteritis		
	Glanders		
	Venezuelan equine encephalomyelitis		
	Western equine encephalomyelitis		
		Missouri Department of Agriculture http://agriculture.mo.gov/animals/health/disease/comdisease.php	

Geographic Location

All agricultural and urban areas in Greene County are susceptible. Diseases are not typically bound by geographic distributions, so any animal can be affected by proximity to another infected animal.

Strength/Magnitude/Extent

Animal diseases have the potential to affect both the economy and public health.

Economics

An animal disease outbreak could be devastating to our economy. In 2012, Greene County had a livestock inventory of 55,424 cattle and calves and a market value of agriculture products valued at \$41,468,000. In 2008, Missouri ranked second in the nation in beef production with 4.25 million head of cattle on 59,000 farms and 15th in milk production with over 1.6 billion pounds of milk produced. Hogs, pigs, and turkeys also constitute one of Missouri's top 5 most valuable agriculture commodities, and pork is one of Missouri's top 5 agriculture exports. Missouri is the 6th largest hog-producing state in the nation with an inventory of nearly three million hogs and pigs. The U.S. Census of Agriculture shows that in Greene County alone as of 2012, there are approximately 55,242 cattle on 1,124 farms, 291 hogs and pigs on 18 farms, and over 172 poultry farms which sells over 6,154 broiler and other meat-type chickens each year.

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Health

Impact from an animal disease outbreak could lead to the following:

- The compromise of food security through serious loss of animal protein and/or loss of draught animal power for cropping.
- Cause major production losses for livestock products such as meat, milk and other dairy products, wool and other fibers and skins and hides.
- Cause losses of valuable livestock of high genetic potential.
- Restrict opportunities for upgrading the production potential of local livestock industries by making it difficult to import exotic high-producing breeds that are extremely susceptible to TADs.
- Add significantly to the cost of livestock production since costly disease control measures need to be applied.
- Seriously disrupt or inhibit trade in livestock, germplasm and livestock products, either within a country or internationally. Their occurrence may cause public health consequences where diseases can be transmitted to humans (i.e. zoonoses); cause environmental consequences when wildlife populations die out; and cause unnecessary pain and suffering for many animals.

This type of incident could cause multiple deaths in animals and humans as well as cause major economic losses. However, because most animal infectious diseases have associated screening and control processes, the potential severity can be diminished. Although many animals may still become infected, protocols regarding control and prevention of spread can limit the number of exposed animals. While a wide-spread animal disease outbreak in Greene County Missouri would be catastrophic, a small scale outbreak would be manageable and result in minimal losses when compared to a large scale spread.

Knowing where diseased, exposed, and at-risk animals are located; where they've been; and when they may have been in contact with others is very important for ensuring a quick, effective response in the event of an animal disease event. Animal disease traceability helps reduce the impact of disease investigations to both animals and producers. Depending on the relative location of the first case of disease, it is very possible to get warning time. If an infectious disease is nearby geographically, measures can be taken to prevent the spread of the disease, look for signs and symptoms of disease transmission, and prevent adverse effects. However, it is also possible to receive no warning time at all. Many diseases are only discovered after they have killed a large portion of animals or resulted in severe adverse effects within an animal population.

Previous Occurrences

Midwest Region 1996

Bovine Leukosis Virus (BLV) is a virus that targets lymphocytes in beef and dairy cattle impairing the immune system and leaving the animal vulnerable to other infectious diseases. BLV can cause significant losses to farmers including increased replacement costs, loss of income from condemned carcasses, reduced reproductive efficiency, and decreased milk production. In 1996, 40% of cattle were infected with this disease in the Midwest. In 2007, a NAHMS prevalence report indicated that BLV may be present in at least 70-80% of Michigan dairy cattle and 83.9% of U.S. dairy operations. The Bovine Leukosis Virus Free Program exists in Missouri to help reduce economic losses by decreasing the prevalence of BLV in Missouri's cattle.

Missouri 2004

Brucellosis is an infectious disease that affects cattle, sheep, goats, rams, dogs, rodents, and pigs. It results in abortions, sterility, reduced milk production, placenta retention, weak calves, problems with reproductive organs, recurrent fever, arthritis, and udder infection. This disease is zoonotic and can be transmitted to humans by ingesting contaminated milk products or through direct contact with an infected animal. The impact of this disease includes the economic burden associated with the cost of medications and vaccines, production costs,

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replacement costs if a herd becomes infected, delay in sale of animals, reduced population of animals, and potential food safety issues. Missouri was classified as a Brucellosis Free state in March 2004, but a small risk continues to exist due to existence of Brucellosis in wild bison and elk in the Greater Yellowstone Area.

Pullorum disease is an acute systemic disease of young chicks and poults that results in a very high mortality (potentially reaching 100%) within the first 2-3 weeks of age. The commercial poultry industry is free of pullorum disease after years of dedicated efforts by the states and poultry producers. However, the disease may still exist in other avian species and backyard or hobby flock. The last outbreak in Missouri was in 2004 and resulted in the direct depopulation of all poultry on 5 Missouri farms and 2 farms in Kansas. Infected poultry were shipped to 11 other states. These shipments resulted in testing and eradication costs for the customers and state agencies and may have potentially resulted in spreading Pullorum disease to clean poultry farms.

Missouri 2007

Anaplasmosis is an infectious parasitic disease of cattle that results in severe anemia, weakness, fever, decreased appetite, depression, constipation, decreased milk production, jaundice, abortion, and death. This is a zoonotic disease that can be transmitted to humans. In 2010, 1761 cases of Anaplasmosis were reported nationwide. In 2007, five Missouri residents died from Anaplasmosis. Missouri's rates of Anaplasmosis have been consistently higher than the national rates since 1998. The impact of this disease on the community includes human infection and economic losses due to decreased milk production, severe weight loss, poor reproductive ability, abortion, and death.

Missouri 2008

Johne's Disease is a chronic, contagious bacterial disease that affects the small intestines of ruminants such as cattle, sheep, goats, deer, antelope, and bison. Manifestations of this disease include weight loss despite a normal appetite, diarrhea, decreased milk production, increased incidence of mastitis, prolonged calving interval, emaciation, and eventual death. A 2007 NAHMS study of 82.5% of U.S. dairy cows found that 17.4% of small operations (less than 100 cows), 35% of medium operations (100-499 cows), and 34.1% of large operations (500 or more cows) confirmed Johne's disease in their herd during the previous 12 months. The impact of Johne's disease includes decreased milk production (of approximately 675 pounds in 305 days), production losses up to 10% for each affected animal, premature culling, reduced fertility, and reduced slaughter value. This can account for losses of approximately \$1,062 per infected 50-head herd. The Johne's Voluntary Control Program exists in Missouri to help reduce prevalence of the disease. In 2008, the Missouri Department of Agriculture's Animal Health Division reported that 12,177 cows, representing 360 cattle herds in Missouri, were tested for Johne's disease and 99 animals tested positive.

Missouri 2011

Campylobacteriosis is a contagious disease found in both humans and animals that can cause enteritis, abortions, and infertility. It is commonly seen in cattle, sheep, poultry, cats, dogs, mink, ferrets, and pigs. In 2011, 919 counts of Campylobacteriosis were documented in humans. This is the most up-to-date information that is available at this time. No information has been found regarding number of incidences of Campylobacteriosis in animals.

Missouri 2013

Trichomoniasis is a disease caused by a protozoan parasite that affects the reproductive ability of cattle (infertility and embryonic death result from infection). This disease results in poor calf crops, infertility, low pregnancy rates, an extended calving season, occasional abortions in cows, and increased expenses associated with cleaning up an infected herd. This disease began to be a problem in Missouri in 2010, and by 2012, 172 bulls tested positive for Trichomoniasis. In 2013, due to mandated testing, only 13 bulls tested positive, which equates to a 70% reduction in infection.

Missouri 2014

Porcine Epidemic Diarrhea Virus (PEDV) is a coronavirus that affects swine. It causes diarrhea, vomiting,

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dehydration, and death in 50-100% of infected piglets. The first case was seen in the United States on May 17, 2013. From April 1, 2013 to July 29, 2013, 254 pigs tested positive for PEDV. Positive cases were found in 14 states including Iowa, Minnesota, Illinois, Oklahoma, Ohio, Kansas, Missouri, North Carolina, New York, and Michigan. Infection has been increasing since it was introduced to the United States. On February 15, 2014, a study showed that there were over 300 new cases occurring per week in the United States. In the past two years, nearly 8 million piglets died from this disease, which equals approximately 10% of the nation's hog population. While this disease caused major economic implications last year (pork cost \$154.45/cwt), spread of the virus is finally starting to be controlled and pork prices are expected to drop (back to an average of

Missouri-Christian County 2015

Rabies is a severe viral disease that can affect all mammals and can be transmitted to humans. This disease affects the central nervous system and almost always leads to death once symptoms develop. In 2011, there were 29 instances of animal Rabies in Missouri, the lowest prevalence recorded in the last 15 years. In 2014, that number decreased even further with 27 confirmed cases. On March 31, 2015, a dead skunk in Christian County, Missouri tested positive for Rabies. Due to possible transmission through a bite, two household dogs were euthanized as a precaution.

Rabies Incidents-Missouri

Year	Total Rabies
2018	20
2017	20
2016	20
2015	31
2014	27
2013	39
2012	28

Source: Missouri Department of Health and Senior Services

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is likely for a small animal disease incident to occur within the next three years in Greene County. For a full description of the CPRI for animal disease, refer to Appendix B.

Changing Future Conditions and Considerations

Climate change, in particular global warming, is likely to greatly affect the health of animals, both directly and indirectly. Direct effects include temperature-related illness and death and the morbidity of animals during extreme weather events. Indirect impacts follow more intricate pathways and includes those deriving from the attempt of animals to adapt to thermal environment or from the influence or climate on microbial populations, distribution of vector-borne diseases, host resistance to infectious agents, feed and water shortages, or food-borne illness. Climate change may also affect the abundance and/or distribution of the competitors, predators, and parasites of vectors themselves, thus influencing patterns of disease.

Heat stress can increase mortality and cause metabolic diseases in production animals. It can also reduce fertility, feed intake and immunological response. These cases tend to result in decreased production of pigs and chickens, which are especially vulnerable to raised temperatures, as increased mortality may result if supplemental cooling is not provided.

The impacts of climate change on lives stock disease may be very complex and studying them needs to go well beyond any simple assessment of rainfall and temperature effects on distribution.

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VULNERABILITY

Vulnerability Overview

Transboundary animal diseases are highly contagious and easily transmitted within and between livestock populations. They therefore threaten the economic health of the livestock sector, the livelihood of farmers, and ultimately food security.

According to Jens F. Sundstrom, Microbial pollution is defined as pollution with pathogens, including bacteria, viruses and parasites. The pathogens may be zoonotic, i.e., affecting both humans and animals, or species specific and may enter agricultural systems in various ways. They can be borne by polluted water or by organic material that is used as fertilizer. Pathogens of animal origin can accumulate in the environment following an outbreak of disease of the kind resulting in large amounts of pathogen-contaminated animal waste (e.g. manure or carcasses). Such waste might contaminate water sources, or the land on which the waste is collected, stored, buried or subsequently spread as fertilizer. Hence, microbial pollution of an agricultural environment can pose health risks to both humans and animals and may render agricultural activity impossible.

All animals and humans within Greene County are vulnerable to experiencing the health or economic effects that animal diseases could cause if not resolved quickly.

Potential Losses to Existing Development

Animal Disease could cause large economic loss to Greene County if not controlled quickly. As of 2017, Greene County had 1,225 livestock and poultry farms, totaling over 68,000 animals. A large animal disease outbreak could cause devastating loss to one or multiple farms within the planning area. According to Drovers, one beef cow can sell from \$600-\$800 each. If five beef cows were to be infected with an animal disease, one farm could lose up to \$4,000 in profit.

Impact of Previous and Future Development

Land degradation is a long-term loss of ecosystem function and services caused by disturbances from which the system cannot recover unaided. The degradation can be caused either by natural phenomena or by human activities, and of course land degradation of natural origin can be reinforced by the action of man.

Greene County has a large amount of livestock production which continues to grow. As farms continue to grow and expand their inventory, the risk of experiencing animal diseases also increases. Much of the land in Greene County has not been developed yet and has the potential to be used for additional farming.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Animal Disease

SUBJECT	DETRIMENTAL IMPACTS
Public	An animal disease could cause illness and death if the disease is transmitted to humans. However, deaths from animal disease are rare. This would cause multiple safety concerns when around animals, or potential infected produce.
Responders	An animal disease outbreak would cause potential life threatening safety issues to responders. Diseases that can spread from animal-to-person may be passed on to a responder. Additionally, if responders become ill response function will be impacted greatly.
Continuity of Operations	Delivery of services has had no reports of animal diseased impact operations or delivery of services.
Property, Facilities, and Infrastructure	Minor property damage may occur on farms if equipment becomes contaminated. Hospitals, veterinary clinic, and first responders would be overwhelmed. Grocery stores that get food from a local farm or butcher will also be greatly impacted in a large-scale event. Multiple infrastructure sectors will be impacted through-out the planning area. Animal diseases would have little to no impact on facilities.
Environment	The wildlife in the area can be affected by animal diseased in many ways. Illness, infertility and death can cause extinction or a large decline in populations. The could become widespread. Animal diseases can cause widespread significant damage to agriculture. Animal diseases create a loss of livestock, animal power and pain and suffering to animals.
Economic Condition of Jurisdiction	An animal disease could have a major economic impact with widespread loss due to the fact that Greene County's economy is so dependent on agriculture. Diseased animals would cause a great loss in profits, and it would be expensive to replenish livestock, euthanize the ill, and dispose of the diseased properly.
Public Confidence in the Jurisdiction's Governance	The government is seen as a responsible for providing food and medical opportunities to the community. Lack of food and availability of hospitals would create a significant loss in public confidence of the government.

* For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

All jurisdictions within Greene County have livestock present. The entire planning area is at risk for experiencing effects from animal diseases. The effects could either be health or economic. Farm owners are more vulnerable in experiencing direct effects from a localized animal disease issue. Larger contaminations would have a greater effect on the county and surrounding areas.

3 - RISK ASSESSMENT

PROBLEM STATEMENT

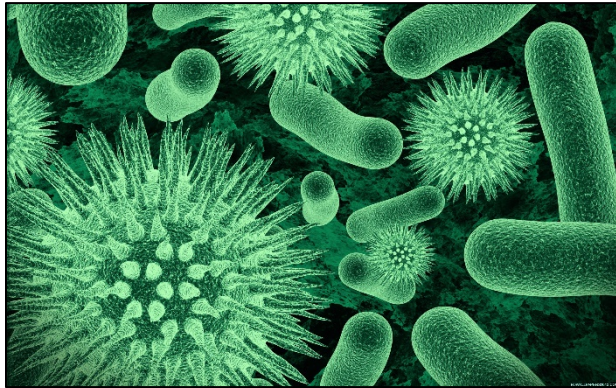
Though Greene County has not experienced a large animal disease incident, the county has large amount of livestock population that is a risk for being infected. Animal diseases can have effects on human health if not controlled and caught quickly. Large incidents could cause large financial loss to individual farms and Greene County's economy. Animal diseases come with no warning time and can last months. They can also take the lives of both animals and humans. Mitigation solutions for Animal disease could be difficult, but focusing on mitigating the transmission could be beneficial. Other solutions could be, ensuring large farms have adequate hygiene, training on symptoms of diseases and vaccination of animals. No participating jurisdiction created a project for mitigating animal disease.

3 - RISK ASSESSMENT

3.7.2 Other Hazards: Communicable Disease

HAZARD PROFILE

Hazard Description



Communicable diseases are spread from person to person or animal to person. It can be spread via airborne, bacteria, blood or other bodily fluid. In some cases zoonotic infections (infections in humans acquired from an animal source) result in severe disease or even death in humans, but often these infections result in only a mild illness or appear to cause no illness at all. All human infections with animal influenza viruses are of concern, not only because of the cases of disease and deaths in individual people, but also because if these viruses become able to spread from human to human they could spark a pandemic. All

of the past four pandemic influenza viruses have contained gene components originating in animals. An outbreak is a sudden rise in the incidence of disease or persons infected within the same community within a short period of time, typically 3 months. This hazard encompasses endemics, epidemics, and pandemics.

- Endemic- An endemic is a disease or illness that is contained to one town or geographical area.
- Epidemic- An epidemic is the spread of disease or illness within the community/surrounding areas or country that could be range several hundreds of miles.
- Pandemic- A pandemic is the spread of disease or illness between two or more countries.

Low and High Pathogenic

The difference between low pathogenic and high pathogenic influenza viruses is their ability to cause mortality. Most strands are classified as low pathogenic avian influenza (LPAI) and cause few clinical signs in infected birds. High pathogenic avian influenza (HPAI) causes severe and extremely contagious illness and death among infected birds. While LPAI does not pose health threats to human, some HPAI strands can be infectious to people. While LPAI does not pose known health risks to humans, it does have the potential of mutating into an HPAI strand.

Ebola

The Fruit bats of the Pteropodidae family are natural Ebola hosts. Transmission is obtained through contact with bodily fluids of infected animals (eg. ill or dead). Although transmission begins as animal to human, once a human begins showing symptoms of the illness, human to human transmission is possible. The human to human transmission is via direct contact (eg. through broken skin or mucus membranes) with blood, secretions, organs or other bodily fluids of infected individuals present with symptoms. It can take from 2 to 21 days once a person has been exposed to an infected person to present with symptoms themselves. Symptoms are sudden onset of fever, fatigue, muscle pain, headache, sore throat, vomiting, diarrhea, rash, impaired liver and kidney function, and possible internal and external bleeding. The average fatality rate for Ebola is 50% and has varied in the past from 25% to 90% depending on the outbreak. There is currently no cure for this disease according to World Health Organization (WHO) and the only way of controlling the spread is by community engagement through management, surveillance, contact tracing, good laboratory service, proper and safe burials, and social mobilization.

3 - RISK ASSESSMENT

Tuberculosis

Tuberculosis (TB) is caused by a bacterium known as *Mycobacterium tuberculosis*. This bacterium typically attacks the lungs but can affect any part of the body such as the brain, spinal cord, and kidney. If it is not treated properly it can lead to death. Tuberculosis was once the leading cause of death in the United States. Tuberculosis is airborne and is spread from one person to another through coughing, sneezing, speaking and singing. Tuberculosis can be a Latent TB Infection or TB disease. The latent form means that the person has the bacterium living within their lungs but does not actively present with any symptoms. This form may at any point go from latent to active when a person's immune system is weakened, the bacterium multiplies, and the person starts to present with symptoms. People actively have the TB infection when their immune system cannot make the bacterium stop growing and they become sick within weeks. Treatment for Tuberculosis is currently a six to nine month process with a varying range of antibiotic regiment.

Mycobacterium bovis (Bovine Tuberculosis) is a type of bacterium that can cause tuberculosis in humans but is most commonly found in bison, elk and deer. Further details are provided on the animal disease hazard.

Seasonal Influenza

Influenza is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness. Respiratory illness spread from person to person. Seasonal Influenza typically occurs between October and April in 5-20% of the U.S. Population.

Pandemic Influenza

A global outbreak caused by a new strand of virus never seen before by the human population; rarely happens; would significantly impact the global economy. Pandemic Influenza would likely cause millions of deaths globally due to individuals not being immune to the strand, unavailable vaccinations, and a limited supply of medicine.

Meningitis

Meningitis is a disease that causes infection of the meninges, membranes that cover the brain and spinal cord. There are five types of meningitis: bacterial, viral, parasitic, fungal and non-infectious. The severity of the illness and treatment differs depending on the cause.

TYPE OF MENINGITIS	TRANSMISSION	HOW IT IS TRANSMITTED
Bacterial	Contagious	Through the exchange of respiratory and throat screens
Viral; enteroviruses	Person to Person	Spread through fecal contamination for example: Diaper changes, not properly using hand hygiene techniques, Enteroviruses: can be spread via eye, nose and mouth secretions or blister fluids.
Fungal	Non Contagious	Inhaling fungal spores
Parasitic	Rare form- swimming in lakes or rivers with <i>Nagleria fowleri</i> (Parasite)	
Non-Infectious	Caused by cancers, systemic lupus erythematosus, certain drugs, head injury and brain injury	Not spread from person to person caused by other attributes of person's medical condition that lead to infection of brain and spinal cord.

3 - RISK ASSESSMENT

Meningitis outbreaks can occur within a community, school, college, prison, or other population. An outbreak happens when several persons become infected over a short period of time, typically three or more individuals with the same strain. There is currently a vaccine for Meningococcal Disease that is recommended for those at high risk of contracting the disease.

Lyme

Lyme disease, or borreliosis, is an infectious disease caused by at least three species of bacteria belonging to the genus *Borrelia*. *Borrelia burgdorferi* is the predominant cause of Lyme disease in the United States. Symptoms include fever, headaches, fatigue, depression, and a target-shaped skin rash known as erythema migrans. If untreated, Lyme disease may affect the joints, heart, and nervous system. Transmission is relatively rare, with only 1% of recognized tick bites resulting in Lyme disease. Experts believe the rate is so low because a tick needs to be attached for at least 24 hours for transmission to occur, and most individuals find the ticks before that time period expires. Lyme disease is difficult to diagnosis, especially in later stages, because the disease has symptoms that mimic other disease. Lyme disease may be misdiagnosed as multiple sclerosis, rheumatoid arthritis, fibromyalgia, chronic fatigue syndrome (FS), or lupus. Lyme diseases may be prevented on a regional level by reducing the deer population that ticks depend on for reproductive purposes. This tactic has been successful in Monhegan, Maine and Mumford Cove, Connecticut. It is recommended to have 8 to 10 deer per square mile, but most populations have 60 deer per square mile. By reducing the number of deer in an area, the tick population may be too low to spread Lyme disease and other tick-borne diseases.

Malaria

Malaria is a serious and potentially fatal disease that is transmitted from mosquito to human. It is a parasite that infects the mosquito is a host to this parasite. When a person is infected, he or she will present with high fevers, chills, and flu-like symptoms. Malaria was first eliminated from the United States in the 1950's and in 2011 it has reached a 40 year high of 1,925 cases. The Center for Disease Control and Prevention (CDC) has estimated that approximately 1,500-2,000 cases are reported every year in the United States.

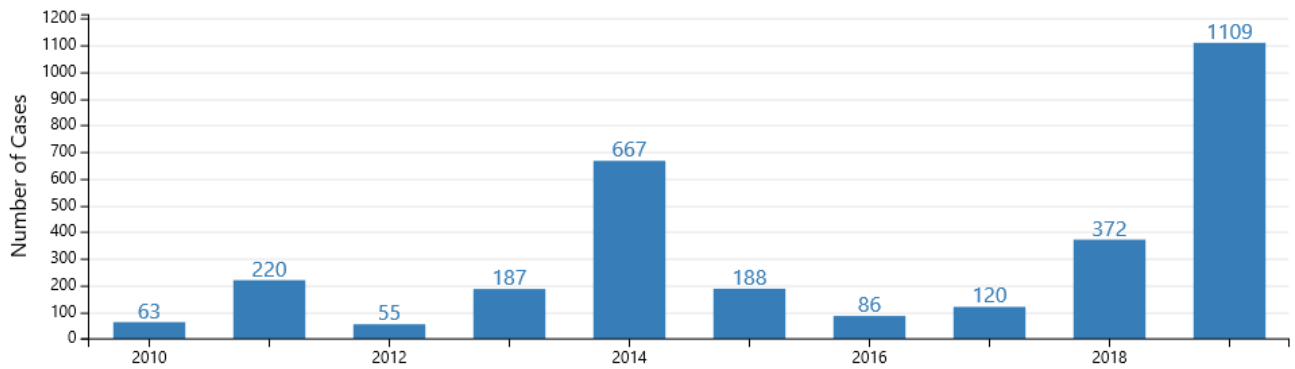
West Nile is transmitted to humans by mosquito according to the CDC. Of those infected with the virus, 70-80% will not become symptomatic. For the people that present with symptoms, 1 out of 5 people will show outward signs of fever, headache, body ache, joint pains, vomiting, diarrhea, or rash. Most people do recovery quickly but symptoms of fatigue can last for several months. In cases that symptoms are more severe is in less than 1% and they will develop a neurologic illness.

Measles

Measles is a highly infectious airborne illness caused by a virus. The disease is spread by coughing and sneezing but can also be transmitted by direct contact with infected nasal or throat secretions. This illness is prevented and often kept under control through the vaccination of children at 12 months and 4 years of age with the MMR vaccine. Those infected usually do not begin showing symptoms until 10 days after exposure. Signs and symptoms of the illness include fever, a severe cough, conjunctivitis, small white spots on the oral mucosa, and a rash lasting 3 or more days. According to the CDC, the United States documented measles as eliminated in 2000. However, in the last 20 years Measles have made a comeback across the nation. Many Measles outbreaks have occurred over the last several years including 17 outbreaks in 2018. Three outbreaks in New York State, New York City, and New Jersey. The cases mostly occurred in unvaccinated people.

3 - RISK ASSESSMENT

Number of Measles Cases reported by Year 2010- July 3rd, 2019



Source: Centers for Disease Control

Foodborne Illnesses

While the United States Food and Drug Administration (FDA) reports the American food supply is among the safest in the world, the United States Federal Government estimates that there are more than 48 million cases of food-borne illness each year that cause approximately 128,000 hospitalizations and 3,000 deaths.

BACILLUS CEREBUS
Common Name: B. cereus, food poisoning
Onset Time after Ingestion: 10-16 hours
Signs and Symptoms: Abdominal cramps, diarrhea, nausea.
Duration: 24-28 hours
Food Sources: Meats, stews, gravies, vanilla sauce.

CAMPYLOBACTER
Common Name: Campylobacteriosis
Onset Time after Ingestion: 2-5 days
Signs and Symptoms: Cramps, fever, vomiting, and diarrhea
Duration: 2-10 days
Food Sources: Raw and undercooked poultry, unpasteurized milk, contaminated water.

CLOSTRIDIUM BOTULINUM
Common Name of Illness: Botulism
Onset Time after Ingestion: 12-72 hours
Signs and Symptoms: Vomiting, diarrhea, blurred vision, double vision, difficulty swallowing, muscle weakness. Can result in respiratory failure and death.
Duration: Variable
Food Sources: Improperly canned foods, especially home-canned vegetables, fermented fish, baked potatoes in aluminum foil, bottled garlic.

CRYPTOSPORIDIUM
Common Name of Illness: Intestinal cryptosporidiosis
Onset Time after Ingestion: 2-10 days
Signs and Symptoms: Diarrhea, stomach cramps, upset stomach, slight fever.
Duration: May be remitting and relapsing over weeks to months.
Food Sources: Undercooked food, contaminated water or food contaminated by an ill food handler.

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CYCLOSPORA CAYETANENSIS
Common Name of Illness: Cyclosporiasis
Onset Time after Ingestion: 1-14 days, usually at least 1 week.
Signs and Symptoms: Diarrhea, loss of appetite, substantial loss of weight, stomach cramps, nausea, vomiting, fatigue.
Duration: May be remitting and relapsing over weeks to months.
Food Sources: Various types of fresh produce (imported berries, lettuce, basil).

E. COLI (ESCHERICHIA COLI)PRODUCING TOXIN
Common Name of Illness: E. coli infection
Onset Time after Ingestion: 1-3 days
Signs and Symptoms: Diarrhea, abdominal cramps, vomiting.
Duration: 3-7 or more days
Food Sources: Water or food contaminated with human feces.

E.COLI 0157:H7
Common Name of Illness: Hemorrhagic colitis or E. Coli Infection
Onset Time after Ingestion: 1-8 Days
Signs and Symptoms: Severe diarrhea, abdominal pain and vomiting. Can lead to kidney failure.
Duration: 5-10 Days
Food Sources: Undercooked beef (especially hamburger), unpasteurized milk and juice, raw fruits and vegetables and contaminated water.

HEPATITIS A
Common Name of Illness: Hepatitis
Onset Time after Ingestion: 28 days average (10-15 days)
Signs and Symptoms: Diarrhea, dark urine, jaundice, and flu-like symptoms.
Duration: variable; 2 weeks to 3 months
Food Sources: Raw produce, contaminated drinking water, undercooked foods and cooked foods that are not heated after contact with an infected food handler; shellfish from contaminated water.

LISTERIA MONOCYTOGENES
Common Name of Illness: Listeriosis
Onset Time after Ingestion: 9-48 hours for gastrointestinal symptoms, 2-6 weeks for invasive disease
Signs and Symptoms: Fever, muscle aches, and nausea or diarrhea. Pregnant women may have mild flu-like illness, and infection can lead to premature delivery or stillbirth. The elderly or immune compromised patients may develop bacteremia or meningitis.
Duration: Variable
Food Sources: Unpasteurized milk, soft cheeses made with unpasteurized milk, ready to eat deli meats.

NOROVIRUSES
Common Name of Illness: Variously called viral gastroenteritis, winter diarrhea, acute non-bacterial gastroenteritis, food poisoning and food poisoning infection.
Onset Time after Ingestion: 12-48 hours
Signs and Symptoms: Nausea, vomiting, abdominal cramping, diarrhea, fever, headache. Diarrhea is more prevalent in adults, vomiting more common in children.
Duration: 12-60 hours
Food Sources: Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler, shellfish from contaminated waters.

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SALMONELLA
Common Name of Illness: Salmonellosis
Onset Time after Ingestion: 6-48 hours
Signs and Symptoms: Diarrhea, fever, abdominal cramps, vomiting
Duration: 4-7 Days
Food Sources: Eggs, Poultry, meat, unpasteurized milk or juice, cheese, contaminated raw fruits and vegetables.

SHIGELLA
Common Name of Illness: Shigellosis or bacillary dysentery
Onset Time after Ingestion: 4-7 days
Signs and Symptoms: Abdominal cramping, fever, bloody diarrhea
Duration: 24-48 Hours
Food Sources: Raw produce, contaminated drinking water, uncooked foods that are not reheated after contact with an infected food handler.

STAPHYLOCOCCUS AUREUS
Common Name of Illness: Staphylococcal food poisoning
Onset Time after Ingestion: 1-6 hours
Signs and Symptoms: Sudden onset of severe nausea and vomiting, abdominal cramps, diarrhea and fever may be present
Duration: 24-48 hours
Food Sources: Unrefrigerated or improperly refrigerated meats, potato and egg salads, cream pastries.

VIBRIO PARAHAEMOLYTICUS
Common Name of Illness: V. parahaemolyticus infection
Onset Time after Ingestion: 4-96 hours
Signs and Symptoms: Water (occasionally bloody) diarrhea, abdominal cramps, nausea, vomiting and fever.
Duration: 2-5 days
Food Sources: Undercooked or raw seafood (shellfish)

VIBRIO VULNIFICUS
Common Name of Illness: V. vulnificus infection
Onset Time after Ingestion: 1-7 days
Signs and Symptoms: Vomiting, diarrhea, abdominal pain, blood-bone infection. Fever, bleeding within the skin, ulcers requiring surgical removal. Can be fatal to persons with liver disease or weakened immune systems.
Duration: 2-8 days
Food Sources: Undercooked or raw seafood (e.g. oysters).

Geographic Location

Communicable diseases can spread throughout the entire planning area, including all of our jurisdictions.

3 - RISK ASSESSMENT

Strength/Magnitude/Extent

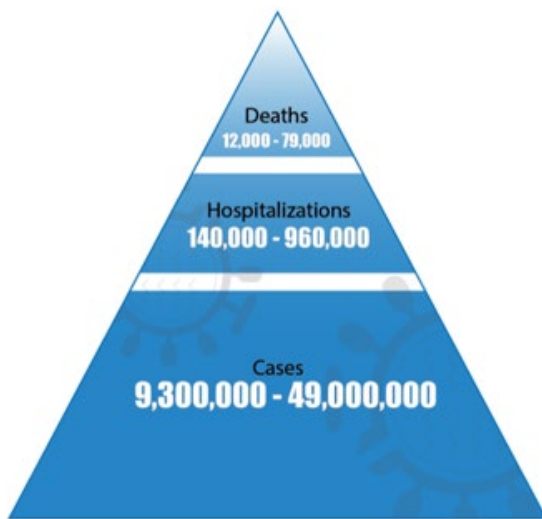
The magnitude and severity of a communicable disease often depends on several factors. The amount of people affected depends on the amount of people exposed to the pathogen and how readily the illness can be passed from one person to another. There is a direct relationship between the degree of infectivity of the pathogen and the amount of people that are affected by the illness.

While some communicable diseases are commonly expected, for example, seasonal influenza, the severity of the illness is usually not known until symptoms present. Viruses and bacteria are able to mutate and adapt over time in order to survive. This means that vaccines that may have been effective a year ago are no longer useful against the current strain.

Burden of Flu in the U.S.

The burden of influenza disease in the United States can vary widely and is determined by a number of factors including the characteristics of circulating viruses, the timing of the season, how well the vaccine is working to protect against illness, and how many people got vaccinated. While the impact of flu varies, it places a substantial burden on the health of people in the United States each year. The Centers for Disease Control estimates that influenza has resulted in between 9.3 million-49.0 million illness, between 140,000-960,000 hospitalizations and between 12,000-79,000 deaths annually since 2010. The flu brings fever, cough sore throat, runny nose, muscle or body aches, headaches, fatigue and sometimes vomiting. The 2017-2018 influenza season was additionally atypical in that it was severe for all ages of the population. The burden of influenza and the rates of influenza associated hospitalization are generally higher for the very young and the very old. In the 2017-18 season alone, 79,400 deaths and over 950,000 hospitalizations.

Influenza Statistics



A global outbreak caused by a new strand of virus never seen before by the human population would significantly impact the global economy. This event would likely cause millions of deaths globally due to individuals not being immune to the strand, unavailable vaccinations and a limited supply of medicine. A pandemic would place everything on hold. Most of the population would be infected, unable to work and may not receive medication due to limited supplies. According to the CDC, several scientists believe a pandemic caused by the Avian Flu is possible. Some estimates suggest the virus could travel around the world in four days. However, scientists have had experience dealing with human infections from the Avian Influenza, thus having more time to prepare for a future global outbreak. A communicable disease

outbreak in Greene County would have many different severities depending on the disease itself. However, if current global communicable diseases were to reach Greene County, the severity would be critical with many illnesses, and shut down of critical facilities for at least 2 weeks.

3 - RISK ASSESSMENT

Estimated Influenza Disease Burden, by Season- United States, 2010-2011-2017-2018 Influenza Seasons

Season	Symptomatic Illnesses		Medical Visits		Hospitalizations		Deaths	
	Estimate	95% Cr I	Estimate	95% Cr I	Estimate	95% Cr I	Estimate	95% Cr I
2010-2011	21,000,000	(20,000,000 - 25,000,000)	10,000,000	(9,300,000 - 12,000,000)	290,000	(270,000 - 350,000)	37,000	(32,000 - 51,000)
2011-2012	9,300,000	(8,700,000 - 12,000,000)	4,300,000	(4,000,000 - 5,600,000)	140,000	(130,000 - 190,000)	12,000	(11,000 - 23,000)
2012-2013	34,000,000	(32,000,000 - 38,000,000)	16,000,000	(15,000,000 - 18,000,000)	570,000	(530,000 - 680,000)	43,000	(37,000 - 57,000)
2013-2014	30,000,000	(28,000,000 - 33,000,000)	13,000,000	(12,000,000 - 15,000,000)	350,000	(320,000 - 390,000)	38,000	(33,000 - 50,000)
2014-2015	30,000,000	(29,000,000 - 33,000,000)	14,000,000	(13,000,000 - 16,000,000)	590,000	(540,000 - 680,000)	51,000	(44,000 - 64,000)
2015-2016 *	25,000,000	(24,000,000 - 28,000,000)	12,000,000	(11,000,000 - 13,000,000)	310,000	(290,000 - 340,000)	25,000	(21,000 - 31,000)
2016-2017 *	30,000,000	(28,000,000 - 32,000,000)	14,000,000	(13,000,000 - 16,000,000)	580,000	(520,000 - 660,000)	51,000	(44,000 - 64,000)
2017-2018 *	49,000,000	(46,000,000 - 53,000,000)	23,000,000	(21,000,000 - 25,000,000)	960,000	(870,000 - 1,100,000)	79,000	(69,000 - 99,000)

Source: Centers for Disease Control

*Note: Estimates from the 2015-2016, 2016-2017, and 2017-2018 seasons are preliminary and may change as data are finalized.

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Previous Occurrences

May 20, 2014

On May 20, 2014, the Springfield-Greene County Health Department was notified that an individual working at the Red Robin restaurant on Glenstone Avenue had tested positive for Hepatitis A. The public was notified of the incident via multiple news media outlets and individuals who ate at the restaurant from May 8 to May 10 were asked to contact their healthcare provider. Vaccination clinics were held and 2,522 vaccines were administered from May 22 to May 27.

December 2014

In 2014, The United States experienced 23 measles outbreaks. During these outbreaks, 383 people were reported to have contracted the illness. A large measles outbreak began in December of 2014 when a case was traced back to an amusement park in California. The outbreak spread across several states and 59 cases were reported. Although vaccination rates are typically higher in the Midwest than either the east or west coast, an outbreak is still possible due to a growing number of unvaccinated children. The last case of measles in Springfield-Greene County occurred in 2010.

Winter 2014-2015

Influenza is a common wintertime illness and the time to get it typically begins at the end of the fall, peaks in January and February, and ends usually with the beginning of spring. In 2014 and continuing in 2015 there has been a large increase in the number of individual flu cases and hospitals have quickly become overwhelmed. During the week of December 7-13, 217 were diagnosed with the flu in Greene County and the following week had 445 cases of influenza. As of February 14, 2015, there have been 2,168 cases reported. Hospitals temporarily had to restrict visitors under that age of 14 from visiting the hospital to help reduce the number of exposures to the influenza virus.

August 2014

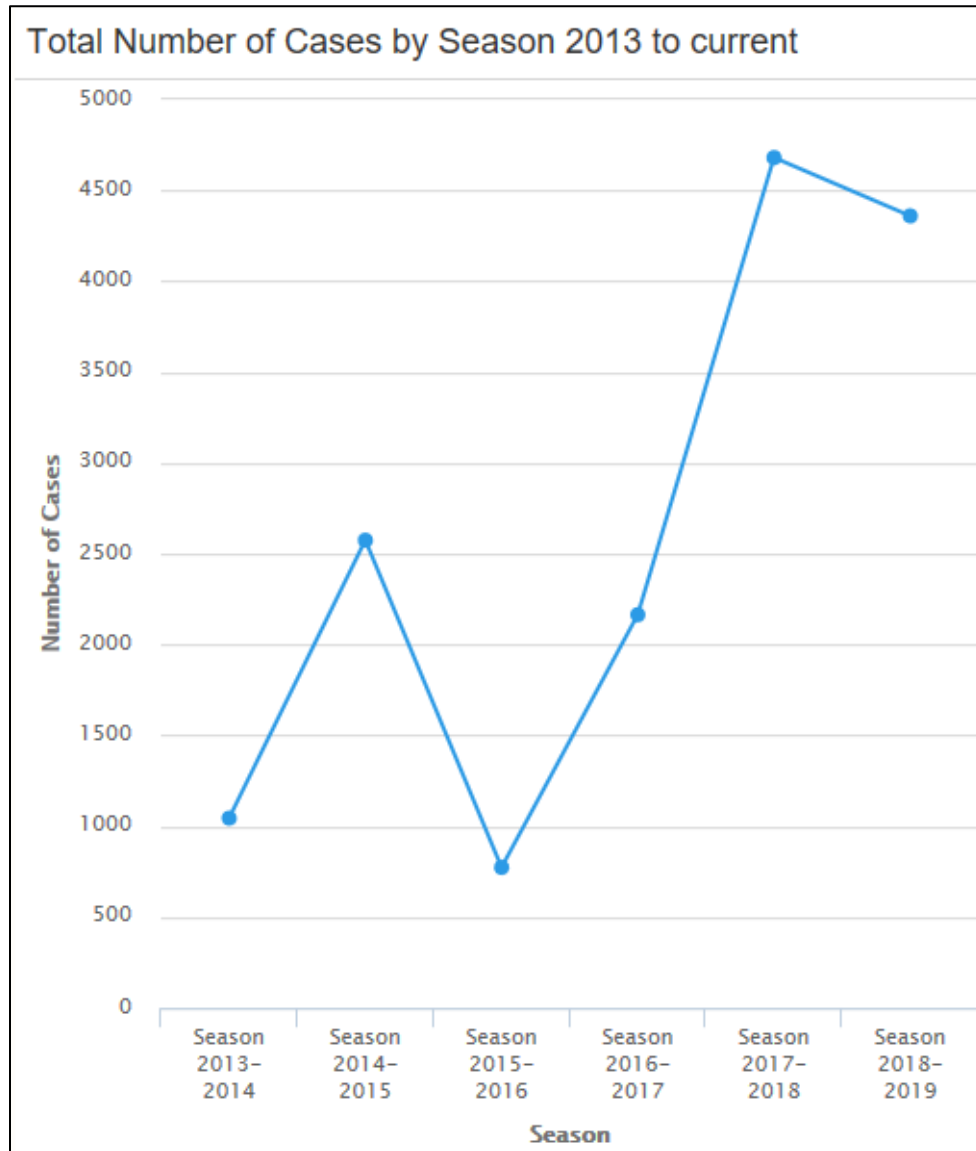
Beginning in mid-August, children across the country began coming down with symptoms of Enterovirus D68. This virus causes respiratory illness that causes fever, runny nose, sneezing, cough, and, if severe, can lead to difficulty breathing. The virus spreads when an infected person coughs or sneezes and infects another individual. Enterovirus D68 has spread across 49 states and has affected 1,153 people. There were over 300 cases of the illness in Missouri. Fourteen patients nationwide died as a result of the virus and currently no antiviral medications are available for people who are diagnosed with this virus.

September 2017-2019

Beginning in September 2017, Missouri Department of Health and Local Public Health Agencies began seeing an increased amount of cases of Hepatitis A within the State. In 2019, Missouri officially was under a Hepatitis A Outbreak. In September of 2019, the State of Missouri had 453 cases of Hepatitis A. 15 of those cases were in Greene County. Of the 453 cases, 255 were hospitalized and there were 2 deaths. No common sources of food, beverages, or drugs have been identified as a potential source of the infection. The transmission appeared to be direct person-to-person contact. Several other states are experiencing Hepatitis A outbreaks as well. Nationwide, as of September 13, 2019 there were 25,783 cases, 15,517 hospitalizations and 259 deaths from this outbreak.

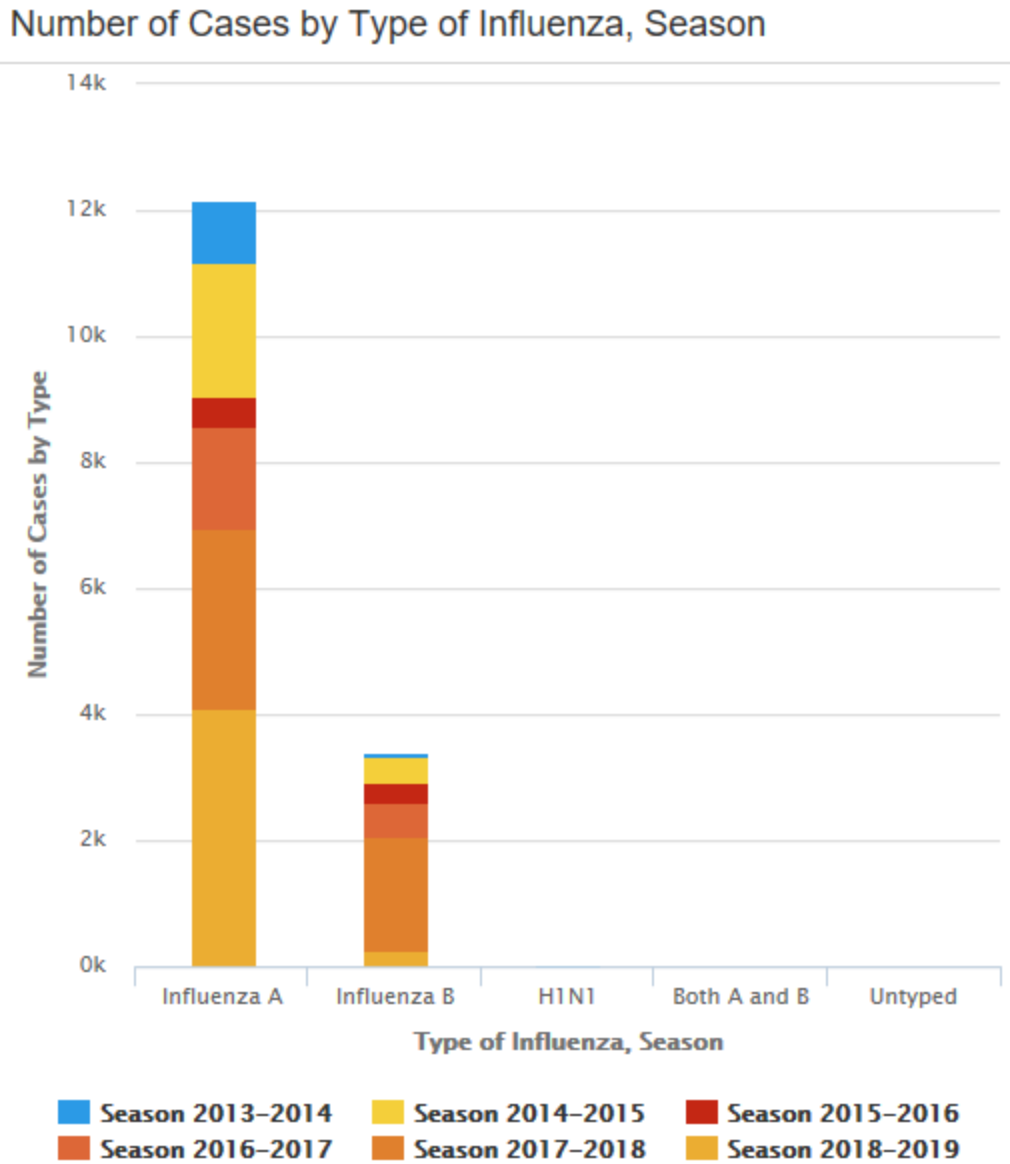
3 - RISK ASSESSMENT

Flu Cases for Greene County



Source: Springfield-Greene County Health Department

3 - RISK ASSESSMENT



Source: Springfield-Greene County Health Department

3 - RISK ASSESSMENT

Probability of Future Occurrence

The probability for hazards in Greene County is determined using Calculated Priority Risk Index (CPRI). It is highly likely that a communicable disease event will occur within the next year in Greene County. For a full description of the CPRI for droughts, refer to Appendix B.

Changing Future Conditions and Considerations

According to the Missouri State Hazard Mitigation Plan, the influences of climate change on public health is significant and varied. The influences range from the clear threats of temperature extremes and severe storms to less obvious connections related to insects. Climate and weather can also affect water and food quality in particular areas, with implications for public health.

One of the diseases most at risk from climate change is malaria. This bacterial infection kills around 429,000 each year and although that number is on the decline, there are fears that in the future, climate change could help malaria spread. Malaria is transmitted to humans by mosquitoes, which are highly sensitive to climatic variations, generally requiring moist conditions, and a temperature of around 25-28 degrees centigrade to breed. Scientists suspect that rising global temperatures could cause mosquitoes to expand, and thereby increase the spread of malaria to humans.

According to Bob Jordan from Stanford News, Scientists have found that warmer temperatures increase transmission of vector-borne disease up to an optimum temperature or “turn-over point”, above which transmission slows. The good news is that higher global temperatures will decrease the chance of most vector-borne disease spreading in places that are currently relatively warm. The bad news is that warming will increase the chance that all diseases spread in places that are currently relatively cold.

VULNERABILITY

Vulnerability Overview

The entire planning area and population are vulnerable to the communicable diseases. Some of our populations are more vulnerable to experiencing a larger impact of diseases than others. Two of our most vulnerable populations for diseases are children and elderly populations.

Influenza

Populations most vulnerable to experiencing flu complications that can result in hospitalizations and sometimes death are:

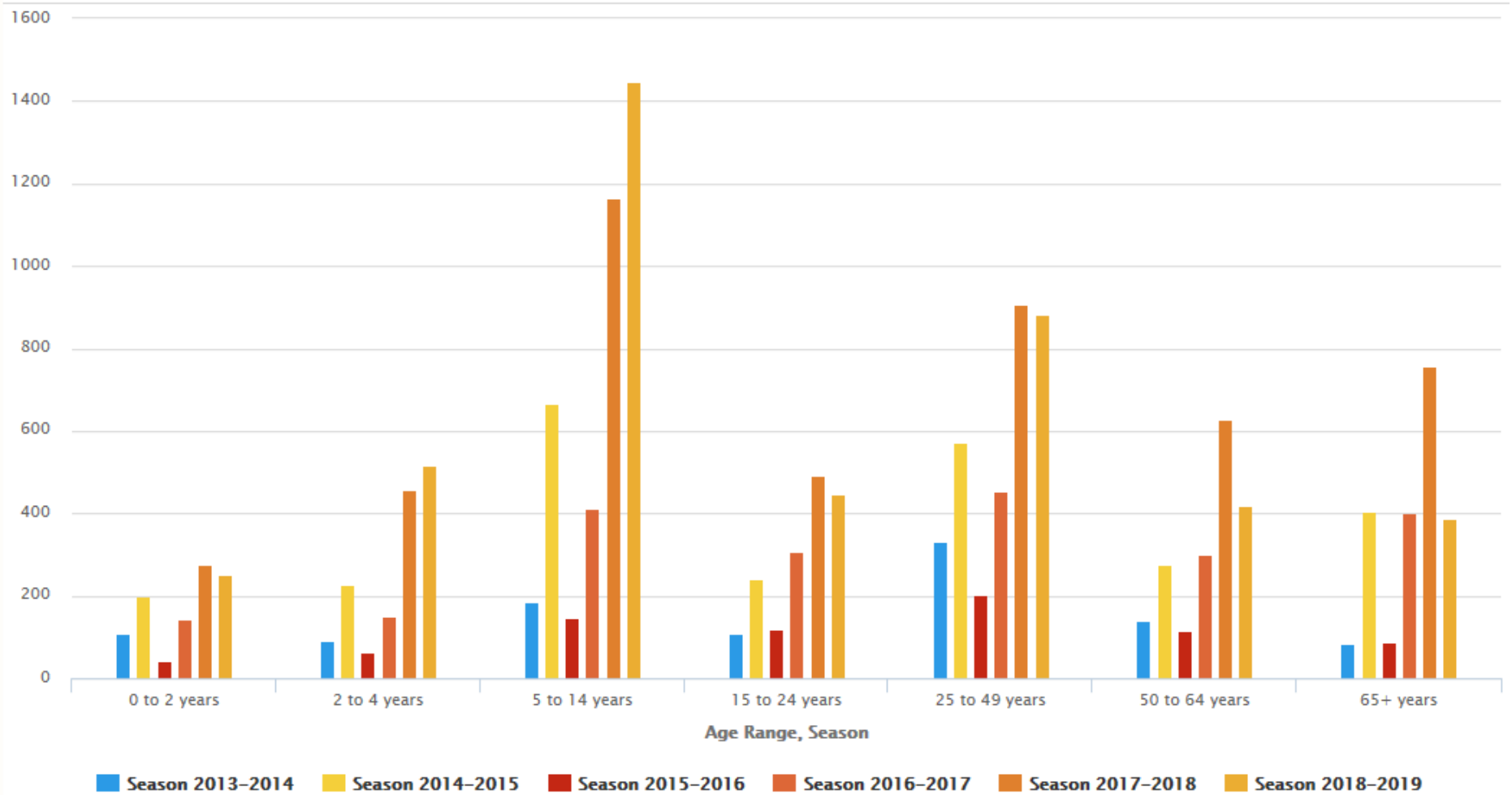
- Adults 65 Years and Older
- Pregnant Women
- Young Children
- Asthmatic Patients
- Heart Disease and Stroke Patients
- Diabetics
- Patients with HIV/AIDS
- Patients with Cancer
- Children with Neurologic Conditions

The best way to protect against flu and its potentially serious complications is to get an annual flu vaccination by the end of October.

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Greene County Flu Cases by Age

Number of Cases by Age Range, Season



Source: Springfield-Greene County Health Department

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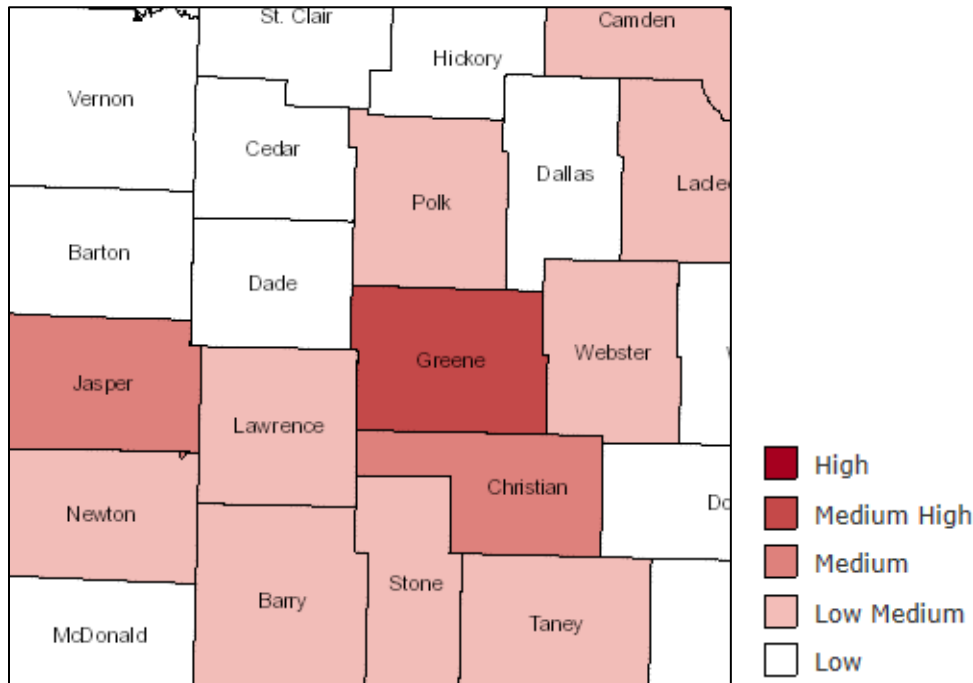
Numbers of Vulnerable Populations-Greene County 2017

Age	Number
Under 5 Years	17,513
10 to 14 years	16,654
65 to 74 Years	24,495
75-84 Years	13,496
85 Years and over	6,406

Source: U.S. Census-2017 Estimates

Currently, the Greene County Jails has 708 beds and staffs approximately 230 officers. Greene County consistently over the years has more than 708 inmates that are housed in other counties. Inmate transports happen daily and happen between multiple different counties and states. Communicable disease could spread quickly throughout the jail and be transmitted to different jail facilities while transports are taking place.

Vulnerability Pandemic Influenza



Potential Losses to Existing Development

Buildings, Infrastructure and critical facilities are not vulnerable to this hazard. It only affects persons susceptible to the illness. Communicable diseases can come with large health impacts but also large financial impacts to the economy as well. The Springfield Business Journal (2009) reported that H1N1 is impacting Missouri’s pork producers. Ron Plain, professor of Agriculture Economics at the University of Missouri-Columbia explains that H1N1, after being labeled “Swine Flu” has cost U.S. pork farmers \$10 million dollars each day. Locally, Heritage Acres Foods in Pleasant Hope had to temporarily lay off 40 of its skilled production workers, or 40% of its production staff.

Health related illnesses can impact the reputation of restaurants if an outbreak, like Hepatitis A, were to come from a specific place. Diseases like this can lead to the restaurant closing down and owners taking a huge financial loss because of it.

3 - RISK ASSESSMENT

The lasting impacts and potential losses are largely economic and are depending on the type, extent, and duration of the illness. "A 2007 study prepared by the Trust for America's Health, a nonprofit organization dedicated to making disease prevention a national priority, developed a model to assess the potential impact of a pandemic flu on each states' workforce and how 20 key industry sectors and trade would be affected. Economic impact to Missouri was estimated to include the following:"

- Projected GDP Loss from Pandemic: \$12.4 billion
- Projected GDP Percentage Loss from Pandemic: 5.74%
- Ranking of Percentage Losses Out of 50 States (Highest = 1): 14
- Projected Impact on the Workforce: \$5.5 billion in losses
- Projected Impact on Industries: \$4.7 billion in losses
- Projected Trade Impact: \$2.2 billion in losses
- Projected Number of Lives Lost: 47,000
- Projected Number of Sick Workers (assuming 3 weeks of work lost (with 50 weeks of work per year) from those who are either ill, fear the risk of infection at work, or need to take care of sick family members): 1,717,000

Impact of Previous and Future Development

As the populations of all our jurisdictions within Greene County continues to grow, potential losses can be expected to rise. A lot of people move to Greene County and surrounding areas to build families. Greene County has excellent school districts which also draws more children to our areas. Children are some of the most vulnerable populations to communicable diseases.

As stated previously in the previous section, incarcerated people are vulnerable to communicable diseases. The Greene County Sheriff's Office is in process of building a larger jail within the county that would house more inmates in one location rather than spreading them throughout different counties. The risk for spreading communicable disease from jail to jail may decrease, but having more incarcerated people in one place also raises the risk of infection among Greene County Inmates and Staff.

3 - RISK ASSESSMENT

EMAP Consequence Analysis

EMAP Impact Analysis: Communicable Disease

SUBJECT	DETRIMENTAL IMPACTS
Public	A widespread communicable disease would cause a significant impact depending on which communicable disease is affecting the community, a large number of the population would be ill and death could result to a few or many.
Responders	A communicable disease would bring many safety concerns to first responders. If a large number of the population were ill, the demand for responders would be overwhelming, especially if responders are ill.
Continuity of Operations	Delivery of services would be heavily impacted if a large number of the population becomes ill. Operation may be delayed, suspended, or overwhelmed.
Property, Facilities, and Infrastructure	A communicable disease would cause little to no property damage. Hospitals and first responders would be overwhelmed. Infrastructure owners and operators contracting the disease would impact multiple infrastructure sectors in the jurisdiction. A communicable disease could have little to no impact of facilities.
Environment	A communicable disease would create little to no impact on the environment. If wildlife becomes infected with disease, please refer to the hazard "Animal Disease"
Economic Condition of Jurisdiction	A communicable disease would create major economic impact and widespread loss. Illness would create a small workforce, and demand for many businesses would dissipate with all income going toward hospital bills and medication.
Public Confidence in the Jurisdiction's Governance	The government is seen as responsible for providing medical opportunities to the community and ultimately a cure. Long term illness and deaths would create a significant loss in public confidence of the government.

*For more details on Consequence Analysis, refer to Appendix B.

Hazard Summary by Jurisdiction

The entire planning area is at risk for experiencing communicable diseases. Communicable diseases are common within Greene County because of seasonal influenza. Though the entire planning area is at risk for experiencing communicable diseases, our most vulnerable populations are elderly and children. The jurisdictions with the most children are all of our school districts. Communicable diseases can spread quickly in schools because of the close contact children have with one another. Our jurisdictions that have the most elderly populations are Battlefield and Springfield, As of 2017, Battlefield had 944 people who were 65 and older were 944 which is 15.77% of the population. As of 2017, Springfield had 24,646 people who were 65 years and older. This is 14.87% of the population.

3 - RISK ASSESSMENT

PROBLEM STATEMENT

Communicable diseases can have extensive health impacts including death. Communicable diseases can also have large economic losses if not controlled quickly. Though diseases do not directly causes damaged to infrastructure and critical facilities, they can have a huge impact on the planning area. Greene County experiences at least one communicable disease every year, seasonal influenza. Flu can cause the most harm to children and elderly populations but can affect everyone in the planning area. Some mitigation solutions for communicable diseases is public education, training for local government staff and Public Information Officers, strengthening the public health infrastructures, including water and sanitations systems, and increasing public awareness. No participating jurisdiction chose a mitigation project involving communicable disease in this hazard mitigation plan.

4 - MITIGATION STRATEGY

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City of Battlefield.....	4.34
City of Fair Grove.....	4.39
City of Republic.....	4.41
City of Springfield.....	4.48
City of Strafford.....	4.55
City of Walnut Grove.....	4.57
City of Willard.....	4.61
Ash Grove Fire Protection District.....	4.69
Battlefield Fire Protection District.....	4.73
Ebenezer Fire Protection District.....	4.75
Fair Grove Fire Protection District.....	4.81
Logan-Rogersville Fire Protection District.....	4.82
Strafford Fire Protection District.....	4.86
Walnut Grove Fire Protection District.....	4.87
Willard Fire Protection District.....	4.88
Ash Grove Public School District.....	4.93
Fair Grove Public School District.....	4.94
Republic Public School District.....	4.96
Springfield Public School District.....	4.98
Strafford Public School District.....	4.104
Walnut Grove Public School District.....	4.105
Willard Public School District.....	4.107
Missouri State University.....	4.108
Ozark Technical Community College.....	4.115

44 CFR Requirement 201.6©(3): The plan shall include a mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section presents the mitigation strategy updated by the Mitigation Planning Committee (MPC) based on the updated risk assessment. The mitigation strategy was developed through a collaborative group process. The process included review of updated goal statements to guide the jurisdictions in lessening disaster impacts as well as specific mitigation actions to directly reduce vulnerability to hazards and losses. The following definitions are taken from FEMA’s Local Hazard Mitigation Review Guide (October 1, 2012)

- Mitigation Goals: are general guidelines that explain what you want to achieve. Goals are long-term policy statements and global visions that support the mitigation strategy. The goals address the risk of hazards identified in the plan.
- Mitigation Actions: are specific actions, projects, activities, or processes taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan’s mission and goals.

4 - MITIGATION STRATEGY

4.1 GOALS

44 CFR Requirement 201.6 (3)(i): the hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The planning effort is an update to Greene County’s existing hazard mitigation plan approved by FEMA on July 6th, 2015. Therefore, the goals from the 2015-2020 Greene County Multi-Jurisdictional Hazard Mitigation Plan were reviewed to see if they were still valid, feasible, practical, and applicable to the defined hazard impacts. The MPC conducted a discussion session during individual meetings to review and update the plan goals. To ensure that the goals developed for this update were comprehensive and supported State goals, the 2018 State Hazard Mitigation Plan goals were reviewed and used as a resource.

Many of our jurisdictions carried goals from the previous plan into the update. Many of the jurisdictions have goals that they still want to accomplish, but will not be able to fund the project without assistance from the grant. Other projects were taken out because they had projects that were not eligible projects or they were not feasible for the jurisdiction.

Goal Number	Jurisdiction	Goal
Greene County		
1	Greene County	To enhance flood prevention by improving flood buyout programs and purchasing more properties located within unincorporated Greene County.
2	Greene County	To enhance protection provided for the inmates and staff members of the Greene County Jail during severe weather and non-weather related emergencies.
3	Greene County	To provide the county with more sirens that have added support systems to help notify citizens when severe weather is present in the area.
4	Greene County	To provide the Greene County citizens and staff with adequate shelter to use during severe storms and tornadoes.
5	Greene County	To protect the lives of the citizens in Greene County during flooding events by creating flood warning systems.
6	Greene County	To provide the public with various education opportunities to learn more about Mitigation and other mission areas of Emergency Management.
7	Greene County	To provide more protection against cyber-crimes and incidents.
8	Greene County	To provide all critical facilities in Greene County with appropriate generators that provide a backup power source in emergencies.
9	Greene County	To provide a large, centrally located multi-purpose shelter for the residents of Greene County.
City of Ash Grove		
1	City of Ash Grove	Reduce the City of Ash Grove’s vulnerability to tornadoes/Severe thunderstorms, and other disasters.
2	City of Ash Grove	To protect the lives of Ash Grove citizens from all hazards that may affect the area.
3	City of Ash Grove	Reduce the City of Ash Grove’s vulnerability to disasters by 50% over the next 5 years.
4	City of Ash Grove	Reduce the City of Ash Grove’s Vulnerability of Human-Caused Hazards and disasters by 50% over the next 5 years.
5	City of Ash Grove	Enhance and strengthen emergency services preparedness and response by the development and linking emergency services with hazard mitigation programs.
6	City of Ash Grove	Reduce the potential damage caused by flooding likely to strike the local area by 50%.
7	City of Ash Grove	Reduce the City of Ash Grove’s vulnerability to extreme heat by 50% over the next 1-3 Years.
8	City of Ash Grove	Reduce the City of Ash Grove’s vulnerability to disasters by 50% over the next 5 years.
9	City of Ash Grove	To protect travel through Ash Grove.
City of Battlefield		
1	City of Battlefield	To increase the ability of city staff to maintain communication during City, County or

4 - MITIGATION STRATEGY

		Regional emergency situations.
2	City of Battlefield	To improve storm-warning systems to increase covered area.
3	City of Battlefield	To protect the lives of the Battlefield citizens during severe weather.
4	City of Battlefield	To enhance stormwater management by improving flood control programs.
City of Republic		
1	City of Republic	To protect the lives of the people who travel through Republic.
2	City of Republic	To protect the lives of walking pedestrians in Republic.
3	City of Republic	To limit the loss of property and injury due to flooding across the Republic area.
4	City of Republic	To protect the lives of citizens traveling through the City of Republic when there is severe flooding in the area.
5	City of Republic	To enhance the public safety and health of the citizens in Republic.
6	City of Republic	To protect sensitive data against attacks or other cyber incidents.
City of Springfield		
1	City of Springfield	To reduce flooding of streets, businesses, and private property to improve safety and quality of life for citizens.
2	City of Springfield	To reduce flooding of homes and businesses to improve safety and quality of life for citizens.
3	City of Springfield	To protect the lives of staff members and shelters animals at the Springfield-Greene County Animal Shelter.
4	City of Springfield	To enhance the capability of providing the community with a large shelter that could be used during any disaster.
5	City of Springfield	To protect the lives of the Parks Department staff and visitors/citizens of the Springfield-Greene County Parks.
City of Strafford		
1	City of Strafford	
City of Walnut Grove		
1	City of Walnut Grove	To protect the lives of the citizens of the City of Walnut Grove.
2	City of Walnut Grove	To enhance the building stability of the Municipal complex.
3	City of Walnut Grove	To improve the response efforts of the Public Works Department during tornado and high wind events.
City of Willard		
1	City of Willard	To maintain the Willard Storm Sirens and purchase more sirens for the community.
2	City of Willard	To create and develop flood control programs for the City of Willard.
3	City of Willard	To reduce the City of Willard's vulnerability to extreme heat by 50% over the next year.
4	City of Willard	To reduce the potential damage caused by flooding likely to strike the local area by 50%.
5	City of Willard	To reduce the City of Willard's vulnerability to tornados/severe thunderstorms by 50% over the next 5 years.
6	City of Willard	To reduce the City's of Willard's vulnerability to tornadoes/severe thunderstorms by 50% over the next 5 years.
Ash Grove Fire Protection District		
1	Ash Grove Fire Protection District	Reduce the Ash Grove Fire Protection District's vulnerability to disasters by 50% over the next 5 years.
2	Ash Grove Fire Protection District	Reduce the Ash Grove Fire Protection District's vulnerability to disaster by 50% over the next 5 years.
3	Ash Grove Fire Protection District	To save the lives of responders and citizens and ensure emergency services and EOC can safely be maintained.
4	Ash Grove Fire Protection District	Reduce the Ash Grove Fire Protection District's vulnerability to disasters by 50% over the next 5 years.
Battlefield Fire Protection District		
1	Battlefield Fire Protection	To provide a more modern and useful apparatus for the District.

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	District	
2	Battlefield Fire Protection District	To better serve the patrons of the district with quicker response times for emergency calls, and to maintain better district resources.
Ebenezer Fire Protection District		
1	Ebenezer Fire Protection District	To limit the time spent during an outage and therefore ensure enhances response to emergencies.
2	Ebenezer Fire Protection District	To limit loss of life and injury to swift water and flood emergencies.
3	Ebenezer Fire Protection District	To enhance storm warning systems in Northern Greene County.
4	Ebenezer Fire Protection District	To protect the lives of the Ebenezer Fire Protection District and the citizens they serve during sever weather and tornados.
5	Ebenezer Fire Protection District	To enhance emergency response by accessing appropriate equipment faster, also to protect the lives of the Ebenezer Fire Protection District and the residents they serve by providing appropriate shelter.
6	Ebenezer Fire Protection District	To enhance the Ebenezer Fire Protection District equipment housing needs.
Fair Grove Fire Protection		
1	Fair Grove Fire Protection District	To enhance the Fair Grove Fire Protection Districts fire suppression.
Logan-Rogersville Fire Protection District		
1	Logan-Rogersville Fire Protection District	To keep the fire stations operational during times of severe weather and power outages.
2	Logan-Rogersville Fire Protection District	To help protect the citizens in the Logan-Rogersville Fire Protection District during tornados and other severe weather.
3	Logan-Rogersville Fire Protection District	To protect the lives of the Logan-Rogersville Fire Protection District fire fighters and staff during severe weather and tornados.
4	Logan-Rogersville Fire Protection District	To enhance training for the staff of the Logan-Rogersville Fire Protection District.
Stafford Fire Protection District		
1	Stafford Fire Protection District	To keep the fire stations operational during times of severe weather and power outages.
Walnut Grove Fire Protection District		
1	Walnut Grove Fire Protection District	To ensure the continued protection of the public by limiting the loss of normal operations.
Willard Fire Protection District		
1	Willard Fire Protection District	To enhance emergency response by replacing the aging districts fleet.
2	Willard Fire Protection District	To continue rapid response by providing the district with new SCBS's district wide.
3	Willard Fire	To enhance communications within the Willard Fire Protection District.

4 - MITIGATION STRATEGY

	Protection District	
4	Willard Fire Protection District	To protect and limit loss thru decreased response times.
5	Willard Fire Protection District	To protect and limit loss of life and injury thru decreased response times.
Ash Grove Public School District		
1	Ash Grove Public School District	To provide safety and security for the students, faculty and/or citizens of the Ash Grove community.
Fair Grove Public School District		
1	Fair Grove Public School District	To enhance safety of the school district buildings.
Republic Public School District		
1	Republic Public School District	To limit the loss of life and injury to students and staff of the district during a tornado or straight line wind event.
2	Republic Public School District	To limit the loss of life and injury to students and staff of the district during a tornado or straight line wind event.
Springfield Public School District		
1	Springfield Public School District	To protect the lives of the Springfield Public School students and faculty during severe weather and tornado events.
2	Springfield Public School District	To enhance communications, response and transportation for the district.
3	Springfield Public Schools	To enhance response of facility during weather related events.
4	Springfield Public Schools	To prepare the students and staff members of the Springfield Public School District for all hazards.
5	Springfield Public Schools	To prevent flooding related injuries and damages to Jaret Middle School.
6	Springfield Public Schools	To prevent cybercrimes and other cyber issues in the Springfield Public School District.
Stafford Public School District		
1	Stafford Public School District	To limit the loss of life and injury to students and staff of the district during a tornado or severe storm incident.
Walnut Grove Public School District		
1	Walnut Grove Public School District	To protect the student and staff during school hours by updating and adding security feature to the school district buildings.
2	Walnut Grove Public School District	To protect the students and staff during severe weather by providing a FEMA Safe Room.
Willard Public School District		
1	Willard Public School District	To provide shelter for the Willard School District Students and faculty during severe storms and tornado events.
Missouri State University		
1	Missouri State University	To improve Missouri State University's in-building emergency notification system.
2	Missouri State University	To improve Missouri State University's outside Emergency Notification System.
3	Missouri State University	To develop and strengthen the Emergency Plans for Missouri State University.
4	Missouri State University	To develop training opportunities at Missouri State University.
5	Missouri State	To test Missouri State University's emergency plans to ensure competencies and identify

4 - MITIGATION STRATEGY

	University	gaps.
6	Missouri State University	To identify and establish an Emergency Operation Center on the MSU Campus.
7	Missouri State University	To protect the lives of the Missouri State University Students and staff.
Ozark Technical Community College		
1	Ozark Technical Community College	To provide backup power to the new Republic Campus when any hazard causes a power-outage.
2	Ozark Technical Community College	To create a space for advancement manufacturing.

4.2 IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS

44 CFR Requirement 201.6 (3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Some specific sources for mitigation actions ideas include the following:

- FEMA’s Mitigation Action Ideas Publication
- 2015-2020 Greene County Multi-Jurisdictional Hazard Mitigation Plan
- SEMA Mitigation-Eligible Activities Worksheet

During individual meetings, risk assessment updates were discussed and key issues were identified for specific hazards. Changes in risk since adoption of the previously approved plan were discussed. There weren’t many changes to the risks from the previously approved plan. Actions from the previous plan included completed actions, on-going actions, and actions upon which progress had not been made. The Mitigation Planning Committee (MPC) discussed SEMA’s identified funding priorities and the types of mitigations actions generally recognized by FEMA.

The focus in the second individual meetings was to update the mitigation strategy. For a comprehensive range of mitigation actions to consider, the MPC reviewed the following information during the second individual meetings:

- A list of actions proposed in the previous mitigation plan and the State plan.
- Key issues from the risk assessments
- State priorities established for HMA grants
- Public input/data collection questionnaires

All members of the MPC were provided a link to the FEMA’s publication, Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards. This document was developed by FEMA as a resource for identification of a range of potential mitigation actions for reducing risk to natural hazards and disasters.

The MPC reviewed the actions from the previously approved plan. Previous goals and actions were provided to the MPC during the kick-off meeting and also over email and individual meetings. Progress from previous goals and actions is requested quarterly from the Senior Planner and Springfield-Greene County Office of Emergency Management.

The table below provides a summary of the action statuses for each jurisdiction:

4 - MITIGATION STRATEGY

Action Status Summary

JURISDICTION	COMPLETED ACTIONS	CONTINUING ACTIONS (ONGOING OR MODIFY)	DELETED ACTIONS
Ash Grove	0	3	1
Battlefield	0	3	0
Fair Grove	2	1	0
Republic	0	6	4
Strafford	0	2	0
Springfield	5	15	0
Walnut Grove	0	10	2
Willard	0	5	0
Ash Grove School District	0	1	0
Fair Grove School District	2	2	1
Republic School District	1	1	0
Springfield School District	1	1	0
Strafford School District	1	3	0
Walnut Grove School District	0	2	0
Willard School District	4	5	0
Ash Grove Fire Protection District	0	2	0
Battlefield Fire Protection District	2	2	0
Ebenezer Fire Protection District	0	0	0
Fair Grove Fire Protection District	0	2	0
Logan-Rogersville Fire Protection District	0	2	0
Strafford Fire Protection District	0	0	0
Walnut Grove Fire Protection District	0	1	0
Willard Fire Protection District	0	4	0
Missouri State University	4	2	0
Ozark Technical Community College	1	0	0

4 - MITIGATION STRATEGY

Summary of Completed and Deleted Actions from the Previous Plan

COMPLETED ACTIONS	COMPLETION DETAILS (DATE, AMOUNT, FUNDING SOURCE)
Fair Grove developed plan of action to update and improve warning capabilities	Completed 2018
Fair Grove purchased radios	Purchased through grant in 2018
City of Springfield obtained more data to add to future mitigation plans.	Completed 2016
City of Springfield Complied PSAs to media outlets	Completed 2016
Springfield Completed revising the mitigation plan	Completed 2017
Springfield and GCOEM put mitigation plan on website	Completed 2017
City of Springfield strengthened emergency services and preparedness	Completed 2016
Springfield Complied list of mitigation capital improvements	Completed 2016
Fair Grove School District Enhancing Technology and Emergency Planning	May 2018 purchased radios with a grant.
Fair Grove School District Training for staff	Worked with local first responders for different education opportunities.
Republic School District Traffic	Round a-bout was completed in summer 2019.
Springfield School District Safe Room	Kickapoo safe room was completed with HMGP funding.
Strafford Schools Vehicle	Received vehicle from City of Strafford
Willard Schools Emergency response Manual	Unknown
Willard Schools modifying emergency action plans	Unknown
Willard Schools information to teachers during faculty meetings	Unknown
Willard Schools reviewing science curriculum to understand environment and ecosystems.	Unknown
Battlefield Fire District purchased a new apparatus	New truck purchased 2019
Battlefield Station new station	New Station completed 2018
Missouri State University radio communications	Completed
Missouri State EOP	Completed 2017
Missouri State Table Top Exercise	Completed 2018
Missouri State Hire Emergency Management	Hired 2017
Ozark Tech. Community College cultivate a safe community	Completed 2018
DELETED ACTIONS	REASON FOR DELETION
Fair Grove School District-Delivering supplies	No longer a need for the district.
Walnut Grove natural gas	No longer a need for the city
Walnut Grove public works	No longer a need for the city.
Ash Grove develop guidelines for management for human caused events.	No longer needing this action.
Republic modify structures within city limits	No longer a need for the city.
Republic sheltering program	No longer a need for the city.
Republic Storm Siren	No longer a need for the city.
Republic Safe Room	No longer a need for the city.

For actions that have not been completed, it is required to do one of two things: (1) describe whether the action is no longer relevant; or (2) include the incomplete action as part of the updated action plan.

4 - MITIGATION STRATEGY

4.3 IMPLEMENTATION OF MITIGATION ACTIONS

44 CFR Requirement 201.6 (3)(ii): The mitigation strategy shall include an action strategy describing how the actions identified in paragraph (2)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefits review of the proposed projects and their associated costs.

Jurisdictional Mitigation Planning Committee (MPC) members were encouraged to meet with others in their community or districts to finalize the actions to be submitted for the updated mitigations strategy. Throughout the MPC consideration and discussion process, emphasis was placed on the importance of a benefit-cost analysis in determining project priority. The MPC decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the 2018 Missouri State Hazard Mitigation Plan. The benefit/cost review at the planning stage primarily consisted of a qualitative analysis and was not the detailed process required for the grant funding application. For each action, the plan sets forth a narrative describing the types of benefits that could be realized from the action implementation. The cost was estimated as closely as possible, with further refinement to be supplied as project development occurs.

Calculated Priority Risk Index (CPRI)

The CPRI formula was used in the 2020-2025 Greene County Multi-Jurisdictional Hazard Mitigation Plan. The CPRI formula was used for prioritization purposes for the hazard profiles. This method uses probability, magnitude/severity, warning time, and duration of a hazard to effectively rate and then prioritize each hazard. The formula is stated below.

$$(Probability \times 0.45) + (Magnitude/Severity \times 0.30) + (Warning Time \times 0.15) + (Duration \times 0.10)$$

Detailed profiles for Calculated Priority Risk for the 2020-2025 Greene County Multi-Jurisdictional Hazard Mitigation Plan is located in Appendix B.

Cost and Benefit

Each participating jurisdiction considered cost and benefit when creating the projects. Most jurisdictions picked projects that the cost was reasonable for the jurisdiction, but most importantly they focused on the benefit of the action. The benefits of each project all outweigh the cost. Most of the projects selected involve protecting life and property which is why a lot of the jurisdictions wanted to participate in the Mitigation Plan.

ACTION WORKSHEET

Each participating jurisdiction was provided with an action worksheet to help map out their goals and actions for the updated plan. The goals and actions had to be consistent with the hazards identified in the plan. The chart below demonstrates the chart that was provided to the jurisdictions to fill out.

4 - MITIGATION STRATEGY

Action Worksheet	
Name of Jurisdiction:	
Risk / Vulnerability	
Hazard(s) Addressed:	List the hazard or hazards that will be addressed by this action
Problem being Mitigated:	Provide a brief description of the problem that the action will address. Utilize the problem statement developed in the risk assessment.
Action or Project	
Applicable Goal Statement:	Choose the goal statement that applies to this action
Action/Project Number:	Insert a unique action number for this action for future tracking purposes. This can be a combination of the jurisdiction name, followed by the goal number and action number (i.e. Joplin1.1)
Name of Action or Project:	
Mitigation Category:	Prevention; Structure and Infrastructure Projects; Natural Systems Protection; Education and Outreach; Emergency Services
Action or Project Description:	Describe the action or project.
Estimated Cost:	Provide an estimate of the cost to implement this action. This can be accomplished with a range of estimated costs.
Benefits:	Provide a narrative describing the losses that will be avoided by implementing this action. If dollar amounts of avoided losses are known, include them as well.
Plan for Implementation	
Responsible Organization/Department:	Which organization will be responsible for tracking this action? Be specific to include the specific department or position within a department.
Supporting Organization/Department:	Which organization/department will assist in implementation of this action?
Action/Project Priority:	Include the STAPLEE score and Priority (H, M, L)
Timeline for Completion:	How many months/years to complete.
Potential Fund Sources:	List specific funding sources that may be used to pay for the implementation of the action.
Local Planning Mechanisms to be Used in Implementation, if any:	
Progress Report	
Action Status:	Indicate status as New, Continuing Not Started, or Continuing in Progress)
Report of Progress:	For Continuing actions only, indicate the report on progress. If the action is not started, indicate any barriers encountered to initiate the action. If the action is in progress, indicate the activity that has occurred to date.

4 - MITIGATION STRATEGY

4.4 Participating Jurisdictions Projects and Goals

The following section will list the participating Jurisdictions Projects and Goals starting with Greene County, followed by the municipalities, fire protection districts, public school districts and universities. The jurisdictions will be organized in alphabetical order. There were many jurisdictions that participated but did not provide projects or goals for the jurisdiction. They were informed that if they wanted to add a project or goal later, it would have to be approved through SEMA.

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To enhance flood prevention by improving flood buyout programs and purchasing more properties located within Unincorporated Green County.

Action: Continue to purchase properties located within Unincorporated Greene County. See page below for already purchased properties.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	There are many properties located in Unincorporated Greene County that need to be purchased from their owners.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 1
Name of Action or Project:	High
Mitigation Category:	Prevention; Infrastructure Projects
Estimated Cost:	Cost varies per property,
Benefits:	Prevention of property damage, prevent loss of life and injury due to flooding
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Greene County- Engineering
Supporting Organization/Department:	Springfield-Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Local Funds, Budget, Grant
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuous
Report of Progress:	See list below of properties that have been purchased

4 - MITIGATION STRATEGY

Greene County Stormwater Buyouts and Total Price

- 535 E. Buena Vista- \$123,139.41
- 545 E. Buena Vista-\$85,884.68
- 605 E. Buena Vista-\$142,413.64
- 606 E. Camino -\$81,273.00
- 611 E. Camino- \$20,918.00
- 612 E. Camino- \$126,868.00
- 645 E. Cardinal- \$142,773.00
- 4441 S. Holland- \$134,901.81
- 4450 S. Holland- \$334,995.00
- 4455 S. Holland- \$\$124,155.50
- 4465 S. Holland- \$141,806.48
- 634 E. Cardinal- \$118,409.00
- 635 E. Cardinal- \$113,632.65
- 3466 W. Spurling Dr.- \$12,285.00
- 3458 W. Spurling Dr.- \$16,627.50
- 3454 W. Spurling Dr.- \$16,456.56
- 3441 W. Spurling Dr.- \$3,942.30
- 2626 W. Allen Dr.- \$123,260.58
- 4650 S. Jewell Ave.- \$427,794.34
- 4639 S. Jewell Ave.- \$166,187.55
- 4708 S. Jewell Ave. -\$122,079.71
- 2609 W. Allen Dr.- \$131,122.21
- 2619 W. Allen Dr.- \$128,138.79
- 4718 S. Jewell Ave.- \$135,064.16
- 4640 S. Jewell Ave.- \$399,176.77
- 4649 S. Jewell Ave.- \$121,297.24
- 4709 S. Jewell Ave.- \$119,186.31
- 4719 S. Jewell Ave.- \$134,809.73
- 4729 S. Jewell Ave.- \$116,599.08
- 4739 S. Jewell Ave.- \$133,651.85
- 8117 E. Diamond Lane.- \$155,098.12
- 4628 S. Deborah \$131,008.29
- 2535 W. Sexton- \$131,021.42
- 4563 E. Farm Road 148- \$30,100.00
- 754 W. Farm Road 178- \$263,515.58
- 4176 S. Farm Road 223- \$185,879.00
- 4450 E. Farm Road 144- \$57,288.80
- 4481 S. Farm Road 193- \$296,483.80
- 2530 W. Vincent- \$137,491.60
- 9574 W Farm Road 84- \$153,400.00
- 751 W Farm Road 36- \$154,425.00
- 2285 N. Farm Road 105- \$83,188.64

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To enhance protection provided for the inmates and staff members of the Greene County Jail during severe weather and non-weather related emergencies.

Action: Add two 1,000 Mega Watt Generators to the Greene County Jail that is being built.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Severe Winter Weather, Non-Weather Related Incidents
Problem being Mitigated:	Power loss to critical systems within the Greene County Jail that keeps officers, staff and inmates safe.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 2
Name of Action or Project:	Greene County Jail Generators
Mitigation Category:	Prevention
Estimated Cost:	\$1,000,000
Benefits:	Supplying electricity to 1,300 inmates, 200 jail staff members, administrative staff, detectives, medical staff, kitchen staff and other critical employees during power outages. Ensuring safety and security of all officers and staff by keeping critical cameras and systems functioning properly during severe weather or other non-weather related incidents.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Greene County-Sheriff's Office
Supporting Organization/Department:	Springfield-Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	2 Years
Potential Fund Sources:	General Revenue Sales Tax
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To provide the county with more sirens that have added support systems to help notify citizens when severe weather is present in the area.

Action: Purchase and place sirens in the areas for the county that are not in the current coverage and update all sirens with support systems.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornado
Problem being Mitigated:	Greene County currently has areas of the county that are lacking storm sirens that are used to notify the public when a tornado warning is in effect. The county sirens are also lacking support systems that make the sirens more efficient.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 3
Name of Action or Project:	Greene County Sirens
Mitigation Category:	Prevention; Emergency Services
Estimated Cost:	\$20,000-\$100,000
Benefits:	Citizens are alerted quicker when tornados are present, prevention of injury or loss of life of citizens
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Various Greene County Departments
Supporting Organization/Department:	Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Department Budgets, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching potential locations

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To provide the Greene County citizens and staff with adequate shelter to use during severe storms and tornadoes.

Action: Build shelters across the county to provide appropriate shelter for the citizens and staff of Greene County during tornadoes.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornado, Severe Storms
Problem being Mitigated:	There are many locations in Greene County that are in need of adequate shelter for people to use during severe storms.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 4
Name of Action or Project:	Greene County Shelters
Mitigation Category:	Prevention; Infrastructure and structure projects
Estimated Cost:	Cost varies per shelter due to size requirements; \$1-\$5 Million
Benefits:	Protect the lives of the citizens of Greene County and the staff who work for the county.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Various Greene County Departments
Supporting Organization/Department:	Greene County Office of Emergency Management
Action/Project Priority:	Medium
Timeline for Completion:	2-5 Years
Potential Fund Sources:	Department Budgets, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To protect the lives of the citizens in Greene County during flooding events by creating flood warning systems.

Action: Create flood warning systems for flood prone roads using various methods including railroad crossing signs.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	There are many roads and areas across the county that are dangerous during flash flooding and other flooding events.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 5
Name of Action or Project:	Greene County Flood Warning Systems
Mitigation Category:	Prevention;
Estimated Cost:	Unknown
Benefits:	Bring awareness to dangerous roads and areas that flood frequently in the county, prevention of injury and possibly death, less water rescues from local fire protection districts
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Various Greene County Departments
Supporting Organization/Department:	Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	Department Budget, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuous
Report of Progress:	Waiting on Funding

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To provide the public with various education opportunities to learn more about Mitigation and other mission areas of Emergency Management.

Action 1: Update the Springfield-Greene County Office of Emergency Management’s Website to include the newest version of the Hazard Mitigation Plan.

Action 2: Create brochures to pass out during OEM events regarding Mitigation information.

Action 3: Update and rollout Hometown Ready

Action 4: Update Storm Spotter Class

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Public education is a growing need for our community. Interest in Emergency Management from the citizens is growing.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 6
Name of Action or Project:	Emergency Management Education
Mitigation Category:	Public Awareness
Estimated Cost:	Limited Cost is Needed
Benefits:	Public involvement, increased disaster resilience for the community, information for our partners to use.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Springfield-Greene County Office of Emergency Management
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	2-4 Years
Potential Fund Sources:	Budget, Grant
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuous
Report of Progress:	Website is created just needs updated

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To provide more protection against cyber-crimes and incidents.

Action: Provide programs to protect the county against cyber-crimes using some of the following: Two Factor Authentication, Encryption, any other protection programs.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Cyber
Problem being Mitigated:	Cyber incidents are increasing rapidly across the nation effecting all types of agencies including the Greene County Government Offices.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 7
Name of Action or Project:	Greene County Cyber Protection
Mitigation Category:	Prevention
Estimated Cost:	Cost varies by programs
Benefits:	Could save millions of dollars, loss of data, loss of personal information
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Various Greene County Departments
Supporting Organization/Department:	Springfield-Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Department Budgets, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To provide all critical facilities in Greene County with appropriate generators that provide a backup power source in emergencies.

Action: Purchase generators for all critical facilities in Greene County including: EOC, 9-11, County Server Room and many other facilities.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Power-Outages
Problem being Mitigated:	There are many critical facilities located within the county that need generators to back up power in major outages situations.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 8
Name of Action or Project:	Greene County Generators
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000 Per Generator
Benefits:	Protection of emergency services
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Various Greene County Departments
Supporting Organization/Department:	Springfield-Greene County Office of Emergency Management
Action/Project Priority:	Medium
Timeline for Completion:	3-5 Years
Potential Fund Sources:	Department Budgets, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To provide a large, centrally located multi-purpose shelter for the residents of Greene County.

Action: Purchase generators and transfer switches for the E-Plex, located at the Ozark Empire Fair

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Tornadoes, Severe Winter Weather, Power Loss
Problem being Mitigated:	The Ozark Empire Fair Grounds has a large indoor space that could be used for sheltering purposes during large-scale disaster events. The location has the recreation space, bathrooms, sleeping space, food service capabilities but does not have generators to support the building during power outages. The location also has space to shelter animals.
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 9
Name of Action or Project:	Ozark Empire Fair Generators
Mitigation Category:	Infrastructure
Estimated Cost:	\$400,000
Benefits:	Shelter for both people and animals of Greene County, Protect Hillcrest students and staff in case of disaster, could be used as a staging area for large disaster events, Relief station for I-44
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Springfield
Supporting Organization/Department:	Greene County Agricultural Mechanic Society
Action/Project Priority:	High
Timeline for Completion:	2-3 Years
Potential Fund Sources:	Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

GREENE COUNTY

Goal: To protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and work with residents to identify flood prone areas.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	Greene County Goal 10
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	EMD/ Floodplain Administrator
Supporting Organization/Department:	Springfield- Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: Reduce the City of Ash Grove's vulnerability to tornadoes/Severe thunderstorms, and other disasters.

Action 1: Develop a plan to replace existing 30+ year old outdoor warning siren with all hazard devices.

Action 2: Add units for larger coverage area and maintain standard of warning in areas of new development. Reach and implement alternative notification systems.

Action 3: Install generators at siren sites to provide reliable warning system in power outage situations.

Action 4: Monitor annexations process to stay informed as to upcoming and potential annexations to ensure warning siren coverage remains consistent with current standard

Action 5: Equip new sirens with radio technology to enable Greene County the ability to activate and monitor sirens.

Action 6: Develop the ability to broadcast emergency and public education material to the public.

Action 7: Promote NOAA weather Radios with annual city sponsored purchase campaign.

Action 8: Develop a plan to install cameras at sites that routinely host large special events and that also have good vantage points to monitor incoming weather. Install cameras at chosen sites and link them to the Emergency Operation Center.

Action 9: Work with the Springfield-Greene County Office of Emergency Management on proper placement of warning sirens and cameras.

4 - MITIGATION STRATEGY

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Tornados
Problem being Mitigated:	The outdoor warning siren in ash grove is currently out dated and needs to be replaced. The city is also at the point where more sirens should be considered for citizen notification.
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 1
Name of Action or Project:	Ash Grove Sirens
Mitigation Category:	Prevention; Structure and Infrastructure
Estimated Cost:	\$50,000-\$150,000
Benefits:	Ensure timely notification to all citizens during sever weather events and emergencies; and prevent loss of lives.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD
Supporting Organization/Department:	Springfield-Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New and On Going
Report of Progress:	Conducting research. Submitted HMGP NOI

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: To protect the lives of Ash Grove citizens from all hazards that may affect the area.

Action 1: Secure funding and build a community safe room and hardened structure for Emergency Management and Public Safety Operations.

Action 2: Research grants and other funding sources to build emergency community safe rooms, large enough to temporarily house citizens.

Action 3: Build FEMA approved emergency safe rooms for citizens to take protective cover in, and provide temporary sheltering during any emergency.

Action 4: Incorporate local public safety department and emergency operations center into hardened facilities connected of the community safe room.

Action 5: Ensure adequate water, equipment and supplies are stored in facilities that will sustain first responders and citizens during and immediately after a disaster.

Action 6: Develop backup systems for utilities and communications, ensuring facilities capability during a disaster and public safety responders can continue to offer life assisting/saving services to the citizens of the city.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All hazards
Problem being Mitigated:	The community of Ash Grove is lacking a community shelter and safe room to be used in any emergency.
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 2
Name of Action or Project:	City of Ash Grove Shelter
Mitigation Category:	Emergency Services; Structure and Infrastructure
Estimated Cost:	\$2,000,000
Benefits:	Save lives of first responders and citizens. Ensure emergency services and Emergency Operations Center capabilities can safely be maintained.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City Ash Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New-On-going
Report of Progress:	Conducting initial research. Submitted HMGP Notice of Interest

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: Reduce the City of Ash Grove’s vulnerability to disasters by 50% over the next 5 years.

Action 1: Develop and implement public education and awareness programs and activities that focus on the prevention and mitigation of natural and manmade hazards their consequences, and the steps that can be taken to reduce risk.

Action 2: Distribute brochures and related materials to inform property owners about projects they can accomplish to make their residential and commercial properties disaster resistant.

Action 3: Promote hazard mitigation awareness and education

Action 4: Promote an awareness campaign regarding safety measures and preparation actions for specific hazards to target populations; severe winter storms, heat, tornadoes.

Action 5: Develop comprehensive workshops to be conducted for elected officials, business owners, and other community leaders on hazard mitigation programs and activities.

Action 6: Increase local business ability to expedite business resumption following a disaster

Action 7: Develop incentive programs for citizens, business and industry to pursue hazards mitigation projects.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All hazards
Problem being Mitigated:	The City of Ash Grove currently lacks public education that can be extremely useful in times of disasters
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 3
Name of Action or Project:	City of Ash Grove Education
Mitigation Category:	Education; Outreach
Estimated Cost:	\$5,000
Benefits:	Increase public education and survivability from disasters.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Ongoing, Continuous
Report of Progress:	Started with FEMA Produced literature

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: Reduce the City of Ash Grove’s Vulnerability of Human-Caused Hazards and disasters by 50% over the next 5 years.

Action 1: Develop and implement mitigation measures focusing on governmental infrastructure improvements, retrofits, and additions.

Action 2: Develop and implement policies and training programs regarding infrastructure security and safety.

Action 3: Install locking, alarm, and security devices to improve physical security of municipal facilities and structures.

Action 4: Retrofit municipal buildings with structural components to prevent unapproved entry.

Action 5: Continue to develop procedural systems to reduce risk of targeted violence, cyber, and other human caused hazards to municipal facilities.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Human Caused Hazards
Problem being Mitigated:	Infrastructure Security
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 4
Name of Action or Project:	Ash Grove Human Caused Vulnerability
Mitigation Category:	Structure and Infrastructure
Estimated Cost:	\$150,000
Benefits:	Protect lives, maintain municipal services and utilities. Safeguard private personal information of citizens.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: Enhance and strengthen emergency services preparedness and response by the development and linking emergency services with hazard mitigation programs.

Action 1: Develop a local Community Emergency Response Team (CERT) for Ash Grove and promote the CERT concept

Action 2: Work with neighborhood groups, non-profit organizations, business and industry to establish response teams.

Action 3: Enhance and strengthen emergency services preparedness and response by linking emergency services with hazard mitigation programs.

Action 4: Improve the efficiency, timing and effectiveness of response and recover efforts during times of disaster.

Action 5: Improve communication capabilities with all Ash Grove municipal departments and emergency services departments. Improve communication capabilities throughout the region and mutual aid area.

Action 6: Establish a mobile Emergency Communications Center/Command Post with necessary communication equipment.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Lack of trained personnel, equipment needs.
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 5
Name of Action or Project:	Ash Grove Training
Mitigation Category:	Emergency Services
Estimated Cost:	\$75,000
Benefits:	Protect life and property
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: Reduce the potential damage caused by flooding likely to strike the local area by 50%.

Action 1: Reduce the vulnerability of flooding damage to existing private and public structures.

Action 2: Conduct a citywide analysis of the sewer system, assessing for causes of sanitary sewer overflows and caused during flooding events.

Action 3: Create a financial and intervention plan for reducing risk for sanitary sewers overflowing during flooding vents as recognized by sewer system analysis.

Action 4: Promote environmentally sound watershed and stormwater practices to decrease flash flooding.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Infrastructures issue due to stormwater and flooding.
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 6
Name of Action or Project:	Ash Grove Flooding
Mitigation Category:	Structure and Infrastructure projects
Estimated Cost:	\$75,000
Benefits:	Reduce sanitary sewer overflows caused by flooding and water infiltration
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Smoke testing and camera reviews of system are underway

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: Reduce the City of Ash Grove’s vulnerability to extreme heat by 50% over the next 1-3 Years.

Action 1: Reduce vulnerability of population with increased risk to medical complications secondary to extreme heat.

Action 2: Search and identify all local citizens that have an increased risk factor for medical complications.

Action 3: Identify adequate locations to develop Community Shelters to be used during extreme heat, and similar emergencies.

Action 4: Create a volunteer program that can assist in monitoring the vulnerable population identified, provide assistance with opening and monitoring shelters.

Action 5: Consult with local office of the American Red Cross and other organizations to help research and organize shelter needs, and operational guidelines.

Action 6: Support annual campaign advertisement for Extreme Heat awareness.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Extreme Heat
Problem being Mitigated:	Heath related illnesses and issued related to extreme heat are constant issues during the Greene County summers
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 7
Name of Action or Project:	Ash Grove Extreme Heat
Mitigation Category:	Prevention
Estimated Cost:	\$5,000
Benefits:	Increase life safety for medically compromised citizens
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: Reduce the City of Ash Grove’s vulnerability to disasters by 50% over the next 5 years.

Action 1: Identify primary and secondary emergency snow routes to be maintained during severe weather conditions. Establish policy and procedures for maintaining these routes.

Action 2: Establish an interdepartmental communications system for Ash Grove Emergency Management, Ash Grove Police Department, Ash Grove Fire Protection District, Ash Grove Public Works, and Ash Grove City Hall.

Action 3: Enhance strategies for post-disaster debris management.

Action 4: Increase the ability of city staff to maintain operations during emergencies.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Infrastructure issues related to Ash Grove Public Works
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 8
Name of Action or Project:	Ash Grove Public Works
Mitigation Category:	Infrastructure Improvements
Estimated Cost:	\$5,000
Benefits:	Reduce risk to personnel and citizens and decrease recovery time.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: To protect travel through Ash Grove.

Action 1: Develop a plan for the replacement of flood-damaged bridge on Brookside, which is currently unsafe for use by emergency and utility vehicles.

Action 2: Work in conjunction with Greene County Highway Department for bridge replacement.

Action 3: Replace damaged bridges across the city of Ash Grove.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Dangerous bridges are effecting travel for some emergency and utility vehicles.
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 9
Name of Action or Project:	Ash Grove Training
Mitigation Category:	Emergency Services, Infrastructure and Structure
Estimated Cost:	\$1 Million
Benefits:	Restore ability of safe travel to 6 residences on a dead end street.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD
Supporting Organization/Department:	Greene County Highway Department
Action/Project Priority:	High
Timeline for Completion:	1 Year.
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF ASH GROVE

Goal: Protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	City of Ash Grove Goal 10
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Ash Grove-EMD/ Floodplain administrator
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

work with residents to identify flood prone areas.

4 - MITIGATION STRATEGY

CITY OF BATTLEFIELD

Goal: To increase the ability of City staff to maintain communication during City, County or Regional emergency situations.

Action: Purchase 800 MHz radios for city officials.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The City of Battlefield needs radios to communicate during all hazards.
ACTION OR PROJECT	
Action/Project Number:	City of Battlefield Goal 1
Name of Action or Project:	Battlefield Radios
Mitigation Category:	Emergency Services
Estimated Cost:	\$10,000
Benefits:	Communication with Emergency Services in surrounding area
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Battlefield-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Grant, Local
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	On-going
Report of Progress:	City needs to acquire 1 more radio to complete project

4 - MITIGATION STRATEGY

CITY OF BATTLEFIELD

Goal: To improve storm-warning systems to increase covered area.

Action: Expansion and improvement of Strom Siren coverage area.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Weather and Tornados
Problem being Mitigated:	Improving reliability of storm warning system
ACTION OR PROJECT	
Action/Project Number:	City of Battlefield Goal 2
Name of Action or Project:	Battlefield Storm Sirens
Mitigation Category:	Emergency Services; Prevention; Infrastructure
Estimated Cost:	\$30,000
Benefits:	Increase warning area radius for the citizens of Battlefield
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Battlefield-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	3 years
Potential Fund Sources:	Grants, Internal Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Not Started
Report of Progress:	Not Budgeted. Researching Grant Funding Opportunities

4 - MITIGATION STRATEGY

CITY OF BATTLEFIELD

Goal: To protect the lives of the Battlefield citizens during severe weather.

Action: Construct emergency safe rooms.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Weather, Tornados
Problem being Mitigated:	There is a lack of shelters for citizens of Battlefield during severe weather.
ACTION OR PROJECT	
Action/Project Number:	City of Battlefield Goal 3
Name of Action or Project:	Battlefield Shelters
Mitigation Category:	Infrastructure; Prevention
Estimated Cost:	\$5 Million
Benefits:	Improve Storm readiness and improve public safety capability.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Battlefield-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	Municipal Funding, Governmental Grant Funding, Private Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Not Started, in process of identifying grant funding sources.

4 - MITIGATION STRATEGY

CITY OF BATTLEFIELD

Goal: To enhance stormwater management by improving flood control programs.

Action: Enhance and create stormwater control programs.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Lack of trained personnel, equipment needs.
ACTION OR PROJECT	
Action/Project Number:	City of Battlefield Goal 4
Name of Action or Project:	Battlefield Flood Control Programs
Mitigation Category:	Infrastructure; Prevention
Estimated Cost:	\$1.5 Million
Benefits:	Reduce risk of flooding in Battlefield. Improve control of storm water run-off
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Battlefield-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	5-10 Years
Potential Fund Sources:	Municipal Funds, County Tax, Grant Programs
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Started and continuing
Report of Progress:	Completed phase 1 and 2 of Cloverdale Stormwater project

4 - MITIGATION STRATEGY

CITY OF BATTLEFIELD

Goal: To protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and work with residents to identify flood prone areas.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	City of Battlefield Goal 5
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	EMD/ Floodplain Administrator
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

4 - MITIGATION STRATEGY

CITY OF FAIR GROVE

Goal: To enhance safety for the citizens of Fair Grove.

Action: Replace, add and update storm sirens as needed across the city to protect and warn the citizens when severe weather is in the area.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Tornados
Problem being Mitigated:	Fair Grove is a developing community and as the community grows, the need for storm sirens will grow.
ACTION OR PROJECT	
Action/Project Number:	City of Fair Grove Goal 1
Name of Action or Project:	City of Fair Grove Storm Sirens
Mitigation Category:	Prevention; Structure
Estimated Cost:	\$25,000-\$50,000
Benefits:	Prevention of loss of life and injury to citizens, enhanced warning for the community
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Fair Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Grant, Tax, Local Funds
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF FAIR GROVE

Goal: To protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and work with residents to identify flood prone areas.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	City of Fair Grove Goal 2
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	EMD/ Floodplain Administrator
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

4 - MITIGATION STRATEGY

CITY OF REPUBLIC

Goal: To protect the lives of the people who travel through Republic.

Action: To address and fix the traffic flow at major intersection and collector streets to MO ZZ

RISK / VULNERABILITY	
Hazard(s) Addressed:	All hazards
Problem being Mitigated:	Currently traffic flow on Highway ZZ can be dangerous. There are multiple traffic accidents that occur at all times of the days.
ACTION OR PROJECT	
Action/Project Number:	City of Republic Goal 1
Name of Action or Project:	City of Republic MO ZZ
Mitigation Category:	Prevention
Estimated Cost:	\$30,000
Benefits:	Improve an extremely congested intersection of St 174 and main and the collection streets carrying traffic to MO ZZ, all involving school traffic.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Republic-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	2 Years
Potential Fund Sources:	Grants, Budgets,
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF REPUBLIC

Goal: To protect the lives of walking pedestrians in Republic.

Action: Construct a pedestrian bridge across E. US 60 connecting sidewalks a long Hines St and removing existing crosswalk and lights.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Public Safety
Problem being Mitigated:	Pedestrian traffic is very dangerous along US 60 because of constant traffic traveling in and out of Republic
ACTION OR PROJECT	
Action/Project Number:	City of Republic Goal 2
Name of Action or Project:	Hines St. Pedestrian Bridge
Mitigation Category:	Structure; Infrastructure
Estimated Cost:	\$6,000,000
Benefits:	Safe crossing for school children from multiple campuses and connection of green trails.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Republic-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	3-4 years
Potential Fund Sources:	Possible Grant with Assistance of Capital Improvement
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF REPUBLIC

Goal: To limit the loss of property and injury due to flooding across the Republic area.

Action: Study of relocation of stormwater from 1740 US 60 E to 1000 block of US 60 E.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Stormwater management needs work in the Republic city limits.
ACTION OR PROJECT	
Action/Project Number:	City of Republic Goal 3
Name of Action or Project:	Republic Fore US 60
Mitigation Category:	Prevention
Estimated Cost:	\$25,000
Benefits:	Developing a plan to help the stormwater run off in the area will reduce the flooding at 1740 US 60. This can help prevent injuries and loss of property.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Republic-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	4 Years
Potential Fund Sources:	TBD
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF REPUBLIC

Goal: To protect the lives of citizens traveling through the City of Republic when there is severe flooding in the area.

Action: Retrofit the piping for stormwater management from 500 Block of St. Highway 174 to 400 block of Hines Street.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Stormwater management needs work in the Republic city limits.
ACTION OR PROJECT	
Action/Project Number:	City of Republic Goal 4
Name of Action or Project:	Logan St. Mediation
Mitigation Category:	Structure; Infrastructure
Estimated Cost:	\$140,000
Benefits:	This will allow for further development and alleviated the flooding of Logan St.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Republic-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	3 Years
Potential Fund Sources:	Capital Improvement Money
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF REPUBLIC

Goal: To enhance the public safety and health of the citizens in Republic.

Action: Add a permanent generator at Lift Station 2, which moves wastewater from southwestern portion of City including the new OTC Campus.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Power Outage; Severe Storms; Severe Winter Weather
Problem being Mitigated:	There is not a generator located on the Lift Station 2. Without power, wastewater and sewage cannot be properly pumped out of the Lift Station.
ACTION OR PROJECT	
Action/Project Number:	City of Republic Goal 5
Name of Action or Project:	Lift Station 2 Back Up Power
Mitigation Category:	Structure; Infrastructure Project
Estimated Cost:	\$20,000
Benefits:	Environment protection and allowing Protect in Place during long power loss disruptions such as occurred in 2007.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Republic-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	2 Years
Potential Fund Sources:	Capital Improvement TBD
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF REPUBLIC

Goal: To protect sensitive data against attacks or other cyber incidents.

Action: Replace aging peripheral devices to reduce susceptibility to takeover or invasion of City's Network and development of additional offsite storage and server management.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Cyber
Problem being Mitigated:	Invasive attacks occurring upon the IT network can cause loss of sensitive data and cost the city thousands of dollars.
ACTION OR PROJECT	
Action/Project Number:	City of Republic Goal 6
Name of Action or Project:	Republic Cyber
Mitigation Category:	Prevention
Estimated Cost:	\$30,000
Benefits:	Continuing the operations of the facets of the city.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Republic-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	3 Years
Potential Fund Sources:	Capital Improvement; TBD
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF REPUBLIC

Goal: To protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and work with residents to identify flood prone areas.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	City of Republic Goal 7
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	EMD/ Floodplain Administrator
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

4 - MITIGATION STRATEGY

CITY OF SPRINGFIELD

Goal: To reduce flooding of streets, businesses, and private property to improve safety and quality of life for citizens.

Action: To retrofit areas identified in the action description section of the chart below.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Many residents across the City deal with flooding on a routine basis due to lack of infrastructure, poor development standards, and building practices in the past.
ACTION OR PROJECT	
Action/Project Number:	City of Springfield Goal 1
Name of Action or Project:	To pursue storm water management for identified repetitive loss locations across the City of Springfield.
Mitigation Category:	Structure and Infrastructure Projects.
Action or Project Description:	Priority Projects: Fasnigh Creek by Art Museum (\$2.3 Million) Fasnigh Creek-Jefferson Ave. to Holland Ave. (\$2.8 Million) Renew Jordan Creek from Main Ave. to Boonville Ave. (\$6.5 Million) North Branch Jordan Creek Regional Detention Basin (\$2.7 Million) South Branch Jordan Creek Regional Detention Basin (\$1.1 Million) Rockhurst St. from Patterson Ave. to Cedarbrook Ave. (\$2.8 Million) Any other repetitive loss areas.
Estimated Cost:	See Project Description
Benefits:	Elimination or reduction in flooding to streets and private property.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Public Works Stormwater Engineering Division
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	5 years
Potential Fund Sources:	City's ¼ Cent Capital Improvement Sales Tax, General Fund Sales Tax, Level Property Tax, private donations, and grant funds
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Design has begun on the Fasnigh Creek by Art Museum project and the South Branch Jordan Creek Regional Detention Basin project.

4 - MITIGATION STRATEGY

CITY OF SPRINGFIELD

Goal: To reduce flooding of homes and businesses to improve safety and quality of life for citizens.

Action: To purchase the properties listed in the action description.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Flooding to homes and businesses due to poor development standards and building practices in the past.
ACTION OR PROJECT	
Applicable Goal Statement:	Reduce flooding of homes and businesses to improve safety and quality of life for citizens.
Action/Project Number:	City of Springfield Goal 2
Name of Action or Project:	Voluntary Floodplain Acquisition Program in the City of Springfield.
Mitigation Category:	Prevention
Action or Project Description:	Priority Locations: <ol style="list-style-type: none"> 1. 1200 S. Lone Pine Ave. 2. 1206 S. Lone Pine Ave. 3. 1207 S. Lone Pine Ave. 4. 1212 S. Lone Pine Ave. 5. 2418 E. Catalpa St. 6. 2424 E. Catalpa St. 7. 2430 E. Catalpa St. 8. 532 S. Villa Rose Ave. 9. 713 S. Oak Grove Ave. 10. McCoy Property 11. Any other repetitive loss property
Estimated Cost:	Price will vary by location
Benefits:	Elimination of flooding to homes and businesses.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Public Works Stormwater Engineering Division
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	City's ¼ Cent Capital Improvement Sales Tax, Level Property Tax, and grant funds
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Ongoing (no end date)
Report of Progress:	Add the following properties to the list of flood properties purchased by the City:

4 - MITIGATION STRATEGY

Additional Properties Purchased through Springfield's Voluntary Floodplain Acquisition Program

1.	2719 and 2725 E. Blaine St.	\$15,000	Apr. 2005
2.	417 S. Patterson Ave.	\$105,565	Apr. 2009
3.	3203 E. Topping Circle	\$135,100	Oct. 2009
4.	1333 S. Kentwood Ave.	\$97,744	Dec. 2009
5.	3300 Block of W. Madison St.	\$10,000	June 2010
6.	520 E. Bennett Ave.	\$135,000	July 2010
7.	3352 W. Harrison St.	\$29,000	Aug. 2010
8.	908 E. Edgewood St.	\$128,000	Mar. 2011
9.	2550 W. Chestnut St.	\$9,500	May 2011
10.	1420 W. College St.	\$106,900	July 2011
11.	3342 W. Harrison St.	\$25,500	Dec. 2011
12.	210 E. Bennett Ave.	\$1,279	Sept. 2011
13.	351 N. Boonville Ave.	\$505,000	Apr. 2012
14.	3335 W. State St.	\$25,500	Aug. 2012
15.	1105 S. John Ave.	\$3,900	Sept. 2012
16.	1111 S. John Ave.	\$90,000	Sept. 2012
17.	1112 S. John Ave.	\$80,000	Sept. 2012
18.	606 S. Fairway Ave.	\$85,000	Oct. 2012
19.	1753, 1762, 1763 E. Caravan St.	\$65,100	Oct. 2012
20.	1243 S. Hillcrest Ave.	\$30,000	Nov. 2012
21.	410 E. Bennett Ave.	\$60,000	Dec. 2012
22.	1432 W. College St.	\$68,250	Dec. 2012
23.	3345 W. Madison St.	\$0	Dec. 2012
24.	514 E. Bennett Ave.	\$134,000	Aug. 2013
25.	Campbell/Mill Parking Lot	\$125,000	Aug. 2013
26.	2733 E. Portland St.	\$85,000	July 2013
27.	2244 N. Lyon Ave.	\$60,000	Dec. 2013
28.	2248 N. Lyon Ave.	\$16,000	Dec. 2013
29.	Cherry St. Indus. Park Lot 29	\$0	Apr. 2014
30.	3248 S. Dayton Ave.	Donated	Oct. 2014
31.	1716 E. Carleton St.	\$160,000	Aug. 2014
32.	3425 W. Lombard St.	\$42,000	Dec. 2014
33.	1247 S. Hillcrest Ave.	\$47,000	Feb. 2015
34.	406 E. Bennett Ave.	\$97,500	June 2015
35.	3323 W. State St.	\$665	Nov. 2015
36.	428 E. Bennett Ave.	\$82,000	Dec. 2016
37.	1410 S. Kimbrough Ave.	\$135,000	Dec. 2017
38.	2533 E. Catalpa St.	\$112,000	July 2019

4 - MITIGATION STRATEGY

CITY OF SPRINGFIELD

Goal: To protect the lives of staff members and shelters animals at the Springfield-Greene County Animal Shelter

Action: To relocate the current animal shelter that is in a designated floodplain area to an area that is safe for staff to travel to and work during severe weather and flooding.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding, Communicable Disease (Indirect Affect)
Problem being Mitigated:	Currently, flooding at the animal shelter causes a huge threat to animal shelter staff because the road entering the shelter becomes unpassable during heavy rains. Animals have been found swimming in the shelter due to water entering the shelter and staff not being able to get to them safely. The water is easily contaminated and can cause communicable diseases in animals that can be passed to humans as well.
ACTION OR PROJECT	
Action/Project Number:	City of Springfield Goal 3
Name of Action or Project:	Springfield-Greene County Animal Shelter
Mitigation Category:	Prevention
Estimated Cost:	\$560,000
Benefits:	Employee and animal safety, prevention of communicable disease from contaminated water, decreased risk for infected animals to escape
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Springfield Health Department
Supporting Organization/Department:	Greene County
Action/Project Priority:	High
Timeline for Completion:	3-4 years
Potential Fund Sources:	City of Springfield and Greene County Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF SPRINGFIELD

Goal: To enhance the capability of providing the community with a large shelter that could be used during any disaster.

Action: Purchase a large generator to supply power to the Jordan Valley Ice Park.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The Parks Department owns a large recreational building that is a great location for a community shelter. (Sleeping areas, restrooms, showers, food service, recreation, etc.) The ice park currently does not have a generator and in the past, the shelter had to be shut down during a large ice storm because the building lost power.
ACTION OR PROJECT	
Action/Project Number:	City of Springfield Goal 4
Name of Action or Project:	Jordan Valley Ice Park Generator
Mitigation Category:	Prevention, Structure and Infrastructure Projects
Estimated Cost:	\$400,000
Benefits:	Create a large, centrally located shelter for Greene County Citizens. If the Ice Park had a generator, the Ice Park could be used as a back-up morgue for mass causality incidents. A power outage during extreme heat situations could lead to the ice melting and flooding (thousands of gallons of water) causing over \$100,000 in damages.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Parks Department
Supporting Organization/Department:	City of Springfield and Greene County
Action/Project Priority:	High
Timeline for Completion:	2-4 Years
Potential Fund Sources:	Budget from Parks Department, City of Springfield and Greene County
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

CITY OF SPRINGFIELD

Goal: To protect the lives of the Parks Department staff and visitors/citizens of the Springfield-Greene County Parks

Action: Build a FEMA Safe Room on property owned by the Parks Department.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms
Problem being Mitigated:	Many of the parks in Springfield-Greene County are left without shelter during severe weather incidents. The parks department also staffs approximately 300 people who are left without proper shelter during severe weather.
ACTION OR PROJECT	
Action/Project Number:	City of Springfield Goal 5
Name of Action or Project:	Parks Department Storm Shelter
Mitigation Category:	Prevention
Estimated Cost:	1.5 Million
Benefits:	Staff and community lives, multi-purpose community room, prevention of injuries
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Parks Department
Supporting Organization/Department:	City of Springfield and Greene County
Action/Project Priority:	Medium
Timeline for Completion:	4-5 Years
Potential Fund Sources:	Budget from Parks Department, City of Springfield and Greene County, Tax
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

CITY OF SPRINGFIELD

Goal: To protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and work with residents to identify flood prone areas.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	City of Springfield Goal 6
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	EMD/ Floodplain Administrator
Supporting Organization/Department:	Springfield-Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

4 - MITIGATION STRATEGY

CITY OF STRAFFORD

Goal: To limit the loss of life and injury Stafford citizens during severe storms

Action: Replace, update and add storm sirens throughout the city to better serve the community during severe weather.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornado, Severe Storms
Problem being Mitigated:	The City of Stafford currently has outdated storm sirens than need to be replaced, the city also is growing and needs more sirens added for expanded coverage.
ACTION OR PROJECT	
Action/Project Number:	Stafford Goal 1
Name of Action or Project:	Stafford Schools Storm Sirens
Mitigation Category:	Infrastructure
Estimated Cost:	\$50,000-100,000
Benefits:	More updated sirens will be beneficial to the citizens with storm warning and notification. This could save lives and prevent injuries during severe weather.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Stafford Emergency Manager
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	Grant, Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

CITY OF STRAFFORD

Goal: To protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and work with residents to identify flood prone areas.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	Strafford Goal 2
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	EMD/ Floodplain Administrator
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

4 - MITIGATION STRATEGY

CITY OF WALNUT GROVE

Goal: To protect the lives of the citizens of the City of Walnut Grove.

Action 1: Promote hazard mitigation awareness and education by providing a quarterly newsletters with information on hazards.

Action 2: Host yearly emergency awareness meeting for citizens to gain information and ask questions.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The citizens of Walnut Grove currently don't have on-going information on hazard.
ACTION OR PROJECT	
Action/Project Number:	City of Walnut Grove Goal 1
Name of Action or Project:	City of Walnut Grove Mitigation Awareness
Mitigation Category:	Education
Estimated Cost:	Low Cost Expected
Benefits:	Having continuous education will keep the citizens of Walnut Grove up to date on the hazards their community is at risk for. By keeping a community education, it makes them more resilient to disasters.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Walnut Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	Budget, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	On-Going
Report of Progress:	

4 - MITIGATION STRATEGY

CITY OF WALNUT GROVE

Goal: To enhance the building stability of the Municipal complex.

Action: Add measures and structural modifications to increase municipal complex's ability to withstand disaster events and serve as both an EOC and warming/post event shelter for displaced.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The current municipal complex could use more protective measures to remain operational at all times.
ACTION OR PROJECT	
Action/Project Number:	City of Walnut Grove Goal 2
Name of Action or Project:	City of Walnut Grove Municipal Complex
Mitigation Category:	Infrastructure
Estimated Cost:	Researching
Benefits:	By enhancing the municipal complex's structures, it gives the community a functional EOC that can be used during times of disasters.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Walnut Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	3-5 Years
Potential Fund Sources:	Budget, Local Funds, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF WALNUT GROVE

Goal: To improve the response efforts of the Public Works Department during tornado and high wind events.

Action: To provide proper equipment to the Public Works Department including a backhoes and hauling trailers.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The Public Works Department needs the proper equipment to make response to disaster events more efficiently.
ACTION OR PROJECT	
Action/Project Number:	City of Walnut Grove Goal 3
Name of Action or Project:	Public Works Equipment
Mitigation Category:	Other
Estimated Cost:	Unknown
Benefits:	Enhance the response of the Walnut Grove community when public works response is needed.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Walnut Grove-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	3-5 Years
Potential Fund Sources:	Budget, Local Funds, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

CITY OF WALNUT GROVE

Goal: To protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and work with residents to identify flood prone areas.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	City of Walnut Grove 4
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	EMD/ Floodplain Administrator
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

4 - MITIGATION STRATEGY

CITY OF WILLARD

Goal: To maintain the Willard Storm Sirens and purchase more sirens for the community.

Action: Develop a new standard operation procedure for maintaining the inspection of sirens. Research funding opportunities for updating sirens in the future.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	There currently is a need for more and updated sirens in the Willard area.
ACTION OR PROJECT	
Action/Project Number:	City of Willard Goal 1
Name of Action or Project:	Willard Storm Sirens
Mitigation Category:	Prevention
Estimated Cost:	\$1500.00 per year
Benefits:	Ensuring timely notification of severe weather to all citizens.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Willard, Emergency Management
Supporting Organization/Department:	Springfield-Greene County Office of Emergency Management
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Begin maintenance schedule and research

4 - MITIGATION STRATEGY

CITY OF WILLARD

Goal: To create and develop flood control programs for the City of Willard.

Action: To develop and implement mitigation measures that focus on building, modifying, or retrofitting buildings and other structures to minimize the effect of natural hazards on them and their occupants.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Stormwater runoff into residential areas.
ACTION OR PROJECT	
Action/Project Number:	City of Willard Goal 2
Name of Action or Project:	Willard Stormwater Management
Mitigation Category:	Structures and Infrastructure Projects
Estimated Cost:	\$10,000-\$25,000
Benefits:	Less damage to property and life from flooding
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Public Works
Supporting Organization/Department:	Greene County Highway Department
Action/Project Priority:	Medium
Timeline for Completion:	Continuous
Potential Fund Sources:	Government Program Funds
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing, Not Started
Report of Progress:	Funding

4 - MITIGATION STRATEGY

CITY OF WILLARD

Goal: To reduce the City of Willard’s vulnerability to extreme heat by 50% over the next year.

Action: Reduce vulnerability of population with increased risk to medical complications secondary to extreme heat by purchasing equipment and implementing shelters.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Extreme Heat
Problem being Mitigated:	Heat related illness and other health problems related to extreme heat.
ACTION OR PROJECT	
Action/Project Number:	City of Willard Goal 3
Name of Action or Project:	Willard Heat Related Illness
Mitigation Category:	Prevention
Estimated Cost:	Unknown
Benefits:	Increases safety for medically fragile residents.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	City of Willard, Willard Emergency Management
Supporting Organization/Department:	Willard Fire Protection District
Action/Project Priority:	Medium
Timeline for Completion:	1-3Years
Potential Fund Sources:	Internal
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing, In Progress
Report of Progress:	Updating list, researching more options for cooling stations.

4 - MITIGATION STRATEGY

CITY OF WILLARD

Goal: To reduce the potential damage caused by flooding likely to strike the local area by 50%.

Action: To reduce the vulnerability of flooding damage to existing private and public structures.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Infrastructure issues due to stormwater and flooding
ACTION OR PROJECT	
Action/Project Number:	City of Willard Goal 4
Name of Action or Project:	Willard Stormwater Projects
Mitigation Category:	Structure and Infrastructure
Estimated Cost:	\$100,000
Benefits:	Reduce sanitary sewer overflows
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Public Works
Supporting Organization/Department:	City of Willard
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal, Government Program Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing, In Progress
Report of Progress:	Conducting smoke testing of sewer lines, improving infrastructure.

4 - MITIGATION STRATEGY

CITY OF WILLARD

Goal: To reduce the City of Willard’s vulnerability to tornadoes/severe thunderstorms by 50% over the next 5 years.

Action: Maintain and improve sufficient warning system as growth and development occur.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornados/Severe Thunderstorms
Problem being Mitigated:	Insufficient warnings during severe weather to certain areas.
ACTION OR PROJECT	
Action/Project Number:	City of Willard Goal 5
Name of Action or Project:	Willard Severe Weather Projects
Mitigation Category:	Prevention
Estimated Cost:	Unknown
Benefits:	Increased warning to entire residential areas.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Emergency Management
Supporting Organization/Department:	City of Willard
Action/Project Priority:	Medium
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing, Not Started
Report of Progress:	Lack of Funding available, researching grants

4 - MITIGATION STRATEGY

CITY OF WILLARD

Goal: To reduce the City of Willard’s vulnerability to tornadoes/severe thunderstorms by 50% over the next 5 years.

Action: Increase public education of specific tornado mitigation activities that can be done. Increase amount of homes with a weather alert radio.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornados/Severe Thunderstorms
Problem being Mitigated:	Lack of Public Education
ACTION OR PROJECT	
Action/Project Number:	City of Willard Goal 6
Name of Action or Project:	Willard Public Education
Mitigation Category:	Education and Outreach
Estimated Cost:	\$15,000
Benefits:	Increased public education
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Emergency Management
Supporting Organization/Department:	City of Willard
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Internal Funding, Government Program Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing, In Progress
Report of Progress:	Education Started, Ongoing

4 - MITIGATION STRATEGY

CITY OF WILLARD

Goal: To reduce the City of Willard’s vulnerability to wildfires’ by 50% over the next 5 years.

Action: Improve city-wide fire hydrant capabilities.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Wildfire, Urban Fire
Problem being Mitigated:	Fires to structures and areas
ACTION OR PROJECT	
Action/Project Number:	City of Willard Goal 7
Name of Action or Project:	Willard Wildfire Prevention
Mitigation Category:	Structure and Infrastructure Projects
Estimated Cost:	\$150,000
Benefits:	Reduce risk to residents with improved fire hydrant availability and water pressure
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Public Works
Supporting Organization/Department:	Willard Fire Protection District
Action/Project Priority:	Medium
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Internal Funding, Government Program Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing, In Progress
Report of Progress:	Working with fire on all new developments and future land use.

4 - MITIGATION STRATEGY

CITY OF WILLARD

Goal: To protect the health, safety, and welfare of residents.

Action: Enforce floodplain management ordinances, regulate new construction in SFHA and work with

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Development in floodplain areas
ACTION OR PROJECT	
Action/Project Number:	City of Willard Goal 8
Name of Action or Project:	NFIP Participation
Mitigation Category:	Prevention
Estimated Cost:	\$25,000-\$50,000
Benefits:	Reduce development in SFHA, protect floodplains
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	EMD/ Floodplain Administrator
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Ongoing
Potential Fund Sources:	General Revenue
Local Planning Mechanisms to be Used in Implementation, if any:	Floodplain ordinances
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Ongoing

residents to identify flood prone areas.

4 - MITIGATION STRATEGY

ASH GROVE FIRE PROTECTION DISTRICT

Goal: Reduce the Ash Grove Fire Protection District’s vulnerability to disasters by 50% over the next 5 years.

Action 1: Acquire new apparatus and equipment capable of mitigating wildland fires.

Action 2: Actively seek grants and other funding sources to assist with goals.

Action 3: Property train personnel on use of purchased apparatus and equipment.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Wildland Fire
Problem being Mitigated:	Additional equipment and training will help the Ash Grove Fire Protection District fight wildfires.
ACTION OR PROJECT	
Action/Project Number:	Ash Grove Fire Goal 1
Name of Action or Project:	Ash Grove Fire Protection District Wildfires
Mitigation Category:	Emergency Services; Structure and Infrastructure
Estimated Cost:	\$50,000
Benefits:	Protect the lives of first responders and citizens. Ensure emergency services and capabilities can safely be maintained. Reduce risk to personnel and citizens and decrease property loss.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ash Grove Fire Protection District- EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-3 Years.
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

ASH GROVE FIRE PROTECTION DISTRICT

Goal: Reduce the Ash Grove Fire Protection District’s vulnerability to disaster by 50% over the next 5 years.

Action 1: Acquire new apparatus capable of multi-type rapid response.

Action 2: Actively seek grants and other funding courses to assist with goals.

Action 3: Properly train personnel on use of purchased apparatus and equipment.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The Ash Grove Fire Protection District currently lacks an apparatus that could help with different responses.
ACTION OR PROJECT	
Action/Project Number:	Ash Grove Fire Goal 2
Name of Action or Project:	Ash Grove Training
Mitigation Category:	Emergency Services; Structure and Infrastructure
Estimated Cost:	\$50,000
Benefits:	Protect the lives of first responders and citizens. Ensure emergency services and capabilities can safely be maintained. Increase effectiveness and decrease response times.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ash Grove Fire Protection District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

ASH GROVE FIRE PROTECTION DISTRICT

Goal: To save the lives of responders and citizens and ensure emergency services and EOC can safely be maintained.

Action 1: Research grants and other funding sources to build a new station.

Action 2: Coordinate with local Public Safety departments to explore opportunities of constructing a joint Public Safety Facility and Emergency Operation Center with hardened structure for services, potentially connected to a Community Safe Room.

Action 3: Construct a new Station, ensure adequate water, equipment, and supplies, are stored in facilities that will sustain First Responders during and immediately after a disaster.

Action 4: Develop backup systems for utilities and communications, ensuring facilities capability during a disaster, and public safety responders can continue to offer life assisting/ saving series to the citizens of the district.

Action 5: Increase the ability of departmental personnel to maintain in departmental operations during emergencies.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The Ash Grove Fire Protection District needs a new fire station to enhance response.
ACTION OR PROJECT	
Action/Project Number:	Ash Grove Fire Goal 3
Name of Action or Project:	Ash Grove Station
Mitigation Category:	Emergency Services; structure and infrastructure
Estimated Cost:	\$400,000
Benefits:	Save the lives of first responders and citizens.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ash Grove Fire Protection District-EMD
Supporting Organization/Department:	City of Ash Grove
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

ASH GROVE FIRE PROTECTION DISTRICT

Goal: Reduce the Ash Grove Fire Protection District’s vulnerability to disasters by 50% over the next 5 years.

Action 1: Acquire new or used fire engine.

Action 2: Actively seek grants and other funding sources to assist with goals.

Action 3: Properly train personnel on use of purchases apparatus and equipment.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The Ash Grove Fire Protection District needs a new fire engine for better response.
ACTION OR PROJECT	
Action/Project Number:	Ash Grove Fire Goal 4
Name of Action or Project:	Ash Grove Engine
Mitigation Category:	Emergency Services
Estimated Cost:	\$50,000-\$150,000
Benefits:	Protect lives of first responders and citizens. Ensure emergency services and capabilities can safely be maintained. Reduce risk to personnel and citizens and decrease property loss.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ash Grove Fire Protection District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Internal, Government Program Funding, Private Funding, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

BATTLEFIELD FIRE PROTECTION DISTRICT

Goal: To provide a more modern and useful apparatus for the District.

Action: Build new fire apparatus and create a replacement plan for existing apparatus.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The district is need of a new apparatus that can be more useful for the district and the citizens the district serves.
ACTION OR PROJECT	
Action/Project Number:	Battlefield Fire Goal 1
Name of Action or Project:	Battlefield New Apparatus
Mitigation Category:	Infrastructure
Estimated Cost:	Unknown
Benefits:	Providing additional space to the district
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Battlefield Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Internal, Government Program Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	In Progress
Report of Progress:	90% complete

4 - MITIGATION STRATEGY

BATTLEFIELD FIRE PROTECTION DISTRICT

Goal: To better serve the patrons of the district with quicker response times for emergency calls, and to maintain better district resources.

Action: Acquire more full time staffing for the district.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Currently the district is outgrowing the amount of full time employees that work for the district.
ACTION OR PROJECT	
Action/Project Number:	Battlefield Fire Goal 2
Name of Action or Project:	District Staffing
Mitigation Category:	Response; Emergency Services
Estimated Cost:	Varies
Benefits:	Increasing response times to the citizens of the district, maintaining better district resources.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Battlefield Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	5-10 Years
Potential Fund Sources:	Internal, Government Program Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	On-going
Report of Progress:	90%

4 - MITIGATION STRATEGY

EBENEZER FIRE PROTECTION DISTRICT

Goal: To limit the time spent during an outage and therefore ensure enhances response to emergencies.

Action: Purchase and place a 14K Generac at Station 2 and a 20k at Station 6 for use during natural disaster and Emergency Operations Centers.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Severe Winter Weather, Non-Weather Related Incidents
Problem being Mitigated:	Prolonged power outages to critical fire stations place throughout Greene County.
ACTION OR PROJECT	
Action/Project Number:	Ebenezer Fire Goal 1
Name of Action or Project:	Station Generators
Mitigation Category:	Prevention, Response
Estimated Cost:	\$15,000
Benefits:	Prolonged fire/rescue operations, health/wellness for citizens, EOC/IC posts.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ebenezer Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	Fire District Budget
Local Planning Mechanisms to be Used in Implementation, if any:	
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

EBENEZER FIRE PROTECTION DISTRICT

Goal: To limit loss of life and injury to swift water and flood emergencies.

Action: Certify all fire fighters to at least the operations level, Certify 8 to the Tech level and purchase 1 Zodiac boats. Also purchase more ropes and other water rescue equipment.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Swiftwater/Flood Emergencies
Problem being Mitigated:	Swiftwater deaths/disability and entrapment
ACTION OR PROJECT	
Action/Project Number:	Ebenezer Fire Goal 2
Name of Action or Project:	Ebenezer Water Rescue Team
Mitigation Category:	Prevention and Emergency Services
Estimated Cost:	\$45,000
Benefits:	Preservation of life
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ebenezer Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	2-4 Years
Potential Fund Sources:	Ebenezer Fire Protection District Budget, RHSOC
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

EBENEZER FIRE PROTECTION DISTRICT

Goal: To enhance storm warning systems in Northern Greene County.

Action: Strategically place storm sirens located in Ebenezer Fire Protection District that are currently lacking warning systems.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms (Including High Wind), Tornados
Problem being Mitigated:	Northern Greene County currently lacks warning systems. Providing warning siren to these citizens would benefit the fire district and citizens residing in the areas.
ACTION OR PROJECT	
Action/Project Number:	Ebenezer Fire Goal 3
Name of Action or Project:	Ebenezer Storm Sirens
Mitigation Category:	Prevention/Emergency Services
Estimated Cost:	\$10,000 each
Benefits:	Increased warning for residents, prevention of loss of life and injury
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ebenezer Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	
Action/Project Priority:	Medium
Timeline for Completion:	2-3 years from funding
Potential Fund Sources:	Budget, Greene County, Tax
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

EBENEZER FIRE PROTECTION DISTRICT

Goal: To protect the lives of the Ebenezer Fire Protection District and the citizens they serve during severe weather and tornados.

Action: Incorporate a storm shelter in the new station 6.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Tornados
Problem being Mitigated:	Currently many areas in Greene County are lacking appropriate shelter for citizens and fire fighters to use as protection during severe storms and tornados.
ACTION OR PROJECT	
Action/Project Number:	Ebenezer Fire Goal 4
Name of Action or Project:	Ebenezer Storm Shelter
Mitigation Category:	Prevention
Estimated Cost:	\$20,000
Benefits:	Reduce loss of life and injury due to storms
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ebenezer Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	5 years
Potential Fund Sources:	AFG or RHSOC, Tax, Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Land has been purchased for new station.

4 - MITIGATION STRATEGY

EBENEZER FIRE PROTECTION DISTRICT

Goal: To enhance emergency response by accessing appropriate equipment faster, also to protect the lives of the Ebenezer Fire Protection District and the residents they serve by providing appropriate shelter.

Action: To enhance all hazards response by being better located, having more room for trucks/boats/ other equipment, having storm shelters for firefighters and residents, and having an EOC room.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Currently the Ebenezer Fire Protection District lacks space to properly store equipment and vehicles. The district also lacks an Emergency Operations Center to be activated in large scale events and shelters for fire fighters and residents.
ACTION OR PROJECT	
Action/Project Number:	Ebenezer Fire Goal 5
Name of Action or Project:	Ebenezer Headquarters
Mitigation Category:	Structure and Infrastructure
Estimated Cost:	\$2,000,000
Benefits:	Rapid response and enhanced response to all emergencies, better infrastructure for response, protection of lives,
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ebenezer Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	Medium-High
Timeline for Completion:	5 years
Potential Fund Sources:	AFG, RHSOC, tax levy, budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Waiting to build on land that has been purchased.

4 - MITIGATION STRATEGY

EBENEZER FIRE PROTECTION DISTRICT

Goal: To enhance the Ebenezer Fire Protection District equipment housing needs.

Action: Creating an area for equipment housing in the district to help enhance all hazards response.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Rapid Response and Equipment Housing
ACTION OR PROJECT	
Action/Project Number:	Ebenezer Fire Goal 6
Name of Action or Project:	Station Five Remodel
Mitigation Category:	Structure and Infrastructure
Estimated Cost:	\$25,000
Benefits:	Rapid response and enhanced response to all emergencies, better infrastructure for response.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ebenezer Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1 year
Potential Fund Sources:	AFG, budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

FAIR GROVE PUBLIC SCHOOL DISTRICT

Goal: To enhance safety of the school district buildings.

Action: Continue inserting access control points throughout the campus to obtain single point of entrances of the buildings.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Civil Unrest
Problem being Mitigated:	Currently the district does not have single point of entrances to the buildings. This is a safety concern for the students and staff.
ACTION OR PROJECT	
Action/Project Number:	Fair Grove Schools Goal 1
Name of Action or Project:	Fair Grove Schools Access Control
Mitigation Category:	Prevention;
Estimated Cost:	\$15,000
Benefits:	Prolonged fire/rescue operations, health/wellness for citizens, EOC/IC posts.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Fair Grove Public School District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	School District Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

FAIR GROVE PUBLIC SCHOOL DISTRICT

Goal: To ensure the facility and students remain safe during a power outage.

Action: Update, replace and get generators for the schools to help with power outages due to tornados, severe storms and winter weather.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornados, Severe Winter Weather, Severe Storms
Problem being Mitigated:	The district needs new generators for the school districts. The current ones are outdated and could be replaced.
ACTION OR PROJECT	
Action/Project Number:	Fair Grove Schools Goal 2
Name of Action or Project:	Fair Grove School Generators
Mitigation Category:	Prevention;
Estimated Cost:	\$20,000
Benefits:	Updated generators would keep critical infrastructure available for the students and staff during times of power outages. Updated generators would allow the school to be used as a shelter for the students and staff.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Fair Grove Public School District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	School District Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

LOGAN-ROGERSVILLE FIRE PROTECTION DISTRICT

Goal: To keep the fire stations operational during times of severe weather and power outages

Action: Provide all stations within the district with generators to provide back-up power.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Severe Winter Weather, Power Outages
Problem being Mitigated:	Prolonged power outages to critical fire stations placed throughout Greene County.
ACTION OR PROJECT	
Action/Project Number:	LR Fire Goal 1
Name of Action or Project:	Logan-Rogersville Station Generators
Mitigation Category:	Prevention; Infrastructure; Emergency Response
Estimated Cost:	\$15,000-\$25,000
Benefits:	Prolonged fire/rescue operations and health/wellness for citizens
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Logan-Rogersville Fire Protection District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	Budget, grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

LOGAN-ROGERSVILLE FIRE PROTECTION DISTRICT

Goal: To help protect the citizens in the Logan-Rogersville Fire Protection District during tornados and other severe weather.

Action: Provide proper storm sirens in locations that don't have coverage within the Logan-Rogersville Fire District

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Tornados
Problem being Mitigated:	There are areas currently not covered by storm sirens in the Logan-Rogersville Fire Protection District.
ACTION OR PROJECT	
Action/Project Number:	LR Fire Goal 2
Name of Action or Project:	Logan-Rogersville Storm Sirens
Mitigation Category:	Prevention
Estimated Cost:	Varies
Benefits:	Early warning for citizens who currently cannot hear storm sirens, this can lead to citizens being hurt by storms. Extra sirens can protect the lives of citizens in the Logan-Rogersville Fire Protection District.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Logan-Rogersville Fire Protection District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	2-5 Years
Potential Fund Sources:	Fire District Budget, Grants, Local Funds
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

LOGAN-ROGERSVILLE FIRE PROTECTION DISTRICT

Goal: To protect the lives of the Logan-Rogersville Fire Protection District fire fighters and staff during severe weather and tornados.

Action: Provide a tornado shelter for the fire fighters and staff during times of severe weather and/or tornados

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Tornados
Problem being Mitigated:	The staff of the Logan-Rogersville Fire Protection District currently does not have proper sheltering during times of severe weather.
ACTION OR PROJECT	
Action/Project Number:	LR Fire Goal 3
Name of Action or Project:	Logan-Rogersville Fire Protection District Shelter
Mitigation Category:	Infrastructure; Prevention
Estimated Cost:	Unknown
Benefits:	Protection of lives during severe storms
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Logan-Rogersville Fire Protection District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	3-5 Years
Potential Fund Sources:	Budget, Local Funds, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

LOGAN-ROGERSVILLE FIRE PROTECTION DISTRICT

Goal: To enhance training for the staff of the Logan-Rogersville Fire Protection District.

Action: Build a training facility that includes a training tower and other vital training resources.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The staff of the Logan-Rogersville Fire Protection District currently needs more training resources to make staff more prepared and trained for calls they may respond too.
ACTION OR PROJECT	
Action/Project Number:	LR Fire Goal 4
Name of Action or Project:	Logan-Rogersville Fire Protection District Training Improvements
Mitigation Category:	Training; Prevention
Estimated Cost:	Cost varies by project
Benefits:	Enhanced training leads to better response to the citizens of the district.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Logan-Rogersville Fire Protection District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	3-5 Years
Potential Fund Sources:	Budget, Local Funds, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

WALNUT GOVE FIRE PROTECTION DISTRICT

Goal: To ensure the continued protection of the public by limiting the loss of normal operations.

Action: Purchase generators large enough to power fire stations in the Walnut Grove Fire Protection District when severe weather is in the area.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Thunderstorms, Severe Winter Weather
Problem being Mitigated:	Power Outages to fire stations.
ACTION OR PROJECT	
Action/Project Number:	Walnut Grove Fire Goal 1
Name of Action or Project:	Generators for Walnut Grove Fire Protection District
Mitigation Category:	Prevention Systems Protection; Emergency Services
Estimated Cost:	\$27,000.00
Benefits:	No disruption in emergency response
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Walnut Grove Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	Within the next 12 months
Potential Fund Sources:	Fire Department Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New (in process of finding funds)
Report of Progress:	Trying to adjust budget to purchase Generator

4 - MITIGATION STRATEGY

WILLARD FIRE PROTECTION DISTRICT

Goal: To enhance emergency response by replacing the aging districts fleet.

Action: Design a new engine to replace the 2016 model, moving the 2016 to another station and retiring a 2001 model.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Many of the district fleet reserve engines are approaching the 20 year mark and need to be replaced
ACTION OR PROJECT	
Action/Project Number:	Willard Fire 1
Name of Action or Project:	WFPD Fleet
Mitigation Category:	Infrastructure; Emergency Response
Estimated Cost:	\$600,000
Benefits:	Continuation of Emergency Services
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Fire Protection District
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	2 Years
Potential Fund Sources:	General Funding, Loan
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

WILLARD FIRE PROTECTION DISTRICT

Goal: To continue rapid response by providing the district with new SCBS's district wide.

Action: Replace SCBA's and spare bottle before full expiration date is reached. Purchase compressor to fill bottles.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Self-Contained Breathing Apparatus (SCBA) are at the end of service life and need to be replaced.
ACTION OR PROJECT	
Action/Project Number:	Willard Fire 2
Name of Action or Project:	Willard Fire Protection District SCBA
Mitigation Category:	Emergency Services
Estimated Cost:	\$350,000
Benefits:	Continuation of fire suppression services
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	2 Years
Potential Fund Sources:	Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

WILLARD FIRE PROTECTION DISTRICT

Goal: To enhance communications within the Willard Fire Protection District.

Action: Upgrade all portable and mobile radios to P25 status as well as purchase a radio capable of using multiband and MOSWIN.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Switch over to P25 System
ACTION OR PROJECT	
Action/Project Number:	Willard Fire 3
Name of Action or Project:	WFPD Radio Upgrades
Mitigation Category:	Infrastructure
Estimated Cost:	\$50,000
Benefits:	Continue to communicate with dispatch and surrounding agencies
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	1 ½ Years
Potential Fund Sources:	General Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

WILLARD FIRE PROTECTION DISTRICT

Goal: to protect and limit loss thru decreased response times.

Action: Staff Station 2 with 6 firefighters, 2 per shift.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Currently, the fire district lacks staffing causing higher response times in District 2.
ACTION OR PROJECT	
Action/Project Number:	Willard Fire 4
Name of Action or Project:	Willard Fire Protection District Staffing
Mitigation Category:	Emergency Services
Estimated Cost:	\$270,000
Benefits:	Decrease response time by providing 24 hour staffing.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1 Year
Potential Fund Sources:	Grant Funding, General Funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

WILLARD FIRE PROTECTION DISTRICT

Goal: To protect and limit loss of life and injury thru decreased response times.

Action: Build an addition to station 2 to include living quarters.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Currently the Willard Fire Protection District would like to improve response times.
ACTION OR PROJECT	
Action/Project Number:	Willard Fire 5
Name of Action or Project:	WFPD Response Times
Mitigation Category:	Emergency Services; Infrastructure and Structure Projects
Estimated Cost:	\$500,000
Benefits:	Decrease response time to district 2 by providing quarters for 24 hour staffing.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard Fire Protection District-EMD/Fire Chief
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1 Year
Potential Fund Sources:	General Funding, Building Funds, Grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

ASH GROVE PUBLIC SCHOOL DISTRICT

Goal: To provide safety and security for the students, facility and/or citizens of the Ash Grove community.

Action: Build a FEMA Shelter that would also serve as a gym at one of the Ash Grove Schools.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Tornado
Problem being Mitigated:	There is a lack of shelter in case of a natural disaster in our area. A FEMA Shelter would provide safety and security for the students and residents of Ash Grove.
ACTION OR PROJECT	
Action/Project Number:	Ash Grove Schools Goal 1
Name of Action or Project:	Ash Grove Schools Storm Shelter
Mitigation Category:	Prevention; Structure and Infrastructure Projects
Estimated Cost:	\$500,000-\$1 Million
Benefits:	The benefit of a FEMA shelter would be to help save lives. Our area has had numerous tornados and severe storms come through just in the last year.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ash Grove School District-EMD/Superintendent
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	2 Years
Potential Fund Sources:	Local district Funding, grant funding, federal funding
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching Ideas

4 - MITIGATION STRATEGY

FAIR GROVE PUBLIC SCHOOL DISTRICT

Goal: To enhance safety of the school district buildings.

Action: Continue inserting access control points throughout the campus to obtain single point of entrances of the buildings.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Civil Unrest
Problem being Mitigated:	Currently the district does not have single point of entrances to the buildings. This is a safety concern for the students and staff.
ACTION OR PROJECT	
Action/Project Number:	Fair Grove Schools Goal 1
Name of Action or Project:	Fair Grove Schools Access Control
Mitigation Category:	Prevention;
Estimated Cost:	\$15,000
Benefits:	Prolonged fire/rescue operations, health/wellness for citizens, EOC/IC posts.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Fair Grove Public School District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	School District Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

FAIR GROVE PUBLIC SCHOOL DISTRICT

Goal: To ensure the facility and students remain safe during a power outage.

Action: Update, replace and get generators for the schools to help with power outages due to tornados, severe storms and winter weather.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornados, Severe Winter Weather, Severe Storms
Problem being Mitigated:	The district needs new generators for the school districts. The current ones are outdated and could be replaced.
ACTION OR PROJECT	
Action/Project Number:	Fair Grove Schools Goal 2
Name of Action or Project:	Fair Grove School Generators
Mitigation Category:	Prevention;
Estimated Cost:	\$20,000
Benefits:	Updated generators would keep critical infrastructure available for the students and staff during times of power outages. Updated generators would allow the school to be used as a shelter for the students and staff.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Fair Grove Public School District-EMD
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	School District Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research

4 - MITIGATION STRATEGY

REPUBLIC SCHOOL DISTRICT

Goal: To limit the loss of life and injury to students and staff of the district during a tornado or straight line wind event.

Action: Build a high wind structure that will be attached to Schofield Elementary School.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornado
Problem being Mitigated:	The Republic, MO area is often in the path of tornados. A high wind shelter would help reduce the loss of life and injury to the students and staff of the district.
ACTION OR PROJECT	
Action/Project Number:	Republic Schools Goal 1
Name of Action or Project:	Schofield High Wind Shelter
Mitigation Category:	Structure Project
Estimated Cost:	\$1.8 Million
Benefits:	The structure will help avoid the loss of life and reduce injuries of the students and staff of the Republic School District.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Republic School District, Operations Department, Executive Director of Operations
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Fall 2021
Potential Fund Sources:	District Capitol Funds, Grants if available
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

REPUBLIC SCHOOL DISTRICT

Goal: To limit the loss of life and injury to students and staff of the district during a tornado or straight line wind event.

Action: Build a high wind structure that will be attached to the Early Childhood building.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornado
Problem being Mitigated:	The Republic, MO area is often in the path of Tornados. A high wind shelter would help reduce the loss of life and injury to the students and staff of the district.
ACTION OR PROJECT	
Action/Project Number:	Republic Schools Goal 2
Name of Action or Project:	Early Childhood High Wind Shelter
Mitigation Category:	Structure Project
Estimated Cost:	\$1.2 Million
Benefits:	The structure will help avoid the loss of life and reduce injuries of the students and staff of the Republic School District.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Republic School District, Operations Department, Executive Director of Operations
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	Fall 2021
Potential Fund Sources:	District Capitol Funds, Grants if available
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

SPRINGFIELD PUBLIC SCHOOLS

Goal: To protect the lives of the Springfield Public School students and faculty during severe weather and tornado events.

Action: Build FEMA Safe Rooms across the district to protect all students and staff from tornado and severe weather events.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornados, Severe Weather
Problem being Mitigated:	The Springfield Pubic School District is the largest school district in Greene County and serves over 25,000 students. Many of the schools within the district do not have proper sheltering for tornados and severe weather.
ACTION OR PROJECT	
Action/Project Number:	SPS Goal 1
Name of Action or Project:	Springfield Public Schools Shelters
Mitigation Category:	Prevention; Infrastructure Projects
Estimated Cost:	Cost varies depending on student population and location of shelter \$500,000-\$1.5 Million
Benefits:	Saving lives and preventing injury for students and staff during tornado events.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Springfield Public Schools-School Safety
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Tax, Budget, Grant
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Many shelters have been complete, waiting for funding to complete more throughout the district.

4 - MITIGATION STRATEGY

SPRINGFIELD PUBLIC SCHOOLS

Goal: To enhance communications, response and transportation for the district.

Action: Purchase generators that can support the different critical facilities in the district.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The Springfield Public School district is lacking generators in some of their critical facilities which can effect communications, response and transportation of their students.
ACTION OR PROJECT	
Action/Project Number:	SPS Goal 2
Name of Action or Project:	Springfield Public Schools Generators
Mitigation Category:	Prevention
Estimated Cost:	30,000-200,000
Benefits:	Labor costs that are created from large power outages, day to day activities not being disturbed during an outages
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Springfield Public Schools-School Safety
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	3-5 Years
Potential Fund Sources:	Tax, Budget, Grant
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

4 - MITIGATION STRATEGY

SPRINGFIELD PUBLIC SCHOOLS

Goal: To enhance response of facility during weather related events

Action: Purchase weather radios for all schools and essential personnel.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Weather Related Hazards
Problem being Mitigated:	The Springfield Public Schools currently lacks the appropriate amount of weather radios for essential personnel to monitor storms and other weather moving into the area.
ACTION OR PROJECT	
Action/Project Number:	SPS Goal 3
Name of Action or Project:	Springfield Public Schools Radios
Mitigation Category:	Response; Prevention
Estimated Cost:	\$500 each
Benefits:	Preparing the schools for weather events faster by having immediate information on weather events moving into the area.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Springfield Public Schools-School Safety
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	2-3 Years
Potential Fund Sources:	Tax, Budget, Grant
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching, waiting for funding

4 - MITIGATION STRATEGY

SPRINGFIELD PUBLIC SCHOOLS

Goal: To prepare the students and staff members of the Springfield Public School District for all hazards.

Action 1: Continue Safety Audits with Springfield-Greene County Office of Emergency Management.

Action 2: Provide new education and training programs for students and staff members that provide information on all hazards.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The Springfield Public School District serves a large, vulnerable population in Greene County. Public education programs could help prepare students and staff for all hazards Greene County is at risk for.
ACTION OR PROJECT	
Action/Project Number:	SPS Goal 4
Name of Action or Project:	Springfield Public Schools Education
Mitigation Category:	Public Education
Estimated Cost:	\$16,000 (Subject to Change)
Benefits:	Continuous education helps all staff and students be prepared for disasters to help prevent injury and death that disasters can cause. Education helps make disaster resilient communities.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Springfield Public Schools-School Safety
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Tax, Budget, Grant
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	Safety Audits happen yearly, with every school in the district getting an audit every three years.

4 - MITIGATION STRATEGY

SPRINGFIELD PUBLIC SCHOOLS

Goal: To prevent flooding related injuries and damages to Jaret Middle School.

Action: Rebuild and relocate Jaret Middle Schools in an area that does not have flooding issues.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Flooding
Problem being Mitigated:	Jaret Middle School currently has major flooding issues including water coming up in the basement of the school during flooding events.
ACTION OR PROJECT	
Action/Project Number:	SPS Goal 5
Name of Action or Project:	Jaret Middle School Flooding
Mitigation Category:	Structure and Infrastructure Projects
Estimated Cost:	Researching
Benefits:	Preventing flooding related damages and injuries.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Springfield Public Schools-School Safety
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	Tax, Bond, Grant
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Planning

4 - MITIGATION STRATEGY

SPRINGFIELD PUBLIC SCHOOLS

Goal: To prevent cybercrimes and other cyber issues in the Springfield Public School District.

Action 1: Prepare all staff and equipment by using different cyber security methods including:

- Expanding Firewall Services
- Advanced Security Services
- Web Content Filtering
- Spam Filtering
- Anti-Virus Malware
- Mobile Device Management
- Data Loss Prevention
- Encrypted Traffic Inspection
- Multi-Factor authentication
- Cameras
- 800 MHz Radios
- Access Control Notifications

RISK / VULNERABILITY	
Hazard(s) Addressed:	Cyber
Problem being Mitigated:	Springfield Public Schools is at risk for experiencing cyber issues and attacks. The School District would like to make their users and equipment prepared for cyber incidents.
ACTION OR PROJECT	
Action/Project Number:	SPS Goal 6
Name of Action or Project:	Springfield Public Schools Cyber Security
Mitigation Category:	Prevention
Estimated Cost:	Cost varies per program
Benefits:	Prevention of data loss, prevention of viruses on computer, maintaining education procedures for students, labor and equipment costs
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Springfield Public Schools-School Safety
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Tax, Budget, Grant
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Research, Waiting for funding

4 - MITIGATION STRATEGY

STRAFFORD PUBLIC SCHOOL DISTRICT

Goal: To limit the loss of life and injury to students and staff of the district during a tornado or severe storm incident.

Action: Build storms shelters in all of the district's schools for students and faculty to use during tornados and severe storm incidents.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornado, Severe Storms
Problem being Mitigated:	Strafford School District is lacking the proper sheltering for students and faculty during severe storms and tornados.
ACTION OR PROJECT	
Action/Project Number:	Strafford Schools Goal 1
Name of Action or Project:	Strafford Schools Storm Shelter
Mitigation Category:	Structure Project
Estimated Cost:	\$1.5-2 Million
Benefits:	The structure will help avoid the loss of life and reduce injuries of the students and staff of the Strafford School District.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Strafford School District-EMD/Superintendent
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	Grant, Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuing
Report of Progress:	NOI currently submitted

4 - MITIGATION STRATEGY

WALNUT GROVE PUBLIC SCHOOL DISTRICT

Goal: To protect the student and staff during school hours by updating and adding security feature to the school district buildings.

Action 1: Provide funds for the implementation of safety and security measure district-wide.

Action 2: Site development, construction, renovation, equipping and furnishing of a new elementary school classrooms and administration offices

Action 3: Development of a new drop-off/pick-up lane.

Action 4: The replacement of mechanical systems

Action 5: The completion of other remodeling and repair improvements to existing facilities.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Civil Unrest
Problem being Mitigated:	The Walnut Grove School District currently lacks secure vestibules at both the Elementary and High School entrances. This poses a security threat to both the students and staff.
ACTION OR PROJECT	
Action/Project Number:	Walnut Grove Schools Goal 1
Name of Action or Project:	Walnut Grove Secure Entrances
Mitigation Category:	Prevention; Infrastructure Projects;
Estimated Cost:	Cost varies per project
Benefits:	Protection of staff and students from multiple hazards
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Walnut Grove School District-EMD/Superintendent
Supporting Organization/Department:	Sapp Design Architects, Springfield MO
Action/Project Priority:	High
Timeline for Completion:	2 -7 Years
Potential Fund Sources:	\$1.07 operating levy increase per \$100/ Assessed Valuation (\$4.5 Million)
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

WALNUT GROVE PUBLIC SCHOOL DISTRICT

Goal: To protect the students and staff during severe weather by providing a FEMA Safe Room.

Action: Construct a FEMA Safe Room at one of the schools that would protect the students and staff member during severe weather.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Thunderstorms, Tornados
Problem being Mitigated:	The Walnut Grove School District currently lacks proper sheltering for students and staff during severe weather and tornadoes.
ACTION OR PROJECT	
Action/Project Number:	Walnut Grove Schools Goal 2
Name of Action or Project:	Walnut Grove School District Safe Room
Mitigation Category:	Prevention; Infrastructure Projects;
Estimated Cost:	\$1.2 Million
Benefits:	Protection of staff and students from severe weather, prevention of injury, protection of life
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Walnut Grove School District-EMD/Superintendent
Supporting Organization/Department:	Sapp Design Architects, Springfield MO
Action/Project Priority:	High
Timeline for Completion:	2 -7 Years
Potential Fund Sources:	\$1.07 operating levy increase per \$100/ Assessed Valuation (\$4.5 Million)
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

WILLARD PUBLIC SCHOOL DISTRICT

Goal: To provide shelter for the Willard School District Students and faculty during severe storms and tornado events.

Action: Build a FEMA Shelter for the High School Population and other locations as desired.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Tornado, Severe Thunderstorms
Problem being Mitigated:	Currently, The Willard School District does not have adequate shelter for their student population and faculty.
ACTION OR PROJECT	
Action/Project Number:	Willard Schools 1
Name of Action or Project:	Willard Public School District Storm Shelters
Mitigation Category:	Prevention; Structure and Infrastructure Projects
Estimated Cost:	\$1.5-2.0 Million
Benefits:	Protect the student and faculty lives of the schools from frequent storms that occur in the Willard area
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Willard School District-EMD/Superintendent
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-3 Years
Potential Fund Sources:	Budget, Tax, Grants
Local Planning Mechanisms to be Used in Implementation, If any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

MISSOURI STATE UNIVERSITY

Goal: To improve Missouri State University's in-building emergency notification system.

Action 1: Integrate existing fire alarm panels into Mass Notification Systems.

Action 2: Provide Interconnectivity to Public Address Systems.

Action 3: Provide dispatch access to mass notification via voice phones in buildings.

Action 4: Provide dispatch access to mass notifications via video monitors in buildings.

Action 5: Add desk top pop up notifications to Mass Notification System.

Action 6: Create design standards for all new and renovated facilities.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Currently, the in building notification system for students and faculty could be more efficient. By improving the systems for the University students, staff and responders can receive information faster.
ACTION OR PROJECT	
Action/Project Number:	MSU Goal 1
Name of Action or Project:	Missouri State University Safety Awareness Improvements
Mitigation Category:	Prevention; Emergency Services; Awareness
Estimated Cost:	Cost depends on the different objective (Listed in the section above)
Benefits:	Educating the students and staff faster, getting response to the University quicker, providing a safe environment for students and staff
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Missouri State University-Emergency Management Department
Supporting Organization/Department:	None
Action/Project Priority:	Medium-High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Missouri State University Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

MISSOURI STATE UNIVERSITY

Goal: To improve Missouri State University's outside Emergency Notification System.

Action 1: Upgrade/replace outdoor emergency notifications systems.

Action 2: Provide dispatch access to mass notifications via video board systems.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	Currently, the outdoor notification system for students and facility could be more efficient. By improving the systems for the University students, staff and responders can receive information faster.
ACTION OR PROJECT	
Action/Project Number:	MSU Goal 2
Name of Action or Project:	Missouri State University Outdoor Safety Awareness
Mitigation Category:	Prevention; Emergency Services; Awareness
Estimated Cost:	Cost varies (researching)
Benefits:	Educating the students and staff faster, getting response to the University quicker, providing a safe environment for students and staff, providing dispatch with instant information.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Missouri State University-Emergency Management Department
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	3-5 Years
Potential Fund Sources:	Missouri State Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

MISSOURI STATE UNIVERSITY

Goal: To develop and strengthen the Emergency Plans for Missouri State University.

Action 1: Continuous updates of MSU Emergency Operations Plans.

Action 2: Develop Continuity of Operations Plan and Business Continuity Plan.

Action 3: Develop hazard specific response plans.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All Hazards
Problem being Mitigated:	The Missouri State University's Emergency Plans need to be updated on a regular basis in order to be the most efficient. More plans need to be developed to address business continuity and hazard specific response.
ACTION OR PROJECT	
Action/Project Number:	MSU Goal 3
Name of Action or Project:	Missouri State University Emergency Plans
Mitigation Category:	Prevention
Estimated Cost:	Labor costs of staff working on plans.
Benefits:	Emergency plans help prepare students and staff for potential threats, the more specific up to date, the more effective.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Missouri State University-Emergency Management Department
Supporting Organization/Department:	None
Action/Project Priority:	Medium-High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Missouri State University Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	Continuous
Report of Progress:	

4 - MITIGATION STRATEGY

MISSOURI STATE UNIVERSITY

Goal: To develop training opportunities at Missouri State University

Action 1: Provide emergency training to campus community.

Action 2: Develop and revise training curriculum.

Action 3: Incorporate safety training for all new staff/faculty/students.

Action 4: Develop and fill training position in Office of University Safety.

Action 5: Identify mid-campus location for Office of University Safety.

Action 6: Office of University Safety facility to include:

- a) Safety
- b) Springfield Police Substation
- c) Dispatch
- d) Emergency Preparedness
- e) Transportation
- f) Training Facility

RISK / VULNERABILITY	
Hazard(s) Addressed:	All
Problem being Mitigated:	Missouri State University needs to expand their training to become more prepared for disasters and crisis on campus. By adding additional training for staff and students, more of the campus population will be educated in proper procedures when they are needed.
ACTION OR PROJECT	
Action/Project Number:	MSU Goal 4
Name of Action or Project:	Missouri State University Training Opportunities
Mitigation Category:	Prevention
Estimated Cost:	Cost will vary by objective (Listed above)
Benefits:	Enhance the training for Safety and Security staff to be more prepared in times of crisis.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Missouri State University-Emergency Management Department
Supporting Organization/Department:	None
Action/Project Priority:	Medium-High
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Missouri State University Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

MISSOURI STATE UNIVERSITY

Goal: To test Missouri State University's emergency plans to ensure competencies and identify gaps.

Action 1: Annually participate in one county-wide full scale exercise.

Action 2: Annually develop and conduct two campus table-top exercises for Policy Group at MSU.

Action 3: Annually conduct one full-scale exercise including community first responders.

Action 4: Annually conduct at least one exercise at the department level.

Action 5: Create/improve specific facility response plans.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All
Problem being Mitigated:	Missouri State University has many emergency plans to ensure the campus is prepared for many different types of crisis. The University would like to annually test these plans to ensure they are efficient.
ACTION OR PROJECT	
Action/Project Number:	MSU Goal 5
Name of Action or Project:	Missouri State University's Emergency Plans
Mitigation Category:	Prevention; Preparedness; Awareness
Estimated Cost:	Staff Labor Costs
Benefits:	Ensure that campus plans work like they are designed to do. Help prepare students and staff for crisis.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Missouri State University-Emergency Management Department
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	1-5 Years
Potential Fund Sources:	Missouri State University Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

MISSOURI STATE UNIVERSITY

Goal: To identify and establish an Emergency Operation Center on the MSU Campus.

Action 1: Identify needs of an operational EOC.

Action 2: Identify space options on MSU Campus.

Action 3: Identify funding sources for EOC.

Action 4: Implement operation of new EOC.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All
Problem being Mitigated:	Missouri State University is lacking an Emergency Operations Center (EOC) that would be used for multi-agency collaboration during times of crisis.
ACTION OR PROJECT	
Applicable Goal Statement:	To identify and establish and Emergency Operations Center on the MSU Campus.
Action/Project Number:	MSU Goal 6
Name of Action or Project:	Missouri State University EOC
Mitigation Category:	Prevention
Estimated Cost:	Cost would depend on if new infrastructure would have to be built
Benefits:	Centralized place on campus for emergency responders and officials to collaborate in times of disasters or crisis.
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Missouri State University-Emergency Management Department
Supporting Organization/Department:	None
Action/Project Priority:	Medium-High
Timeline for Completion:	1-5 years
Potential Fund Sources:	Missouri State University Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

MISSOURI STATE UNIVERSITY

Goal: To protect the lives of the Missouri State University Students and staff.

Action: Build and establish large safe rooms across the MSU campus for students and staff.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Weather, Tornado
Problem being Mitigated:	A large population on the Missouri State University Springfield Campus do not have a place to properly shelter during severe weather and tornados.
ACTION OR PROJECT	
Action/Project Number:	MSU Goal 7
Name of Action or Project:	Missouri State Safe Rooms
Mitigation Category:	Prevention
Estimated Cost:	Each safe room could vary by cost, depending on the size and location of the shelter. \$500,000-\$1 Million
Benefits:	Protect student and faculty lives
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Missouri State University-Emergency Management Department
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	3-5 Years
Potential Fund Sources:	Missouri State University Budget
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	

4 - MITIGATION STRATEGY

OZARK TECHNICAL COMMUNITY COLLEGE

Goal: To provide backup power to the new Republic Campus when any hazard causes a power-outage.

Action: To purchase generator(s) that would be large enough to power the entire republic campus.

RISK / VULNERABILITY	
Hazard(s) Addressed:	Severe Storms, Tornados, Power Outage
Problem being Mitigated:	OTC is building a campus in Republic that currently does not have back up power in the instance of a power outage.
ACTION OR PROJECT	
Action/Project Number:	OTC Goal 1
Name of Action or Project:	OTC Generators
Mitigation Category:	Prevention; Infrastructure
Estimated Cost:	\$15,000-\$20,000
Benefits:	Stability to continue education when severe storms may affect power, being able to shelter at the campus if needed
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ozark Technical Community College-Safety and Security Department
Supporting Organization/Department:	None
Action/Project Priority:	High
Timeline for Completion:	1-2 Years
Potential Fund Sources:	Budget, grants
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New-Campus is currently being built
Report of Progress:	Research

4 - MITIGATION STRATEGY

OZARK TECHNICAL COMMUNITY COLLEGE

Goal: To create a space for advancement manufacturing

Action: Construct a new Center for Advancement Manufacturing building for the OTC community.

RISK / VULNERABILITY	
Hazard(s) Addressed:	All
Problem being Mitigated:	OTC needs more space for growth
ACTION OR PROJECT	
Action/Project Number:	OTC Goal 2
Name of Action or Project:	OTC CAM Building
Mitigation Category:	Infrastructure
Estimated Cost:	Unknown
Benefits:	Added space for future development of the campus
PLAN FOR IMPLEMENTATION	
Responsible Organization/Department:	Ozark Technical Community College-Safety and Security Department
Supporting Organization/Department:	None
Action/Project Priority:	Medium
Timeline for Completion:	2-5 Years
Potential Fund Sources:	Grants, Budget, General Funds
Local Planning Mechanisms to be Used in Implementation, if any:	None
PROGRESS REPORT	
Action Status:	New
Report of Progress:	Researching

5- PLAN MAINTENANCE PROCESS

5 PLAN MAINTENANCE PROCESS	5.1
5.1 Monitoring, Evaluating, and Updating the Plan	5.1
5.1.1 Responsibility for Plan Maintenance.....	5.1
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5.1.3 Plan Maintenance Process	5.1
5.2 Incorporation into Existing Planning Mechanisms	5.2
5.3 Continued Public Involvement	5.5

This chapter provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

5.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

44 CFR Requirement 201.6 (4): the plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

5.1.1 Responsibility for Plan Maintenance

Each participating jurisdiction will be responsible for updating goals and actions. The Springfield-Greene County Office of Emergency Management’s Senior Planner will request annual updates for goals and actions. The plan will be reviewed and updated annually by the individual jurisdictions and the Springfield-Greene County Office of Emergency Management. When needed, the Mitigation Planning Committee (MPC) can meet to discuss potential changes.

5.1.2 Plan Maintenance Schedule

The MPC will review the plan annually and after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. In coordination with all participating jurisdictions, the Emergency Management director will be responsible for initiation a five-year written update of the plan to be submitted to the Missouri State Emergency Management Agency (SEMA) and FEMA Region VII per Requirement 201.6 (4)(i) of the Disaster Mitigation Act of 2000, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

5.1.3 Plan Maintenance Process

Goals and Actions will be updated annually by each of the participating jurisdictions. This will be done in a live Google Documents workbook. Progress on the proposed action can be monitored by evaluating changes in vulnerabilities identified in the plan. The Mitigation Planning Committee (MPC), during the annual meeting should review changes in vulnerability identified as follows:

- Decreased vulnerability as a result of implementing recommended actions
- Increased vulnerability as a result of failed or ineffective mitigation actions
- Increased vulnerability due to hazards events
- Increased vulnerability as a result of new development (and/or annexation).

5- PLAN MAINTENANCE PROCESS

Future 5-Year updated to this plan will include the following activities:

- Consideration of changes in vulnerability due to action implementation
- Documentation of success stories where mitigation efforts have proven effective
- Documentation of unsuccessful mitigation actions and why the actions were not effective
- Documentation of previously overlooked hazard events that may have occurred since the previous plan approval
- Incorporation of new data or studies with information on hazard risks
- Incorporation of new capabilities or changes in capabilities
- Incorporation of growth data and changes to inventories
- Incorporation of ideas for new actions and changes in action prioritization

Changes will be made to the plan to remedy actions that have failed or are not considered feasible. Feasibility will be determined after a review of action consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well as during monitoring of this plan. Updating of the plan will be accomplished by written changes and submissions, and the MPS deems appropriate and necessary. Changes will be approved by the Springfield-Greene County Office of Emergency Management and the governing boards of the other participating jurisdictions.

5.2 INCORPORATION INTO EXISTING PLANNING MECHANISMS

44 CFR Requirement 201.6 (4)(ii): The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate

Where possible, plan participants, including schools and special districts, will use existing plans and/or programs to implement hazard mitigation actions. Based on the capability assessments of the participating jurisdictions, communities in Greene County will continue to plan and implement programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through the following plans:

- General or master plans of participating jurisdictions
- Ordinances of participating jurisdictions
- Greene County Emergency Operations Plan
- Capital Improvement plans and budgets
- School and Special District Plans and budgets
- Other community plans

The MPC (or designated responsible entity) members involved in updating these existing planning mechanisms will be responsible for integrating the findings and actions of the mitigation plan, as appropriate. The MPC (or designated responsible entity) is also responsible for monitoring this integration and incorporation of the appropriate information into the five-year update of the multi-jurisdictional hazard mitigation plan.

5 - PLAN MAINTENANCE PROCESS

Planning Mechanisms Identified for Integration of the Hazard Mitigation Plan

Jurisdiction	Planning Mechanisms	Integration Process for Previous Plan	Integration Process for Current Plan
Greene County	County Emergency Operations Plan	When updating the EOP, the planning team in OEM worked with the Mitigation Plan to add and update actions into the EOP.	Planning team in OEM will identify new actions that can be added to the next EOP update.
City of Ash Grove	Comprehensive Plan	When updating the Comprehensive plan, City Officials implement development possibilities and use the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.
City of Battlefield	Comprehensive Plan	When updating the Comprehensive plan, City Officials implement development possibilities and use the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.
City of Fair Grove	Comprehensive Plan	When updating the Comprehensive plan, City Officials implement development possibilities and use the Mitigation Plan as a resource.	Identify new development/projects for the comprehensive plan.
City of Republic	Comprehensive Plan	When updating the Comprehensive plan, City Officials implement development possibilities and use the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.
City of Springfield	Comprehensive Plan	When updating the Comprehensive plan, City Officials implement development possibilities and use the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.
City of Strafford	Comprehensive Plan	When updating the Comprehensive plan, City Officials implement development possibilities and use the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.
City of Walnut Grove	Comprehensive Plan	When updating the Comprehensive plan, City Officials implement development possibilities and use the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.
City of Willard	Comprehensive Plan	When updating the Comprehensive plan, City Officials implement development possibilities and use the Mitigation Plan	Identify new development/projects for the next comprehensive plan.

5- PLAN MAINTENANCE PROCESS

		as a resource.	
Ash Grove Fire Protection District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Battlefield Fire Protection District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Ebenezer Fire Protection District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Fair Grove Fire Protection District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Logan-Rogersville Fire Protection District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Strafford Fire Protection District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Walnut Grove Fire Protection District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Willard Fire Protection District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Ash Grove Public School District	Comprehensive School Improvement Plan	When updating the CSIP, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Fair Grove Public School District	Comprehensive School Improvement Plan	When updating the CSIP, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Republic Public School District	Comprehensive School Improvement Plan	When updating the CSIP, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Springfield Public School District	Strategic Plan	When updating the strategic, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Strafford Public School District	Comprehensive Plan	When updating the Comprehensive Plan, the school district used the Mitigation Plan as a resource.	Identify new development/ projects for the next comprehensive plan.
Walnut Grove Public School District	Facility Master Plan	When updating the Facility Master Plan, the school district used the Mitigation	Identify new development/ projects for the next comprehensive plan.

5 - PLAN MAINTENANCE PROCESS

		Plan as a resource.	
Willard Public School District	Strategic Plan	When updating the Strategic, the school district used the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.
Ozark Technical Community College	Strategic Plan	When updating the Strategic Plan, the school district used the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.
Missouri State University	Strategic Plan	When updating the Strategic Plan, the school district used the Mitigation Plan as a resource.	Identify new development/projects for the next comprehensive plan.

5.3 CONTINUED PUBLIC INVOLVEMENT

44 CFR Requirement 201.6 (4)(iii) the plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process.

The hazard mitigation plan update process provides an opportunity for public involvement. Once a year, the public feedback form will be pushed out on social media giving the public an opportunity to share any new hazards that they may be experiencing in their area. All jurisdictions will have the opportunity to use the hazard feedback form for their individual communities as well. Springfield-Greene County Office of Emergency Management has scheduled social media posts for the next 4 years on July 1st requesting for public input. The survey will be open for one month before results are documented. When the MPC reconvenes for the five-year update, it will coordinate with all stakeholders participating in the planning process.

Critical Facilities Inventory: Ash Grove

SCHOOLS			
Ash Grove Elementary	100 N. Maple Ln	Ash Grove	65604
Ash Grove High School	100 N. Maple Ln.	Ash Grove	65604
Bois D'Arc Elementary	10315 W. State Highway T	Bois D'Arc	65612
NURSING HOMES			
Ash Grove Healthcare Facility	401 North Medical Drive, P.O. Box 247	Ash Grove	65604
POLICE			
Ash Grove	100 W. Main	Ash Grove	65604
FIRE			
Ash Grove Fire Protection District	112 N. Pippin Rd.	Ash Grove	65604
CITY GOVERNMENT			
Ash Grove	100 W. Main	Ash Grove	65604
WASTE FACILITIES/RECYCLING CENTERS			
Ash Grove Recycling Center	704 Industrial Dr.	Ash Grove	65604
PLACES OF WORSHIP			
Apostolic Church of Promise	415 E. Walker St.	Ash Grove	65604
Ash Grove Assembly of God Church	411 N. Crestview Avenue	Ash Grove	65604
Ash Grove United Methodist - Presbyterian Church	403 E. Boone St.	Ash Grove	65604
Bible Baptist Church	405 N. Crestview	Ash Grove	65604
Center Baptist Church	5124 N. Farm Road 43	Ash Grove	65604
First Christian Church	211 N. Calhoun P.O Box 366	Ash Grove	65604
Hopewell Baptist Church	21711 Lawrence 2000	Ash Grove	65604
Johns Chapel Fundamental Methodist	2275 N. Farm Rd. 25	Ash Grove	65604
Theotokos Unexpected Joy Orthodox Church	810 W. Woodbine	Ash Grove	65604
United Methodist Presbyterian	403 E. Boone St P.O Box 396	Ash Grove	65604
CHILD CARE AND HEAD STARTS			
Sugar Dumplin's Daycare and Preschool	600 E Wells St.	Ash Grove	65604
Ash Grove Elementary	100 Maple Ln.	Ash Grove	65604
Little Pirates Daycare and Preschool	305 E. Prairie Ln.	Ash Grove	65604
Little Explorer's Daycare	18823 Lawrence 2078	Ash Grove	65604
Vibrancy in Christ	415 E. Walker Stn	Ash Grove	65604
Ash Grove Head Start	117 S. Calhoun	Ash Grove	65604

Critical Facilities Inventory: Battlefield

POLICE			
Battlefield	5434 S. Tower Dr.	Battlefield	65619
FIRE			
Battlefield Fire Protection District	4117 W. Second St.	Battlefield	65619
CITY GOVERNMENT			
Battlefield	5424 S. Tower	Battlefield	65619
PLACES OF WORSHIP			
180 Church	4032 W. Lark St.	Battlefield	65619
Battlefield Assembly of God	5154 State Highway FF	Battlefield	65619
Battlefield United Methodist Church	5475 S. Daniel St.	Battlefield	65619
First Baptist Church of Battlefield	5010 S. State Highway FF	Battlefield	65619
Souled Out Youth Ministries	4852 S. State Highway FF	Battlefield	65619
Wilson Creek Baptist Church	6411 S. Farm Road 115	Battlefield	65619
CHILD CARE AND HEAD STARTS			
Butterflies and Daisies	3501 W Moark St.	Battlefield	65619
Little Angels Learning Academy	4222 W. Sandy	Battlefield	65619
Wilson's Creek 5th/6th Grade	4035 W. Weaver Rf.	Battlefield	65619

Critical Facilities Inventory: Bois D'Arc

FIRE			
Bois D'Arc Fire Protection District	10515 W. State Highway T	Bois D'Arc	65612
PLACES OF WORSHIP			
St. Luke United Methodist	10463 State Highway T	Bois D'Arc	65612
CHILD CARE AND HEAD STARTS			
Bois D'Arc Elementary	10315 W. State Highway T	Bois D'Arc	65612

Critical Facilities Inventory: Brookline

FIRE			
Brookline Fire Protection District	3504 E. Orr St.	Brookline	65619
PLACES OF WORSHIP			
Brookline Church of Christ	3086 N. Brookline Ave.	Brookline	65619
Christ Community Church	4224 S. Farm Road 115	Brookline	65619
Wilson Creek Baptist	6411 S. Farm Road 115	Brookline	65619

Critical Facilities Inventory: Fair Grove

SCHOOLS			
Fair Grove Elementary	132 N. Main St.	Fair Grove	65648
Fair Grove Middle School	132 N. Main St.	Fair Grove	65648
Fair Grove High School	132 N. Main St.	Fair Grove	65648
POLICE			
Fair Grove	81 S. Orchard Blvd.	Fair Grove	65648
FIRE			
Fair Grove Station 2	4242 Missouri KK	Fair Grove	65648
Fair Grove Station 1 Headquarters	340 W. Eagle Ct.	Fair Grove	65648
CITY GOVERNMENT			
Fair Grove	81 S. Orchard	Fair Grove	65648
PLACES OF WORSHIP			
Cedar Bluff Baptist Church	8505 E. State Highway E	Fair Grove	65648
Church of the Redeemer	532 S. Orchard Blvd.	Fair Grove	65648
Community Southern Baptist	4686 State Highway CC	Fair Grove	65648
Fair Grove Assembly of God Church	255 W. Cherry St.	Fair Grove	65648
Fair Grove Baptist Temple	532 S. Orchard Blvd.	Fair Grove	65648
Fair Grove First Baptist	14 E. Maple St.	Fair Grove	65648
Fair Grove United Methodist Church	83 E. Hickory St.	Fair Grove	65648
Faith Freewill Baptist	373 Union Grave Rd.	Fair Grove	65648
Peace Chapel Assembly of God	9260 N. Farm Road 183	Fair Grove	65648
Pleasant Ridge Church	12107 N. Farm Road 221	Fair Grove	65648
CHILD CARE AND HEAD STARTS			
A Lil Nature At K's, LLC	7308 Farm Road 197	Fair Grove	65648
Fair Grove Head Start	103 N. Main	Fair Grove	65648
The Little School, LLC	163 W. Saddle Club Rd.	Fair Grove	65648

Critical Facilities Inventory: Republic

SCHOOLS			
Sweeny Elementary	720 N. Main St.	Republic	65738
Lyon Elementary	201 E. Highway 174	Republic	65738
Moculloch Elementary	234 E. Anderson St.	Republic	65738
Price Elementary	518 N. Hampton St.	Republic	65738
Schofield Elementary	253 E. Anderson St.	Republic	65738
Republic Middle School	#1 Tiger Dr.	Republic	65738
Republic High School	4370 Repmo Dr.	Republic	65738
NURSING HOMES			
Bristol Manor of Republic	634 East Highway 174	Republic	65738
Republic Nursing and Rehab	901 East Highway 174	Republic	65738
Sunshine Manor	300 South Cottonwood Ave.	Republic	65738
POLICE			
Republic Police Department	540 W. Civic Blvd	Republic	65738
FIRE			
Republic Fire Department	701 U.S. Highway 60 E	Republic	65738
West Republic Fire Protection District	11088 W. Farm Road 168	Republic	65738
CITY GOVERNMENT			
Republic City Hall	213 N. Main St.	Republic	65738
PLACES OF WORSHIP			
Bible Baptist Church	227 E. Brooks St.	Republic	65738
Anchor Baptist Church	210 N. Main St.	Republic	65738
Calvary Baptist	804 U.S 60	Republic	65738
Calvary Chapel Republic	210 E. Hines St.	Republic	65738
Crosspoint Fellowship	1664 U.S 60	Republic	65738
Destiny Church	526 E. Harrison St	Republic	65738
First Baptist Church of Republic	305 N. Main St.	Republic	65738
First Christian Church	443 N. Main St.	Republic	65738
Hood United Methodist	139 N. Walnut Ave.	Republic	65738
Hope Lutheran	218 MO-174	Republic	65738
Liberty Faith Church of God	830 MO-174	Republic	65738
Live Church	1244 U.S. 60	Republic	65738
New horizon Seventh-Day Adventist	4421 S. Farm Road 85	Republic	65738
Republic Assembly of God	341 U.S. Highway 60 West	Republic	65738
Republic Church of Christ	323 E. Harrison St.	Republic	65738

Republic Church of the Nazarene	1003 E. Harrison St.	Republic	65738
Republic Family Church	317 N. Walnut Ave.	Republic	65738
Republic Free Will Baptist Church	437 N. Walnut St.	Republic	65738
United Pentecostal Church	303 MO-174	Republic	65738
Westside Christian Church	537 W. Elm St.	Republic	65738
CHILD CARE AND HEAD STARTS			
Bethany Pate	2436 E Willow	Republic	65738
ABCs and One Two Three Preschool	139 N. Walnut	Republic	65738
B. Jill Canfield	1610 Jody Cir.	Republic	65738
Building Blocks Learning Center	505 E. Harrison	Republic	65738
Child Life Academy LLC	517 E. Elm St.	Republic	65738
Elizabeth Bashore	720 Highway 60	Republic	65738
Growing Kids Childcare	341 US Highway 60 W	Republic	65738
Hale Home Day Care	525 S. Ventura	Republic	
Hope Child Care Center	218 E. Highway 174	Republic	65738
Hope Lutheran Church	218 MO-174	Republic	65738
Learn and Grow Organic Daycare LLC	545 N. Walnut Ave.	Republic	65738
Little People's Workshop	139 N Walnut Ave.	Republic	65738
Little Stepping Stones Academy LLC	975 N. Lindsey Ave.	Republic	65738
Lyon Elementary	201 E. Highway 174	Republic	65738
Mandi Pilkinton	601 Lexington	Republic	65738
Mary Ladwig	1002 E. Harrison	Republic	65738
Moculloch Elementary	234 E. Anderson	Republic	65738
Price Elementary	518 N. Hampton	Republic	65738
Republic Early Childhood Center Preschool	636 N. Main St.	Republic	65738
Republic Head Start	933 N. Lindsey Ave.	Republic	65738
Republic Middle School	#1 Tiger Dr.	Republic	65738
Sandra Richesin	7628 W. Farm Road 174	Republic	65738
Schofield Elementary	253 E. Anderson	Republic	65738
Sweeny Elementary	720 N. Main St.	Republic	65738
Teresa Hale	525 S. Ventura	Republic	65738
Tots Spot, LLC	220 N. Cedar	Republic	65738

Critical Facilities Inventory: Springfield

SCHOOLS			
Bingham Elementary	2126 E. Cherry	Springfield	65802
Bissett Elementary	3014 W. Calhoun	Springfield	65802
Bowerman Elementary	2148 N. Douglas	Springfield	65803
Boyd Elementary	1409 Washington	Springfield	65802
Campbell Elementary	506 S. Grant	Springfield	65806
Carver Middle School	3325 W. Battlefield	Springfield	65807
Central High School	423 E. Central	Springfield	65802
Cherokee Middle School	420 E. Farm Rd 182	Springfield	65810
Cowden Elementary	2927 S. Kimbrough	Springfield	65807
Delaware Elementary	1505 S. Delaware	Springfield	65804
Disney Elementary	4100 S. Fremont	Springfield	65804
Field Elementary	2120 Barataria	Springfield	65804
Fremont Elementary	2814 N. Fremont	Springfield	65803
Glendale High School	2727 S. Ingram Mill Rd.	Springfield	65804
Gray Elementary	2101 W. Farm Rd 182	Springfield	65810
Hickory Hills Elementary	3429 E. Trafficway	Springfield	65802
Hickory Hills Middle School	3429 E. Trafficway	Springfield	65802
Hillcrest High School	3319 N. Grant	Springfield	65803
Holland Elementary	2403 S. Holland	Springfield	65807
Jarrett Middle School	840 S. Jefferson	Springfield	65806
Jefferies Elementary	4051 S. Scenic	Springfield	65807
Kickapoo High School	3710 S. Jefferson Ave.	Springfield	65807
Mann Elementary	3745 S. Broadway	Springfield	65807
McBride Elementary	5005 S. Farm Rd 135	Springfield	65810
McGregor Elementary	1221 W. Madison	Springfield	65806
Parkview High School	516 W. Meadowmere	Springfield	65807
Pershing Elementary	2120 S. Ventura	Springfield	65804
Pershing Middle School	2120 S. Ventura	Springfield	65804
Pipkin Middle School	1215 N. Boonville	Springfield	65802
Pittman Elementary	2934 E. Bennett	Springfield	65804
Pleasant View Elementary	2210 E. State Highway AA	Springfield	65803
Pleasant View Middle School	2210 E. State Highway AA	Springfield	65803
Portland Elementary	906 W. Portland	Springfield	65807
Reed Middle School	2000 N. Lyon	Springfield	65803
Robberson Elementary	1100 E. Kearney	Springfield	65803

Rountree Elementary	1333 E. Grand	Springfield	65804
Sequitoa Elementary	3414 Mentor Road	Springfield	65804
Shady Dell Elementary	2757 E. Division	Springfield	65803
Sherwood Elementary	1813 S. Scenic	Springfield	65807
Study Middle School	2343 W. Olive	Springfield	65802
Sunshine Elementary	421 E. Sunshine	Springfield	65807
Truman Elementary	3850 N. Farm Rd. 159	Springfield	65803
Twain Elementary	2352 S. Weaver	Springfield	65807
Watkins Elementary	732 W. Talmage	Springfield	65803
Weaver Elementary	1461 N. Douglas	Springfield	65802
Weller Elementary	1630 N. Weller	Springfield	65803
Westport Elementary	415 S. Golden	Springfield	65802
Wilder Elementary	2526 S. Hillsboro	Springfield	65804
Williams Elementary	2205 W. Kearney	Springfield	65803
Wilson's Creek 5-6	4035 W. Weaver	Battlefield	65619
York Elementary	2100 Nichols	Springfield	65802
ALTERNATIVE SCHOOLS/PROGRAMS			
A.I.M.S.	911 E. Division	Springfield	65803
Baily Alternative School	501 W. Central	Springfield	65802
C.T.C.	924 N. Main Street	Springfield	65802
Juvenile Detention Center	1111 N. Robberson	Springfield	65802
Middle College, OTC	1001 E. Chestnut Expy.	Springfield	65802
Parents As Teachers Programs at Doling School	1423 W. Atlantic	Springfield	65803
Solutions/A.C.E./PALS/Storefront/Elementary Suspension Program	1518 E. Dale	Springfield	65803
S.E.A.L.	1518 E. Dale	Springfield	65803
Springfield Option Site (S.O.S.)	1212 W. Lombard	Springfield	65806
GIFTED PROGRAMS			
Bridges	1630 N. Weller Ave.	Springfield	65803
MYPSP	423 E. Central	Springfield	65802
Phelps School for Gifted/WINGS	934 S. Kimbrough	Springfield	65806
PRIVATE SCHOOLS			
Christian Schools of Springfield	739 W. Talmage	Springfield	65803
Greenwood Laboratory School	901 S. National	Springfield	65897
Springfield Lutheran	2852 S Dayton Ave.	Springfield	65807
Springfield Seventh Day Adventist	704 S. Belview	Springfield	65802
<u>Springfield Catholic</u>			

St. Agnes School	531 South Jefferson	Springfield	65806
St. Elizabeth Seton School	2200 W. Republic Rd.	Springfield	65807
Immaculate Conception School	3555A S. Fremont	Springfield	65804
St. Joseph School	515 West Scott St.	Springfield	65802
Springfield Catholic High School	2340 S. Eastgate	Springfield	65809
COLLEGES, UNIVERSITIES AND TECHNICAL SCHOOLS			
Assembly of God Theological Seminary	1435 N. Glenstone	Springfield	65802
Baptist Bible College	628 E. Kearney	Springfield	65803
Bryan College	237 S. Florence	Springfield	65806
Central Bible College	3000 N. Grant Ave.	Springfield	65803
Drury University	900 N. Benton	Springfield	65802
Evangel University	1111 N. Glenstone	Springfield	65802
Everest College	1010 W. Sunshine	Springfield	65807
Forest Institute of Psychology	2885 W. Battlefield	Springfield	65807
Global University	1211 S. Glenstone	Springfield	65804
Ozarks Technical College	1001 E. Chestnut Expy.	Springfield	65802
Missouri State University	901 S. National Ave.	Springfield	65897
Vatterott College	3850 S. Campbell	Springfield	65807
University of Phoenix	1343 E. Kingsley	Springfield	65804
Webster University	321 W. Battlefield	Springfield	65807
COXHEALTH SYSTEMS SCHOOLS			
School of Radiology	3801 S. National	Springfield	65807
School of Medical Technology	3801 S. National	Springfield	65807
School of Nursing	1423 N. Jefferson	Springfield	65802
MERCY HEALTH SYSTEMS SCHOOLS			
School of Radiology	1235 E. Cherokee	Springfield	65804
School of Nursing	4431 S. Fremont	Springfield	65804
LODGING			
Abor Suites	1550 E. Raynell	Springfield	65807
Baymont Inn & Suites	2445 N. Airport Plaza Ave.	Springfield	65803
Baymont Inn & Suites	3776 S. Glenstone	Springfield	65804
Best Budget Inn	4433 W. Chestnut Expy.	Springfield	65802
Best Western Coach House Inn	2535 N. Glenstone	Springfield	65803
Best Western Deerfield Inn	3343 E. Battlefield	Springfield	65804
Best Western Route 66 Rail Haven	203 S. Glenstone	Springfield	65802
Blackberry Creek Retreat Bed and Breakfast	5086 Route KK	Rogersville	65752
Budget Lodge	3050 N. Kentwood	Springfield	65803

Candlewood Suites	1920 E. Kerr	Springfield	65803
Clarion Hotel & Conference Center	3333 S. Glenstone	Springfield	65804
Comfort Inn & Conference Center	3370 E. Battlefield	Springfield	65804
Comfort Inn Suites	2815 N. Glenstone	Springfield	65803
Comfort Suites Medical District	310 E. Monastery	Springfield	65810
Courtyard by Marriott	3527 W. Kearney St.	Springfield	65803
Crystal Suites	1260 E. Independence	Springfield	65804
Days Inn South	621 W. Sunshine	Springfield	65807
Dogwood Park Inn	815 N. Glenstone	Springfield	65803
Doubletree Hotel Springfield	2431 N. Glenstone	Springfield	65803
Drury Inn & Suites Springfield	2715 N. Glenstone	Springfield	65803
Econo Lodge	2808 N. Kansas	Springfield	65803
Econo Lodge	2611 N. Glenstone	Springfield	65803
Econo Lodge	3404 E. Ridgeview	Springfield	65804
Economy Inn	2555 N. Glenstone	Springfield	65803
Elliott Lodging, LTD	1736 E. Sunshine, #101	Springfield	65804
Flagship Motel	2209 N. Glenstone	Springfield	65803
Hampton Inn	222 N. Ingram Mill	Springfield	65802
Hampton Inn	2750 N. Glenstone	Springfield	65803
Hampton Inn	3232 S. Glenstone	Springfield	65804
Holiday Inn Express Hotel & Suites	1117 E. St. Louis	Springfield	65806
Holiday Inn North I-44	2720 N. Glenstone	Springfield	65803
Kyrstal Aire Inn & Suites	2745 N. Glenstone	Springfield	65803
La Quinta Inn	1610 E. Evergreen	Springfield	65803
La Quinta South	2535 S. Campbell	Springfield	65807
Lamplighter Inn - North	2820 N. Glenstone	Springfield	65803
Lamplighter Inn - South	1772 S. Glenstone	Springfield	65804
Magers Lodgings	2776 S. Campbell	Springfield	65807
Mansion at Elfindale Bed and Breakfast	1701 S. Fort	Springfield	65807
Merigold Inn	2006 S. Glenstone	Springfield	65804
Microtell Inn	3125 N. Kentwood	Springfield	65803
Motel 6	2655 N. Glenstone	Springfield	65803
Oasis Hotel & Convention Center	2550 N. Glenstone	Springfield	65803
Ozark Inn	2601 N. Glenstone	Springfield	65803
Plaza Inn	2933 N. Glenstone	Springfield	65803
Quality Inn - E. Battlefield	3303 E. Battlefield Road	Springfield	65804
Quality Inn & Suites	3930 S. Overland Ave.	Springfield	65807
Ramada Oasis and Conference Center	2500 N. Glenstone	Springfield	65803

Residence Inn by Marriott	1303 E. Kingsley	Springfield	65804
Rest Haven Court	2000 E. Kearney	Springfield	65803
Sleep Inn of Springfield	233 E. Camino Alto	Springfield	65810
Super 8 Motel	3034 S. Moulder	Springfield	65804
University Plaza Hotel & Convention Center	333 S. John Q. Hammons Pkwy.	Springfield	65806
Value Place	2021 W. Kingsley	Springfield	65807
Virginia Rose Bed and Breakfast	317 E. Glenwood	Springfield	65807
Walnut Street Inn Bed and Breakfast	900 E. Walnut	Springfield	65806
Wishing Well Motor Inn	3500 W. Chestnut Expy.	Springfield	65802
HOSPITALS AND URGENT CARES			
CoxHealth Systems North	1423 N. Jefferson	Springfield	65802
CoxHealth Systems South	3801 S. National Ave.	Springfield	65807
CoxHealth Systems Walnut Lawn	1000 E. Walnut Lawn	Springfield	65807
Lakeland Regional Hospital	440 S. Market Ave.	Springfield	65806
Ozarks Community Hospital	2828 N. National	Springfield	65803
Mercy Hospital	1235 E. Cherokee	Springfield	65804
U.S. Medical Center for Federal Prisoners	1900 W. Sunshine	Springfield	65807
Concentra Urgent Care	1308 N. Glenstone	Springfield	65802
Cox Pediatric Urgent Care	1000 E. Primrose #170	Springfield	65804
Cox Walnut Lawn Urgent Care	1000 E. Walnut Lawn	Springfield	65807
Mercy Northside Urgent Care	2120 W. Kearney	Springfield	65803
Mercy Urgent Care Center/Pediatric Urgent Care	3231 S. National	Springfield	65807
Cox Family Medical Walk-in Clinic	4049 S. Campbell	Springfield	65807
NURSING HOMES			
Christian Health Care of Springfield East	3535 East Cherokee	Springfield	65809
Christian Health Care of Springfield West	3403 West Mt. Vernon	Springfield	65802
Culpepper Place of Chesterfield Village	2410 Chesterfield Blvd.	Springfield	65807
Culpepper Place of Springfield	3540 East Cherokee	Springfield	65809
Gardens, The	1302 West Sunset	Springfield	65807
Golden Estate Residential Care	1134 West Norton Rd.	Springfield	65803
Jacob's Care Center	932 West State	Springfield	65806
James River Care and Rehabilitation Center, Inc.	3550 East Battlefield	Springfield	65809
Jordan Creek Nursing & Rehab	910 South West Ave.	Springfield	65802
Joy Assisted Living for Seniors	2030 West Mt. Vernon, P.O. Box 9655	Springfield	65802
Lakewood - Assisted Living by Americare	4685 Robberson Ave.	Springfield	65810
Lodges, The	2401 West Grand	Springfield	65802

Magnolia Square Nursing and Rehabilitation Center	1502 West Edgewood	Springfield	65807
Manor at Elfindale, The	1707 West Elfindale St.	Springfield	65807
ManorCare Health Services	2915 South Fremont	Springfield	65804
Maranatha Village, Inc.	233 East Norton Rd.	Springfield	65803
Mercy Villa	1100 East Montclair	Springfield	65807
Neighborhood at Quail Creek, The	1514 West Lark	Springfield	65810
Primrose Place Health Care Center	1115 East Primrose St.	Springfield	65807
Quality Residential Care	2034 West College	Springfield	65806
Ravenwood - Assisted Living by Americare	1950 East Republic Rd.	Springfield	65807
Spring Ridge - Assisted Living by Americare	2828 South Meadowbrook	Springfield	65807
Springfield Rehabilitation & Health Care Center	2800 South Fort Avenue, P.O. Box 3438GS	Springfield	65807
Springfield Skilled Care Center	2401 West Grand	Springfield	65802
Woodland Manor	1347 East Valley Watermill Rd.	Springfield	65803
AIRPORTS			
Springfield/Branson Regional Airport	5000 West Kearney	Springfield	65803
Springfield Downtown Airport	2546 E. Division	Springfield	65803
BUS STATION			
CU Bus Transportation Offices	1505 N. Boonville	Springfield	65803
POLICE			
Headquarters	321 E. Chestnut Expy.	Springfield	65802
South District Station	2620 W. Battlefield Rd.	Springfield	65807
Missouri State University Sub-Station	901 S. National Ave.	Springfield	65897
FIRE			
Ebenezer Fire Protection District	7918 N. FR 145	Springfield	65803
Pleasant View Fire Protection District	2313 E. State Highway AA	Springfield	65803
Springfield Fire Department	830 N. Boonville	Springfield	65802
Station 1	720 E. Grand	Springfield	65807
Station 2	608 W. Commercial St.	Springfield	65803
Station 3	205 N. Patterson Ave.	Springfield	65802
Station 4	2423 N. Delaware	Springfield	65803
Station 5	2750 W. Kearney St.	Springfield	65803
Station 6	2620 W. Battlefield Rd.	Springfield	65807
Station 7	2129 E. Sunshine	Springfield	65804
Station 8	1405 S. Scenic Ave.	Springfield	65807
Station 9	450 W. Walnut Lawn	Springfield	65807
Station 10	2245 E. Galloway	Springfield	65804

Station 11	4940 S. Fremont	Springfield	65804
Station 12	2455 S. Blackman Rd.	Springfield	65809
CITY GOVERNMENT			
Springfield Art Museum	1111 E. Brookside Dr.	Springfield	65807
Emergency Communications	319 E. Chestnut Expy.	Springfield	65802
Health Department	227 E. Chestnut Expy.	Springfield	65802
Department of Information Systems	220 E. Central	Springfield	65801
Springfield Municipal Division	625 N. Benton	Springfield	65806
Springfield-Greene County Park Board	1923 N. Weller	Springfield	65803
Workforce Development	1514 S. Glenstone	Springfield	65804
Busch Municipal Building	840 Boonville Ave	Springfield	65802
Department of Building Development Services	840 Boonville Ave.	Springfield	65802
City Attorney	840 Boonville Ave.	Springfield	65802
City Clerk	840 Boonville Ave.	Springfield	65802
City Manager	840 Boonville Ave.	Springfield	65802
Finance Department	840 Boonville Ave.	Springfield	658020
Human Resources	840 Boonville Ave.	Springfield	65802
Public Information	840 Boonville Ave.	Springfield	65802
Planning and Development	840 Boonville Ave.	Springfield	65802
Public Works	840 Boonville Ave.	Springfield	65802
GREENE COUNTY DEPARTMENTS			
Archives	1126 N. Boonville Ave.	Springfield	65802
Budget Office	933 N. Robberson	Springfield	65802
Building Regulations	940 N. Boonville Ave.	Springfield	65802
Emergency Management	330 W. Scott St.	Springfield	65802
Highway	2065 N. Clifton	Springfield	65803
Human Resources	933 N. Robberson	Springfield	65802
Juvenile	1111 N. Robberson	Springfield	65802
Medical Examiner	917 N. Boonville Ave.	Springfield	65802
Planning & Zoning	940 N. Boonville Ave.	Springfield	65802
Public Information	940 N. Boonville Ave.	Springfield	65802
Purchasing	933 N. Robberson	Springfield	65802
GREENE COUNTY OFFICES			
Assessor	940 N. Boonville Ave.	Springfield	65802
Auditor	940 N. Boonville Ave.	Springfield	65802
Circuit Clerk/Court	1010 N. Boonville Ave.	Springfield	65802
Collector	940 N. Boonville Ave.	Springfield	65802

County Clerk	940 N. Boonville Ave.	Springfield	65802
County Commission	933 N. Robberson	Springfield	65802
Prosecuting Attorney	1010 N. Boonville Ave.	Springfield	65802
Public Administrator	843 N. Boonville Ave.	Springfield	65802
Recorder	940 N. Boonville Ave.	Springfield	65802
Sheriff	1010 N. Boonville Ave.	Springfield	65802
Treasurer	940 N. Boonville Ave.	Springfield	65802
STATE OF MISSOURI GOVERNMENT OFFICES			
Administrative Offices/State Office Buildings	149 Park Central	Springfield	65806
Agriculture Department, Veterinary Lab	701 N. Miller	Springfield	65802
Conservation Nature Center	4600 Chrisman	Springfield	65804
Courts of Appeals	300 Hammons Parkway	Springfield	65806
Department of Conservation	2630 N. Mayfair	Springfield	65803
Department of Corrections, Probation and Parole	2530 S. Campbell	Springfield	65807
Department of Economic Development	1360 Fairway	Springfield	65804
Department of Elementary and Secondary Education	2530-I S. Campbell	Springfield	65807
Department of Health and Senior Services	1414 W. Elfindale	Springfield	65807
Department of Natural Resources	2040 Woodland	Springfield	65807
Department of Social Services, Child Support	1410 Kansas Expy.	Springfield	65807
Department of Social Services, Division of Aging	1721 E. Elfindale	Springfield	65807
Department of Transportation	2549 N. Mayfair	Springfield	65803
Employment Security	505 E. Walnut	Springfield	65806
Lottery Commission	1506 E. Raynell	Springfield	65804
Missouri Career Center	1514 S. Glenstone	Springfield	65804
National Guard	1400 N. Fremont	Springfield	65802
Public Defender	333 Park Central	Springfield	65806
Southwest Missouri Office on Aging	1923 E. Kearney	Springfield	65803
Springfield Regional Center	1515 E. Pythian	Springfield	65802
State Highway Patrol	3131 E. Kearney	Springfield	65803
State Veteran Cemetery	5201 S. Southwood Rd.	Springfield	68504
U.S. GOVERNMENT OFFICES			
Department of Agriculture	3003 E. Chestnut	Springfield	65802
USDA Service Center	688 S. State Highway B.	Springfield	65802
Departments of Army, Air Force, Navy and Marines	1110 N. Fremont	Springfield	65802
Public Defender	901 E. St. Louis	Springfield	65806
Federal Courthouse	222 N. Hammons Parkway	Springfield	65806
Department of Energy	2858 S. Golden	Springfield	65807

Federal Bureau of Investigation	1932 W. Chesterfield Blvd.	Springfield	65807
Food Safety & Quality Service	3003 E. Chestnut	Springfield	65802
Department of Labor	901 E. St. Louis	Springfield	65806
Internal Revenue Service	3333 S. National	Springfield	65807
Immigration and Naturalization Service	2401 W. Old Route 66	Strafford	65757
Medical Center for Federal Prisoners	1900 W. Sunshine	Springfield	65807
Wilson's Creek National Battlefield	6424 W. Farm Rd. 182	Republic	65738
Post Office – Main	500 W. Chestnut	Springfield	65801
Secret Service	901 E. St. Louis	Springfield	65806
Small Business Administration	830 E. Primrose	Springfield	65807
Social Security Administration	1570 W. Battlefield	Springfield	65807
Springfield Natural Cemetery	1702 E. Seminole	Springfield	65804
Transportation Security Administration	5000 W. Kearney	Springfield	65803
National Weather Service	5805 W. Highway EE	Springfield	65802
WASTE, WATER AND ENERGY MANAGEMENT			
CU Southwest Wastewater Treatment Plant	3301 S. FF Highway	Springfield	65807
CU Northwest Wastewater Treatment Plant	4901 N. Highway 12	Springfield	65803
WASTE FACILITIES/RECYCLING CENTERS			
American Disposal Services	357 N. Fort	Springfield	65802
Commercial Metals	634 E. Phelps	Springfield	65806
Computer Recycling Center	1434 N. National	Springfield	65802
Habitat for Humanity ReStore	2410 S. Scenic	Springfield	65807
Household Chemical Collection Center	1226 W. Nichols	Springfield	65802
McCoy's Iron and Metal	321 N. Fort	Springfield	65802
Midwest Fibre Sales Corp	911 N FR 123	Springfield	65802
Missouri Council of the Blind	1445 W. Kearney	Springfield	65803
New American Recycling	357 N. Fort	Springfield	65802
Ozarks Literacy Council	430 South Avenue, #200	Springfield	65806
Southwest Treatment Plant	Off Farm Roads 115/116		
Springfield Recycling Center	731 N. Franklin	Springfield	65802
Springfield Recycling Center	3020 S. Lone Pine	Springfield	
Springfield Recycling Center	2525 W. College	Springfield	65802
Springfield Recycling Center	1831 W. Kearney	Springfield	65803
Springfield Recycling Center	1717 W. Battlefield	Springfield	65807
Springfield Sanitary Landfill	Highway 13	Springfield	
SW MO Humane Society	3161 W. Norton	Springfield	65803
Waste Corp of America	2120 W. Bennett	Springfield	65807

PLACES OF WORSHIP			
Abundant Life Ministries	157 Park Central Sq.	Springfield	65806
All Saint's Anglican	1842 E. Richmond Pl.	Springfield	65804
Altar of Praise Family Church	2219 E. Kearney	Springfield	65803
Amazing Grace Fellowship	3801 S. Kansas Ave.	Springfield	65807
Anitoch United Methodist Church	3614 N. Glenstone	Springfield	65803
Apostolic United Pentecostal Church	3010 W. Nichols St.	Springfield	65803
Asbury United Methodist Church	1500 S. Campbell	Springfield	65804
Ascension Episcopal Church	903 W. Katella	Springfield	65807
Assemblies of God Europe Development Office	1927 S. National Ave.	Springfield	65804
Assemblies of God Southern Missouri District Headquarters	528 E. Battlefield	Springfield	65807
Baha'l Faith	941 N. Rogers Ave.	Springfield	65802
Baptist Temple of Springfield	2655 N. Grant Ave.	Springfield	65803
Berean Baptist Church	507 E. Norton Rd.	Springfield	65803
Bible Baptist Church	2631 S. Mccann Ave.	Springfield	65804
Boulevard Baptist Church	1030 S. Eastgate Ave.	Springfield	65809
Brentwood Christian Church	1900 E. Barataria St.	Springfield	65804
Brentwood Church of Christ	1010 S. Elm	Springfield	65806
Briar Street Baptist Church	1361 E. Briar St.	Springfield	65804
Broadway Baptist Church	2537 N. Broadway	Springfield	65803
Brown Avenue Baptist Church	805 N. Brown Ave.	Springfield	65803
Calvary Chapel of Springfield	2440 E. Seminole St.	Springfield	65804
Campbell United Methodist Church	1747 E. Republic Rd.	Springfield	65804
Central Assembly of God	1301 N. Boonville Ave.	Springfield	65802
Central Baptist Church	916 N. Campbell	Springfield	65802
Central Christian Church	1475 N. Washington Ave.	Springfield	65802
Charity Baptist Church	2603 S. Westwood	Springfield	65807
Cherry Street Baptist Church	1201 S. Oak Grove	Springfield	65804
Christ Church Unity	2214 S. Seminole St.	Springfield	65804
Christ Episcopal Church	601 E. Walnut St.	Springfield	65806
Christ the King Church	1517 E. Valley Water Mill Rd.	Springfield	65803
Christian Foundation Inc	1601 W. College St.	Springfield	65802
Church of Christ	2540 N. Kansas	Springfield	65803
Church of Christ	2220 E. Grand	Springfield	65804
Church of Christ - East Sunshine	3721 E. Sunshine	Springfield	65809
Church of Christ Minister	2540 N. Kansas	Springfield	65803

Church of Christ South Side	802 W. Sunshine	Springfield	65807
Church of Christ Southside	1517 E. Cherokee	Springfield	65804
Church of Christ Walnut Lawn	216 E. Walnut Lawn St.	Springfield	65807
Church of God International	3731 S. Glenstone Ave.	Springfield	65804
Church of God Seventh Day	1521 E. 24th	Springfield	65803
Church of Jesus Christ Latter Day Saints	4450 S. Farm Road 141	Springfield	65810
Church of the Harvest	501 W. College	Springfield	65806
Church of the Nazarene Dayspring	2812 E. Grand	Springfield	65804
Church of the Nazarene Scenic Drive	550 S. Scenic Ave.	Springfield	65802
College Street Baptist Church	2216 College	Springfield	65806
Common Ground Church	1701 W. Sunshine	Springfield	65807
Cornerstone Church	1701 S. Fort	Springfield	65807
Covenant of Grace Christian Center	713 S. Newton Ave.	Springfield	65806
Covenant Presbyterian Church	2441 S. Lone Pine Ave.	Springfield	65804
Cumberland Presbyterian Church	4216 S. Charleston Ave.	Springfield	65804
Dayspring Christian Fellowship	2157 N. Prospect Ave.	Springfield	65803
Dayspring Church of the Nazarene	2812 E. Grand	Springfield	65804
Deliverance Temple Church	2101 W. Chestnut Expy.	Springfield	65802
Eastern Gate Freewill Baptist Church	922 S. Eastgate	Springfield	65809
Eben-Ezer Romanian Assembly	2233 N. East Ave.	Springfield	65803
Eckankar of Springfield	1950 S. Glenstone Ave.	Springfield	65804
El Faro Assembly of God	644 S. Eastgate Ave.	Springfield	65809
Elwood Full Gospel Word Church	6824 W. Farm Road 124	Springfield	65802
Evangel Temple Christian Center	2035 E. Holly Cir.	Springfield	65804
Evangel Temple Christian Center	2020 E. Battlefield Rd.	Springfield	65804
Faith Assembly of God Church	3001 W. Division St.	Springfield	65802
Faith Christian Fellowship of Springfield	1535 E. St. Louis St.	Springfield	65802
Faith Outreach Pentecostal Church	518 E. Atlantic St.	Springfield	65803
Faith Tabernacle Apostolic Church	2548 N. Fremont Ave.	Springfield	65803
First & Calvary Presbyterian Church	820 E. Cherry	Springfield	65806
First Baptist Church	525 South Ave.	Springfield	6806
First Church of Christ Scientist	960 S. Eastgate Ave.	Springfield	65809
First Evangelical Free Church	5500 S. Southwood Rd.	Springfield	65804
First Freewill Baptist Church	2635 W. Nichols St.	Springfield	65802
First Korean Presbyterian Church	205 E. South	Springfield	65806
First Unitarian Universalist Church	2434 S. Battlefield	Springfield	65804
First United Methodist Church	1600 N. Central	Springfield	65802
Forest Avenue Assembly of God	806 N. Forest Ave.	Springfield	65802

Foundation of Life Christian Fellowship	2850 N. Park Ave.	Springfield	65803
Fremont Hills FBC	4367 N. Fremont Rd.	Springfield	65804
Fresh Heart Foursquare Church	5357 N. Farm Road 151	Springfield	65803
Fresh Oil Ministries	1700 N. Benton Ave.	Springfield	65803
Friendship Assembly of God	1349 W. Meadowmere	Springfield	65807
Fruitland Road Country Church	9925 N. Farm Road 173	Springfield	65803
General Baptist Church First	1400 W. Walnut	Springfield	65806
Glad Tidings Assembly of God	1301 W. Atlantic	Springfield	65803
Glendale Baptist Church	2236 Ingram Mill Rd.	Springfield	65804
Glendale Christian Church	2110 S. Blackman Rd.	Springfield	65809
Glenstone Baptist Church	413 S. Glenstone	Springfield	65802
Grace Assembly of God	514 W. Mt. Vernon St.	Springfield	65806
Grace Chapel Church	1120 E. Farm Road 182	Springfield	65810
Grace Church of The Nazarene	540 E. Walnut Lawn	Springfield	65807
Grace Independent Baptist Church	2101 N. Johnston Ave.	Springfield	65803
Grace Life Fellowship	1831 W. Melville Rd.	Springfield	65803
Grace United Methodist Church	600 S. Jefferson	Springfield	65806
Graceway Baptist Church	5010 S. Farm Road 135	Springfield	65810
Grant Avenue Free Will Baptist Church	1060 S. Grant Ave.	Springfield	65807
Grandview Baptist Church	3208 N. Barnes	Springfield	65803
Grant Avenue Baptist Church	1033 N. Grant Ave.	Springfield	65802
Grant Avenue Free Will Baptist Church	1060 S. Grant Ave.	Springfield	65807
Greater Metropolitan Baptist	1400 N. West	Springfield	65802
Hamlin Memorial Baptist Church	829 W. Atlantic	Springfield	65803
Harvest Ministries UPC	3114 W. Sunset St.	Springfield	65807
High Street Baptist Church	900 N. Eastgate	Springfield	65802
Hillcrest Presbyterian Church	722 W. Atlantic	Springfield	65803
Holy Ground Ministry Church of God in Christ	1034 N. Broadway Ave.	Springfield	65802
Holy Trinity Catholic Church	2818 E. Bennett St.	Springfield	65804
Holy Trinity Parish Hall	515 E. Washington	Springfield	65806
Hope Community Church	2121 S. Blackman Rd.	Springfield	65809
Immaculate Conception Church	3555 S. Fremont	Springfield	65807
Immanuel Baptist Church	1931 W. Nichols	Springfield	65802
Immanuel Korean Church	819 E. Dale St.	Springfield	65803
Immanuel Lutheran Church AFLC	2756 Blackman Rd.	Springfield	65809
Jefferson Avenue Baptist Church	316 E. Sunshine	Springfield	65807
Jehovah's Witnesses	403 E. Elm	Springfield	65806
Jehovah's Witnesses Parkview Congregation	3886 S. Farm Road 135	Springfield	65807

John Calvin Presbytery	2150 W. Republic Rd.	Springfield	65807
Journey Fellowship Church	1400 W. Walnut	Springfield	65806
King's Chapel Assembly of God	2434 E. Cherry St.	Springfield	65802
King's Way United Methodist Church	2401 S. Lone Pine Ave.	Springfield	65804
Kingsway Free Will Baptist Church	2615 N. Park Ave.	Springfield	65803
Korean Baptist Church of Springfield	3112 W. Grand	Springfield	65802
Korean Presbyterian Church of Springfield	1559 S. Grant	Springfield	65807
Life Fellowship Church	3145 W. Republic Rd.	Springfield	65807
Life Publishers	1625 N. Robberson Ave.	Springfield	65803
Macedonia Baptist Church	3110 W. Sunshine	Springfield	65807
Messiah Lutheran ELCA	925 E. Seminole	Springfield	65807
Mt. Carmel United Methodist	1001 N. National	Springfield	65802
National Avenue Assembly of God	931 N. National	Springfield	65802
National Avenue Christian Church	1515 S. National	Springfield	65804
National Heights Baptist Church	3050 N. National	Springfield	65804
New Life Church	776 W. Farm Road 186	Springfield	65810
New Star Community Chapel	309 S. Scenic Ave.	Springfield	65802
New Vision Ministries	1440 N. State Highway AB	Springfield	65802
North Point Church	3401 W. Norton Rd.	Springfield	65803
North Side Assembly of God Office	2310 N. Campbell Ave.	Springfield	65803
Northside Christian Church	4902 State Highway H	Springfield	65803
Northside General Baptist Church	2305 N. Golden	Springfield	65803
Northwest Baptist Church	3075 W. Norton Rd.	Springfield	65803
Oak Grove Assembly of God	1320 S. Oak Grove Ave.	Springfield	65804
Ozark Lake Area Office of the Christian Church	500 South Ave.	Springfield	65806
Palmer Heights Baptist Church	1606 W. High	Springfield	65803
Park Crest Assembly of God Church	3581 S. Kansas Ave.	Springfield	65807
Park Crest Baptist Church	816 W. Republic	Springfield	65807
Park Crest Calvary Temple, Calvary Campus	444 W. Grand	Springfield	65807
Park Crest Calvary Temple, Park Crest Campus	3581 S. Kansas Ave.	Springfield	65807
Pitts Chapel United Methodist Church	600 N. Benton	Springfield	65806
Pleasant Home Baptist Church	3630 E. State Highway AA	Springfield	65803
Pleasant Valley Church	722 W. Farm Road 80	Springfield	65803
Praise Assembly	3535 N. Glenstone	Springfield	65803
Prince of Peace Lutheran Church ELCA	815 East Farm Road 182	Springfield	65810
Pythian Avenue Baptist Church	1001 N. Rogers	Springfield	65802
Queen of All Saints Catholic Church	1505 W. Atlantic St.	Springfield	65803
Recovery Fellowship Ministries	2235 E. Fritts Ln.	Springfield	65804

Redeemer Lutheran Church	2852 S. Dayton Ave.	Springfield	65807
Resurrection Ministry	1706 N. Jefferson Ave.	Springfield	65803
Ridgecrest Baptist Church	2210 W. Republic	Springfield	65807
Sacred Heart Church	1609 N. Summit Ave.	Springfield	65803
Schweitzer United Methodist Church	2747 E. Sunshine	Springfield	65804
Second Baptist	3111 E. Battlefield Rd.	Springfield	65804
Seminole Baptist Temple	4221 S. National Ave.	Springfield	65810
Seventh-Day Adventist Church	702 S. Belview Ave.	Springfield	65802
Seventh-Day Adventist Church Providence	1402 N. Prospect Ave.	Springfield	65802
Silver Springs Church of God	1010 E. Pythian	Springfield	65802
Solid Rock Assembly	1040 N. Sherman Ave.	Springfield	65802
South Campbell Avenue Baptist Church	927 S. Campbell	Springfield	65806
South Creek Church	5360 S. Campbell Ave.	Springfield	65810
South Fremont Free Will Baptist Church	4547 S. Fremont Ave.	Springfield	65810
South Gate Baptist Church	5701 S. Farm Road 157	Springfield	65810
South Haven Baptist Church	2353 S. Campbell Ave.	Springfield	65807
South Side Baptist Church	465 S. Grant	Springfield	65806
Southern Heights Bible Church	2228 S. Jefferson Ave.	Springfield	65807
Southland Christian Church	1630 W. Republic	Springfield	65807
Southminster Presbyterian	2245 S. Holland Ave.	Springfield	65807
Sovereign Grace Baptist Church	2766 W. Weaver Rd.	Springfield	65810
Springfield Bible Church	2145 E. Grand	Springfield	65804
Springfield Chinese Church Assembly of God	1909 W. Chestnut Expy.	Springfield	65802
Springfield Community Church	2616 E. Battlefield	Springfield	65804
Springfield First Nazarene	3245 S. Kansas Ave.	Springfield	65807
Springfield Korean Presbyterian Church	313 E. Edgewood	Springfield	65807
Springhill Baptist Church	7370 N. Farm Road 159	Springfield	65803
St. Agnes Cathedral	533 S. Jefferson Ave.	Springfield	65806
St. Elizabeth Ann Seton Church	2200 W. Republic Rd.	Springfield	65807
St. James Episcopal Church	2645 Southern Hills	Springfield	65804
St. John's Chapel UCC	4344 S. Fremont	Springfield	65804
St. John's Episcopal Church	515 E. Division	Springfield	65803
St. Joseph Catholic Church	1115 N. Campbell	Springfield	65802
St. Stephen's Episcopal Church	601 E. Benton	Springfield	65806
St. Thomas The Apostle Orthodox Church	4200 S. Holiday Ave.	Springfield	65810
Sunset Church of Christ	1222 W. Sunset St.	Springfield	65807
Sunshine Baptist Church	5034 E. Sunshine	Springfield	65809
Sycamore Baptist Church	3146 S. Golden Ave.	Springfield	65807

Tampa Assembly of God	2006 W. High St.	Springfield	65803
Temple Baptist Church	845 S. Fort	Springfield	65806
The Catholic Center	601 S. Jefferson	Springfield	65806
The King's Way United Methodist Church	2401 S. Lone Pine	Springfield	65804
Trinity Pentecostal Church of God	530 S. Miller Ave.	Springfield	65802
Truth Community Church	2848 N. Broadway	Springfield	65803
Union Hill Church of Christ	865 N. Nicholas Rd.	Springfield	65802
United Baptist Church	2501 W. State St.	Springfield	65802
United Methodist District Office	506 N. Stewart Ave.	Springfield	65802
United Methodist Hispanic Ministry	1232 E. Dale St.	Springfield	65803
University Heights Baptist Church	1010 S. National Ave.	Springfield	65804
Walnut Lawn Church of God	544 W. Walnut Lawn St.	Springfield	65807
Walnut Street Christian Church	2201 W. Walnut	Springfield	65806
Washington Avenue Baptist Church	1722 N. National Ave.	Springfield	65803
Water Mill Church of Christ	3020 N. Barnes	Springfield	65803
Webster Park Assembly of God	1905 N. Yates Ave.	Springfield	65803
Webster Park Baptist Church	1513 N. Old Orchard	Springfield	65803
Wesley United Methodist Church	922 W. Republic Rd.	Springfield	65807
West Atlantic Street Baptist Church	2301 W. Atlantic	Springfield	65803
West Division Street Baptist Church	3104 W. Division St.	Springfield	65802
Westminster Presbyterian Church	1551 E. Portland	Springfield	65804
Westport Baptist Church	2919 W. College	Springfield	65802
Woodland Heights Presbyterian Church	722 W. Atlantic	Springfield	65802
Zion Evangelical Lutheran Church	4717 S. Farm Road 135	Springfield	65810
CHILD CARE AND HEAD STARTS			
Alpha Tots Learning Center, Inc.	1601 W. Sunshine, Ste Q.	Springfield	65807
Amazing Kidz Day Care	3801 S. Kansas	Springfield	65807
Angela Kostron	540 W. Crestview	Springfield	65807
Ark Angels Childcare Center	1513 N. Old Orchard	Springfield	65803
Bambi Yoast	1021 S. Craig	Springfield	65804
Beverly Barnett	5721 S. King	Springfield	65810
Brenda Rumley	2644 E. Verona	Springfield	65804
Brenda Thomas	1837 W. Primrose	Springfield	65807
Bright Beginnings	2263 E. Cherry	Springfield	65802
Bright Minds Learning Academy, LLC	1926 S. Ingram Mill Rd	Springfield	65804
Broadway Head Start	1477 N. Broadway	Springfield	65802
Buenola Kincaid	723 N. Fulbright	Springfield	65802
Campbell United Methodist Church	1747 E. Republic Rd.	Springfield	65804

Carol Jones Daycare Preschool	2411 W. Catalpa	Springfield	65807
Carline Denise Payne	1225 S. Estate	Springfield	65804
Carolyn Sue Dobbelare	2779 W. Vincent	Springfield	65810
Carpenters Kids Preschool	2353 S. Campbell	Springfield	65807
Cassandra Hunt	838 S. Rogers	Springfield	65804
Cherished Days	1895 N. Kansas	Springfield	65803
Christine Kensinger	2435 E. Bodeb	Springfield	65802
Cox Learning Center North	1632 N. Robberson	Springfield	65803
Cox Learning Center South	950 E. Primrose	Springfield	65807
Creative Learning Center, Education-Recreation, LLC	2551 S. Campbell	Springfield	65807
Creative Minds	1439 E. Lark	Springfield	65804
Cross Training Summer Day Camp	2353 S. Campbell	Springfield	65807
Dal Vero Early Childhood Academy, LLC	1500 S. Campbell	Springfield	65807
Dawn Ray	2102 E. Cinderella	Springfield	65806
Debby Scott	3051 S. Lone Pine	Springfield	65804
Deborah Hinkle	3215 W. Calhoun	Springfield	65802
Debra Balty	926 W. Downing	Springfield	65807
Developmental Center of the Ozarks	1545 E. Pythian	Springfield	65802
Developmental Learning Center	2020 E. Battlefield	Springfield	65804
Donna Byrd	3543 S. Newton	Springfield	65807
Douglas Head Start	1042 S. Douglas	Springfield	65807
East Grand Church of Christ Programs	2220 E. Grand	Springfield	65804
East Grand Community Services	2220 E. Grand	Springfield	65804
Ed. V. Williams Elementary	2205 W. Kearney	Springfield	65803
Ellen P. Montford	951 E. Snider	Springfield	65803
Ernestine Guterrez	2930 E. Linwood	Springfield	65804
Geniece Frymire	1120 W. Westview	Springfield	65807
Gina Steffins	2738 W. Roxbury	Springfield	65807
Golden Avenue Head Start	3146 S. Golden	Springfield	65807
Grant Avenue Baptist Daycare	1033 N. Grant	Springfield	65802
Grant Training Center	1051 S. Grant Ave.	Springfield	65807
Grow to Know	2747 E. Sunshine	Springfield	65804
Heidi Bailey	3318 S. Palisades Dr.	Springfield	65807
Jo Brake	2841 Eastmoor	Springfield	65804
Joans Family Childcare HM/PRES	3330 W. Sexton	Springfield	65810
Jody Langstraat	1264 McClernon	Springfield	65803
Joyland Learning Center	1301 N. Boonville	Springfield	65802

Judith A. Johnston	2778 Village Terrace	Springfield	65810
Judith Hall	2917 E. Portland	Springfield	65804
Julie Brown	2789 W. Vincent	Springfield	65810
Kerri's Kidsville/Babyville	2559 South Ave.	Springfield	65807
Kids First Preschool	4344 S. Fremont Ave.	Springfield	65804
Kingswood Programs	2401 S. Lone Pine	Springfield	65804
La Petite Academy one	1714 S. Enterprise Ave.	Springfield	65804
Latisha Rush	1425 E. Arlington	Springfield	65803
Life Skills Learning Center	452 S. Grant	Springfield	65803
Lighthouse Child and Family Development Center	2548 N. Fremont, Ste 100	Springfield	65803
Linda Dixon	3865 S. Cottage	Springfield	65807
Little Sunshine Playhouse and Preschool	201 E. Cardinal	Springfield	65810
Little Sunshine's Playhouse and Preschool, Inc.	2826 W. Chestnut Expy.	Springfield	65802
Little Sunshine's Playhouse, LLC	2937 S. Claremont	Springfield	65804
Macedonia Preschool	3110 W. Sunshine	Springfield	65807
Missouri State Child Development Center	609 E. Cherry St.	Springfield	65806
Monarch Children's Academy	1108 N. Robberson Ave.	Springfield	65802
Mother's Touch Learning Center	2115 S. Brentwood	Springfield	65807
OTC Early Childhood Education Center	936 N. Hampton Ave.	Springfield	65802
Our World, LLC	1720 W. Elfindale	Springfield	65807
Ozarks Regional YMCA - Bingham Prime Time	2126 Cherry	Springfield	65802
Ozarks Regional YMCA - Bisset Prime Time	3014 W. Calhoun	Springfield	65802
Ozarks Regional YMCA - Bowerman Prime Time	2148 N. Douglas	Springfield	65803
Ozarks Regional YMCA - Campbell Prime Time	506 S. Grant	Springfield	65806
Ozarks Regional YMCA - Cowden Prime Time	2927 S. Kimbrough	Springfield	65807
Ozarks Regional YMCA - Delaware Prime Time	1505 S. Delaware	Springfield	65804
Ozarks Regional YMCA - Disney Prime Time	4100 S. Fremont	Springfield	65804
Ozarks Regional YMCA - Field Prime Time	2120 Baratavia St.	Springfield	65804
Ozarks Regional YMCA - Fremont Prime Time	2814 N. Fremont	Springfield	65804
Ozarks Regional YMCA - Gray Prime Time	2102 W. 182 Farm Rd.	Springfield	65810
Ozarks Regional YMCA - Greenwood Prime Time	901 S. National	Springfield	65804
Ozarks Regional YMCA - Hickory Hills Prime Time	3429 E. Trafficway St.	Springfield	65802
Ozarks Regional YMCA - Holland Prime Time	2403 S. Holland	Springfield	65807
Ozarks Regional YMCA - Immaculate Conception Prime Time	3555 S. Fremont	Springfield	65804
Ozarks Regional YMCA - Jeffries Prime Time	4051 S. Scenic	Springfield	65807
Ozarks Regional YMCA - Mann Prime Time	3745 S. Broadway Ave.	Springfield	65807
Ozarks Regional YMCA - McBride Prime Time	5005 S. Farm Road 135	Springfield	65806

Ozarks Regional YMCA - Pershing	2120 S. Ventura	Springfield	65804
Ozarks Regional YMCA - Pittman Prime Time	2934 E. Bennett	Springfield	65804
Ozarks Regional YMCA - Pleasant View Prime Time	2210 E. AA State Hwy.	Springfield	65803
Ozarks Regional YMCA - Portland Prime Time	906 W. Portland St.	Springfield	65807
Ozarks Regional YMCA - Robberson Prime Time	1100 E. Kearney	Springfield	65803
Ozarks Regional YMCA - Sequiota Prime Time	3414 S. Mentor Ave.	Springfield	65804
Ozarks Regional YMCA - Sherwood Prime Time	1813 S. Scenic Ave.	Springfield	65807
Ozarks Regional YMCA - St. Agnes Prime Time	531 S. Jefferson	Springfield	65806
Ozarks Regional YMCA - St. Elizabeth Prime Time	2200 W. Republic	Springfield	65807
Ozarks Regional YMCA - St. Joseph Prime Time	515 W. Scott St.	Springfield	65802
Ozarks Regional YMCA - Sunshine Prime Time	421 E. Sunshine	Springfield	65807
Ozarks Regional YMCA - Truman Prime Time	3850 N. Vernon Rd.	Springfield	65803
Ozarks Regional YMCA - Twain Prime Time	2352 S. Weaver	Springfield	65807
Ozarks Regional YMCA - Watkins Prime Time	732 W. Talmage St.	Springfield	65803
Ozarks Regional YMCA - Weller Prime Time	1630 N. Weller Ave.	Springfield	65803
Ozarks Regional YMCA - Westport Prime Time	415 S. Golden	Springfield	65802
Ozarks Regional YMCA - Wilder Prime Time	2526 S. Hillsboro	Springfield	65806
Paradise Preschool & Childcare, LLC	4636 S. West Ave.	Springfield	65810
Parent Cooperative Preschool	922 W. Republic	Springfield	65807
Parkcrest Day Care Center	3581 S. Kansas St.	Springfield	65807
Patsy R. Egan	1765 E. Lafayette	Springfield	65804
Peapod Learning Center	1355 S. Black Locust Pl.	Springfield	65809
Pickwick Place Children's Center	614 S. Pickwick	Springfield	65802
Precious Gems Daycare Facility	1421 W. Kearney	Springfield	65802
Primekids Learning Center	2740 N. Mayfair	Springfield	65803
Promise Preschool and Child Development Center	5701 S. Farm Road 157	Springfield	65810
Queen of Angels Daycare Center Inc.	625 S. Jefferson	Springfield	65806
Rebecca Hummel	3870 S. Homewood Ave.	Springfield	65807
Rebecca S. Campbell	1327 S. Arcadia	Springfield	65804
Rhonda Ellen Hersh	1522 E. Price	Springfield	65804
Ridge Kids Preschool	2210 W. Republic Rd.	Springfield	65807
Rise and Shine Montessori Learning Center	420 W. Broadmoor	Springfield	65807
Ritter Head Start	3601 N. Farm Road 139	Springfield	65803
Safe n Sound Playground	3216 S. Scenic	Springfield	65807
Safe n Sound Playground Too	3386 S. Scenic	Springfield	65807
Salvation Army After School Center and Summer Day Camp	1707 W. Chestnut Expressway	Springfield	65802
Sarah Carr	2784 W. Vincent St.	Springfield	65810

Second Baptist Church Child Development Center	3111 E. Battlefield	Springfield	65804
Sharon Davis	2214 W. Walnut St.	Springfield	65806
Smart Start Day Care & Preschool, LLC	2425 N. Pine	Springfield	65802
Southside Kids Childcare Center and Preschool, Inc.	2723 S. Meadowbrook	Springfield	65807
Squibblestix After School Program	1201 S. Oak Grove Ave.	Springfield	65804
St. John's Employee Child Development Center I	1831 S. Fremont	Springfield	65804
St. John's Employee Child Development Center II	3540 S. Culpepper	Springfield	65804
Stephanie Cartwright	1125 N. Oak Park Dr.	Springfield	65802
Stewart Head Start	552 N. Stewart	Springfield	65802
Tammy Stephens	1634 S. Estate	Springfield	65803
Teresa Snyder	1905 S. Luster	Springfield	65804
The Goddard School	2238 W. Kingsley Rd.	Springfield	65810
The Little Rascals Preschool	1381 E. Division	Springfield	65802
The Nurturing Place	3039 N. National	Springfield	65803
Thresa Lee	3027 W. Latoka	Springfield	65804
Touch of Nature Quality Child Care, Inc.	622 S. Pickwick	Springfield	65802
Touch of Nature Quality Child Care Too	1446 E. Lark	Springfield	65804
University Child Care Center	500 South St.	Springfield	65806
Verna Dayton	3211 W. Village Ln.	Springfield	65807
Victoria A. Taylor	2246 N. Roosevelt	Springfield	65802
Wesley Kids Club	922 W. Republic	Springfield	65807
West Chestnut Head Start	246 W. Farm Road 115	Springfield	65802
Westminster Parents Day Out and Preschool At Westminster	1551 E. Portland	Springfield	65804
Yellow Brick Road, Inc.	627 E. Monroe	Springfield	65806

Critical Facilities Inventory: Strafford

SCHOOLS			
Strafford Elementary	201 W. McCabe St.	Strafford	65757
Strafford Middle School	201 W. McCabe St.	Strafford	65757
Strafford High School	201 W. McCabe St.	Strafford	65757
NURSING HOME			
Strafford Care Center	505 West Evergreen	Strafford	65757
POLICE			
Strafford Police Department	113 E. Pine	Strafford	65757
FIRE			
Strafford Fire Protection District	207 W. Stan Harriman	Strafford	65757
CITY GOVERNMENT			
Strafford City Hall	126 N. Washington	Strafford	65757
WASTE FACILITIES/RECYCLING CENTERS			
Strafford Recycling Center	333 E. Evergreen	Strafford	65757
Strafford Recycling Center	(Behind Building) 201 W. McCabe	Strafford	65757
Strafford Recycling Center	113 W. Old Rte 66	Strafford	65757
PLACES OF WORSHIP			
First Assembly of God of Strafford	1113 W. Old Route 66	Strafford	65757
Church of Christ	11 S. Redwood Dr.	Strafford	65757
First Baptist Church of Strafford	400 S. Madison Ave.	Strafford	65757
Harvest Hill Baptist	101 E. Evergreen St.	Strafford	65757
Landmark Church	200 S. Peach Tree Ln.	Strafford	65757
Strafford Church of Nazarene	101 MO-125 B	Strafford	65757
Strafford United Methodist Church	200 E. Chestnut St.	Strafford	65757
CHILD CARE AND HEAD STARTS			
A Touch Above Child Care	9379 E. Evergreen St.	Strafford	65757
Rainbow Connection	222 McCabe St.	Strafford	65757
Strafford Early Childhood Center	218 W. McCabe St.	Strafford	65757
Strafford Pre-School	205 Rt. 66	Strafford	65757
Westermans Day Care	406 Dell St.	Strafford	65757

Critical Facilities Inventory: Walnut Grove

SCHOOLS			
Walnut Grove Elementary	300 College St.	Walnut Grove	65770
Walnut Grove Junior High and High School	300 College St.	Walnut Grove	65770
POLICE			
Walnut Grove Police Department	116 N. Washington	Walnut Grove	65770
FIRE			
Walnut Grove Fire Protection District	540 N. Washington	Walnut Grove	65770
CITY GOVERNMENT			
Walnut Grove	101 S. Washington	Walnut Grove	65770
PLACES OF WORSHIP			
Apostolic Lighthouse of Praise	5663 S. 60th Rd.	Walnut Grove	65770
Harold Baptist Church	10110 N. Farm Road 51	Walnut Grove	65770
Walnut Grove First Baptist	417 S. Washington	Walnut Grove	65770
Walnut Grove First Christian	301 E. Main	Walnut Grove	65770
CHILD CARE AND HEAD STARTS			
Walnut Grove Preschool	300 E. College	Walnut Grove	65770

Critical Facilities Inventory: Willard

SCHOOLS			
Willard Central Elementary	2625 N Farm Rd. 101	Springfield	65802
Willard East Elementary	518 Kime	Willard	65781
Willard Intermediate School	407 Farmer Rd.	Willard	65781
Willard North Elementary	409A Farmer Rd.	Willard	65781
Willard Orchard Hills Elementary	4595 W. Farm Rd. 140	Willard	65781
Willard South Elementary	4151 W. Division	Springfield	65802
Willard Middle School	205 Miller Rd.	Willard	65781
Willard High School	515 E. Jackson	Willard	65781
Willard Alternate School	406 S. Farmer Rd.	Willard	65781
Willard Special Services	405 S. Farmer Rd.	Willard	65781
NURSING HOME			
Briston Manor of Willard	511 Watson	Willard	65781
Willard Care Centre, Inc.	400 Walnut Ln.	Willard	65781
POLICE			
Willard Police Department	795 Hughes St.	Willard	65781
FIRE			
Willard Fire Protection District	240 N State Highway Z	Willard	65781
Willard Fire Station	2455 N Pine Ave	Willard	65781
CITY GOVERNMENT			
Willard City Hall	224 W. Jackson	Willard	65781
WASTE FACILITIES/RECYCLING CENTERS			
Willard Recycling Center	613 Tower Rd.	Willard	65781
PLACES OF WORSHIP			
Lighthouse Gospel Center	201 W. Jackson	Willard	65781
Calvary Assembly of God	8580 W. Farm Road 52	Willard	65781
Carpenter's House Church	410 E. Jackson	Willard	65781
Crosspoint Independent Baptist	4295 N. Willard	Willard	65781
Emanuel Romanian Christian	510 S. Miller Rd.	Willard	65781
Jackson St. Church of Christ	304 E. Jackson #303	Willard	65781
Lone Star Baptist Church	3518 W. Farm Road 44	Willard	65781
New Life Baptist Church	414 E. New Melville Rd.	Willard	65781
Noble Hill Baptist	3285 W. Farm Road 36	Willard	65781
Renew united Methodist	218 S. Farmer Rd.	Willard	65781
Robberson Prairie Baptist Church	3244 W. Farm Road 50	Willard	65781

Rose Hill Baptist	9903 N. State Highway Z	Willard	65781
The Church of Jesus Christ of Latter-Day Saints	320 W. Jackson	Willard	65781
Willard Assembly of God	203 Miller Rd.	Willard	65781
Willard Community Christian Church	300 E. Proctor Rd.	Willard	65781
Willard First Baptist Church	202 W. Jackson	Willard	65781
Willard Presbyterian Church	800 S. State Highway AB	Willard	65781
Willard United Methodist Church	304 S. Farmer Rd.	Willard	65781
CHILD CARE AND HEAD STARTS			
Ladonna Woolsey	5994 N. Farm Rd. 117	Willard	65781
Michelle Crawford	603 S. Miller Rd.	Willard	65781
Smart Start Day Care & Preschool II, LLC	105 Willey	Willard	65781
Willard Preschool	203 Miller Rd.	Willard	65781

CALCULATED PRIORITY RISK INDEX

CALCULATED PRIORITY RISK INDEX (CPRI)

The Greene County Hazard Mitigation Plan for 2020-2025 incorporated a CPRI (Calculated Priority Risk Index) for prioritization purposes in the hazard profiles. This method uses probability, magnitude/severity, warning time, and duration of a hazard to effectively rate and then prioritize each hazard.

CPRI Formula

$$(Probability \times 0.45) + (Magnitude/Severity \times 0.30) + (Warning Time \times 0.15) + (Duration \times 0.10)$$

CPRI Range Significance

The probability, magnitude/severity, warning time, and duration of a hazard will be calculated first. After all four are multiplied by their weight value, they are added together to give each hazard a single number rating. After applying the formula for CPRI to each hazard, we then appropriately rated each based on the combined score from probability, magnitude/severity, warning time, and duration. Any hazards that fall between 1.0 and 1.9 are categorized as a low priority, between 2.0 and 2.9 categorized as a medium priority, and between a 3.0 and a 4.0 as a high priority. This method of prioritization takes all elements into account when determining which hazards should have the most priority in the mitigation plan and also provides reasoning behind the priorities.

MITIGATION PLANNING PRIORITY LEVEL	RANGES
High	3.0 – 4.0
Moderate	2.0 – 2.9
Low	1.0 – 1.9

All elements and weighted values are discussed in this section to show the effectiveness and reasoning behind the Calculated Priority Risk Index. The charts will present a quick reference on how the hazards are ranked by the rating criteria.

Probability

Rating the probability of a hazard is based heavily on history of the area, and the possibility of it occurring in Greene County. The lowest probability given for any hazard (See chart below) is unlikely. As listed, unlikely means that the event is still possible, but has not occurred in the last 10 years (less than 10% per year). The next category is occasional, and a 1 in 5 years (20% chance of occurrence). Likely means that the event has a 1 in 3 years chance of occurrence (33%), and highly likely has a 1 in 1 year chance of occurrence (100%- this does not mean that it will occur, just that there is 100% chance).

PROBABILITY	RATING	RATING CRITERIA
	4 HIGHLY LIKELY	Event is probable within the year
		Event has up to 1 in 1 year chance of occurrence (1/1=100%)
		History of events is greater than 33% likely to happen
		Event is "Highly Likely" to occur
	3 LIKELY	Event is probable within the next 3 years
		Event has up to 1 and 3 years chance of occurring (1/3=33%)
		History of events is greater than 20% but less than or equal to 20% likely per year
		Event is "Likely" to occur
	2 OCCASIONAL	Event is probable within the next 5 years
		Event has up to 1 in 5 years chance of occurring (1/5=20%)
		History of events is greater than 10% but less than or equal to 20% likely per year
		Event could "Possibly" occur
	1 UNLIKELY	Event is possible within the next 10 years
		Event has up to 1 in 10 years chance of occurring (1/10=10%)
		History of events is less than or equal to 10% likely per year
Event is "Unlikely" but is possible of occurring		

Probability is given the highest weighted value of 45% (x.45). The hazards probability is the greatest factor in determining risks because without the presence of the hazard, the rest of the factors are not as predominant. Missouri has a fair amount of hazards that are very likely and happen yearly, for example damaging winds and lightning. There are also hazards that are planned for, but unlikely to occur such as dam failure and nuclear hazards.

Magnitude/Severity

Measuring the magnitude/severity of a hazard needs to take multiple elements into account that have a potential to be affected. Injuries, illnesses, and deaths need to be considered as one of the most important elements. Facility damage is important to represent not only costs associated with hazards, but the shutdown of facilities can greatly affect the public, the economy, and specific needs to the population such as utilities, medical needs, and food. 24 hours or less of facility shutdowns is a minor setback for the needs of the public in most situations, but the longer the facilities are shutdown, the more of a demand and will grow. Property damage also attributes to the magnitude and severity of a hazard. The consequence analysis will further break down types of damage. (Pages 3-1.1 to 3-1.12.)

MAGNITUDE/ SEVERITY	RATING	RATING CRITERIA	
	4 CATASTROPHIC		Multiple deaths (3 or more)
			Complete shutdown of facilities for 30 days or more
			Property is widespread with significant damage
	3 CRITICAL		Injuries and/or illnesses result in permanent disability
			Complete shutdown of critical facilities for at least 2 weeks
			Widespread minor or multiple instances of significant property damage
	2 LIMITED		Injuries and/or illnesses do not result in permanent disability
			Complete shutdown of critical facilities for over 24 hours to 1 week
			Minor isolated instances of property damage
	1 NEGLIGIBLE		Injuries and/or illnesses are treatable with first aid
			Minor quality of life lost
			Shutdown of critical facilities and services for 24 hours or less
			Limited to no property damage

Magnitude/severity was given the weighted value of 30% (x.30) because a large determinate of prioritization is going to come from the severity of a hazard and the direct effects of the hazard. Percentages were not used in this measure due to the varying sizes of participating jurisdictions. Instead, rating is based on more objective terminology. This was given the second highest weighted value because it will be the most important element after the probability of the hazard is determined.

Warning Time

Warning time in hazard profiles is divided up into time increments. The more time we have before a hazard is present, the more time we have to prepare the public and responders for impact. This was categorized by over 1 day of warning, a day to a day in a half of warning time, 6 – 12 hours of warning, and less than 6 hours of warning.

WARNING TIME	RATING	RATING CRITERIA
	4	Less than 6 hours
	3	6-12 hours
	2	12-24 hours
	1	24+ hours

Warning time provides a chance to take cover/stock necessary supplies. It is weighted at 15% because the probability and magnitude have a far greater effect on the community where very few of our consequences will chance based off of warning time.

Duration

The duration of a hazard is also based off of time increments, but on a larger scale to measure how long a hazard will last. The duration represented does not take into account recovery time, only the duration and how long the hazard itself will be present in the community. The lowest ranking is anything that lasts 6 hours or less, followed by anything lasting less than 1 day, less than 1 week, and finally more than 1 week. This is an important factor in determining stamina for the community and having an idea of how long we may be enduring the impacts of this event. This also affects response, as many services may not be available until after the hazard has ended.

DURATION	RATING	RATING CRITERIA
	4	More than 1 week
	3	Less than 1 week
	2	Less than 1 day
	1	Less than 6 hours

Duration is weighted with a 10% value as it also is important when discussing the impact of a hazard to the community. The longer the duration of a hazard, the longer people may have to go without necessities, the longer businesses may be shut-down, and the longer the effects of the hazard in general.

CONSEQUENCE ANALYSIS

CONSEQUENCE ANALYSIS EXPLANATION

The consequence analysis is similar to the magnitude/severity of the CPRI rating. The consequence analysis is specific to how safety and health of the public, safety and functionality of responders, property, facility, infrastructure, environment, delivery of services, economy, and public confidence in governance is affected. These factors are also rated as 4- "catastrophic," 3- "critical," 2- "limited," or 1- "negligible". To better understand the consequence analysis, the following will break down how each hazard was rated. These consequences are rated with minimal, moderate, significant, and severe ratings.

Objective Based Evaluation

The Joplin tornado of 2011 was a disaster that affected over 6% of the population with 158 deaths and around 900 injuries out of the surrounding metropolitan area of 174,237. If the same number of people suffered from injury or death in Greene County, this would only account for 0.37% of our population. If Ash Grove were to face these same numbers in injuries and deaths, it would include 68% of the population. These numbers also demonstrate how using percentages to measure impact would not be as practical or accurate. If a hazard were to take place in the rural population of Greene County, it would take quite a different impact then if it were to occur at a college dormitory.

These varying sizes of participating jurisdictions make it hard to classify categories based on numbers and percentages. Due to the variation of populations in the Greene County, most ratings are based on objective definitions (widespread, significant, minor, etc.). Catastrophic, critical, limited, and negligible are described on the right of each chart.

Safety and Health of the Public

The safety and health of the public is rated based off of the amount of safety concerns and the amount of injuries, illnesses, or deaths involved with a hazard. Safety concerns mean that while the public may not have suffered injuries, illnesses, or deaths, the risk is present.

Safety and Health of the Public

4	CATASTROPHIC	Severe number of injuries and illnesses, multiple deaths (more than 2) Major widespread significant safety concerns present
3	CRITICAL	Severe number of injuries and illnesses, minimal number of deaths (1-2) Widespread minor or multiple instances of significant safety concerns
2	LIMITED	Few/minor injuries and illnesses, no deaths Few/minor safety concerns
1	NEGLIGIBLE	Little to no impact on public safety No safety concern present

Safety and Functionality of Responders

There are many different types of responders to hazardous events. Law enforcement, fire departments, emergency medical services, emergency management, military, cave/mine rescue, search and rescue, hazmat, highway departments, and utility services may be needed depending on the extent and type of hazardous event. Elements to be mindful of are both life safety and operational ability. Road conditions are an important factor to be considered that could have many effects on functionality and life safety. Power failure could also severely hamper response functionality if electricity is required.

Safety and Functionality of Responders

4	CATASTROPHIC	Life threatening situations for multiple responders, response functions severely hampered
3	CRITICAL	Potential for life safety issues, response functions are impacted
2	LIMITED	No life threatening issues to responders, minor impact of some response functions
1	NEGLIGIBLE	Little or no impact on responders and response functions

Property Damage

Property damage can occur in both private and public settings. Vehicles and residential homes, commercial businesses and industrial buildings are included in this category. In 2009, Greene County homes averaged at \$165,843, with a total of 125,387 housing units from the Census data of 2010. The 2010 Census data also estimates 197,769 vehicles. Without placing price values on estimated property damage, assigning each category with a descriptive approach of property damage is the easiest to rate and understand.

Property Damage

4	CATASTROPHIC	Widespread significant property damages
3	CRITICAL	Widespread minor damage or multiple instances of significant property damage
2	LIMITED	Minor isolated instances of property damage
1	NEGLIGIBLE	Little to no impact on property

Agriculture Damage

Agriculture is an important aspect to the Greene County community. Hazards affecting crops and livestock can have a significant impact on food supplies and the economy. Hazards that affect agriculture can also spread illness or disease among livestock.

Agriculture Damage

4	CATASTROPHIC	Widespread significant agriculture damages
3	CRITICAL	Widespread minor damage or multiple instances of significant agriculture damage
2	LIMITED	Minor isolated instances of agriculture damage
1	NEGLIGIBLE	Little to no impact on agriculture

Damages to the Environment

When discussing the potential damages to the environment, many elements should be taken into consideration. Greene County is home to many cave systems, floodplains, and an extensive waste system for the population. All of these things can be affected by hazards. The environment of Greene County also plays an important role in the economy with any environmental damages that affect our agricultural businesses. Wildlife can also be negatively affected by hazards.

Damages to the Environment

4	CATASTROPHIC	Widespread significant damage to the environment
3	CRITICAL	Widespread minor damage to the environment or multiple instances of significant damage to the environment
2	LIMITED	Minor isolated instances of environmental damage
1	NEGLIGIBLE	Little to no impact on the environment

Infrastructure Damage

Infrastructures are the basic structures needed for the operation of a society. Critical infrastructure consists of chemical, commercial facilities, communications, manufacturing, emergency services, energy, financial services, government facilities, healthcare services, and transportation services are all examples of critical infrastructure that could be impacted in a hazard. Infrastructure damage includes damage to roadways, bridges, and power lines, sewer, gas lines, and many others. Critical facilities are also included in infrastructure. Hospitals, utilities, fire and police stations, gas stations, and grocery stores are just a few extremely critical facility types that can cause the impact of a disaster to increase. Facility damage to hospitals can create various problems such as evacuating the building in large groups as well as supplying any special needs that make transportation more difficult. There is also the problem of where to place the occupants when facilities are evacuated, as most Greene County hospitals operate at close to full capacity on a regular basis. Utility facilities that are damaged may not be able to supply services and repairs until they have reached a state of stability. Grocery stores that are impacted cannot supply the public with food, water, hygienic supplies or critical needs of the public. These damages can create greater problems for the public, responders, and the delivery of services. With damaged roads, some can be left in very dangerous conditions, while others may remain completely impassable. Power lines can also create dangerous situations.

Infrastructure Damage

4	CATASTROPHIC	Major critical infrastructure impacted in all key sectors
3	CRITICAL	Multiple critical infrastructure impacted in areas throughout the jurisdiction
2	LIMITED	Minor impact to some key infrastructure, no widespread impact
1	NEGLIGIBLE	Little to no impact on critical infrastructure

Facility Damage

Non-critical facilities are important to the community and the economics of the jurisdiction, but do not have a direct “need” from the public for life and safety. These can be department stores or small businesses that do not provide a direct public service in life or safety.

Facility Damage

4	CATASTROPHIC	Widespread significant facility damages to facilities
3	CRITICAL	Widespread minor damage or multiple instances of significant facility damage to facilities
2	LIMITED	Minor isolated instances of damage to facility structures
1	NEGLIGIBLE	Little to no impact to facility structures

Delivery of Services

The delivery of services is dependent on many other elements in the consequence analysis. In order for emergency services, supplies, and outside support to be brought into a hazardous environment the infrastructure's means of transportation must be useable. The element of safety must also be considered, much like the safety and functionality of the responders.

Delivery of Services

4	CATASTROPHIC	Critical services are severely impacted and inoperable
3	CRITICAL	Critical services operations are hampered for multiple functions across the jurisdiction, many services have been suspended
2	LIMITED	Minor service operations may be interrupted, delays of some services
1	NEGLIGIBLE	Little to no impact on service operations, all services can be delivered without interruption.

Economic Impact

Rating a hazard on the economic impact that it has on a jurisdiction is dependent on the costs associated with the hazards damage, and also on the losses from closed businesses, lost wages, and also loss of productivity. The unemployment rate can be greatly affected in many situations. In order to categorize the economic impacts, the jurisdiction size must be taken into consideration. The temporary closing of some facilities is going to have a far greater impact on a jurisdiction of 2,000 people than of a jurisdiction of 160,000 people.

Economic Impact

4	CATASTROPHIC	Major economic impact with widespread loss
3	CRITICAL	Greatly impacted economic condition in areas throughout the jurisdiction
2	LIMITED	Minor economic impact
1	NEGLIGIBLE	Little to no economic impact.

Public Confidence in Governance

Public confidence in governance can be very fragile in times of need, and is often shaped by how the response is handled. The public will depend of the government for any needs such as shelter, food and water, and guidance on how to return to a normal state. With a loss of public confidence in governance, riots and protests can become another hazard.

Public Confidence in Governance

4	CATASTROPHIC	Major widespread significant loss in public confidence
3	CRITICAL	Greatly impacted public confidence in governance in areas throughout the jurisdiction
2	LIMITED	Minor isolated instances of loss in public confidence in governance
1	NEGLIGIBLE	Little to no loss in public confidence in governance

VULNERABILITY: DROUGHT

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
DROUGHT	3	3	4	4	3.25

Probability

Probability is determined by previous occurrences. For a full list of previous drought occurrences in Greene County, please see the hazard profile “Drought” starting on page 3.39.

Probability Summary

With having several drought events over the last several years, it is probable that a drought will occur in the next 3 years in Greene County.

DROUGHT	PROBABILITY
	3

Magnitude/Severity

In addition to damages to crops, produce, livestock, soil and the resulting economic consequences, the arid conditions created by drought pose an increased risk of fire. The danger is especially high for wild land fires in the urban interface areas of Greene County.

Severe drought also poses a threat to citizens through water shortages and extreme heat. Children, the elderly and those with respiratory problems are particularly vulnerable during a drought. Contaminated or poor water quality for drinking and sanitation measures also causes a variety of serious illnesses.

The magnitude of another drought would depend on the duration. With the history of droughts in the area, most last at least a couple of months. A drought at this duration would be critical and could cause widespread minor, or multiple instances of significant damage.

DROUGHT	MAGNITUDE/SEVERITY
	3

Warning Time

There is typically no warning time associated with droughts.

DROUGHT	WARNING TIME
	4

Duration

The duration of a drought in Greene County typically lasts a few months.

DROUGHT	DURATION
	4

CONSEQUENCE ANALYSIS: DROUGHT-GREENE COUNTY

IMPACTED AREA	CPRI RATING		Rating Explanation
Safety and Health of the Public	3	Critical	Droughts can create many safety concerns. Wildfires and urban fires are at elevated risk during droughts. Droughts can pose threats to citizens through water shortages and extreme heat that is often accompanied by droughts. Children, the elderly, and those with respiratory problems are at elevated health risks. Illnesses can also come from contaminated water. These elements create multiple safety concerns.
Safety and Functionality of Responders	3	Critical	Greene County has no reports life threatening situations to responders or any impact to response functions due to a drought. Responders can be vulnerable to fatigue and this can cause response functions to be impacted.
Property Damage	2	Limited	Property damage is often minor but is impacted especially when considering the issues that may arise due to a water shortage.
Agriculture Damage	4	Catastrophic	Widespread significant crop damages have been recorded in Greene County due to droughts. Livestock is also vulnerable and results in losses as well during a drought. This can also negatively affect the environmental, economic, and public confidence consequences if foods become a short supply.
Damage to the Environment	4	Catastrophic	Significant widespread damage has occurred in Greene County due to drought incidents. The environment can take years to recover from a drought. Wildfires and wildlife is also highly affected. Water and soil contamination is also probable.
Infrastructure Damage	2	Limited	There have been no reports of infrastructure damages due to droughts in Greene County. However, water shortage can create an impact to some infrastructure.
Facility Damage	1	Negligible	There have been no reports of facility damages due to drought in Greene County.
Delivery of Services	1	Negligible	There have been no reports of impact on service operations due to droughts in Greene County.
Economic Impact	3	Critical	Many rural areas depend on crops and livestock, while the cities need a large amount of water to support the larger populations. Many rural homes and areas that survive off their own wells will also suffer greatly from a drought.
Public Confidence in Governance	2	Limited	Public confidence can be affected if food and water supplies are scarce. This factor is heavily dependent on how the crisis is handled by the government.

VULNERABILITY: EARTHQUAKE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
EARTHQUAKE	1	2	4	1	1.75

Probability

Probability is determined by previous occurrences. For a full list of previous Earthquake events in Greene County, please see the hazard profile for “Earthquake” starting on page 3.50.

Probability Summary

With the data collected, it is reasonable to assume that Greene County is unlikely to experience a serious earthquake within the next 10 years.

EARTHQUAKE	PROBABILITY
	1

Magnitude/Severity

The primary effect any earthquake would have on Greene County is the influx of emergency management personnel and scientists, as well as people trapped on I-44. Greene County could also see an influx in people evacuating. This would significantly clog emergency routes. It is reasonable to assume Greene County would experience minor instances of property damage resulting in a limited magnitude or severity.

EARTHQUAKE	MAGNITUDE/SEVERITY
	2

Warning Time

Earthquakes can happen at any time, and with no warning.

EARTHQUAKE	WARNING TIME
	4

Duration

The period of tremors, (shocks) can last up to several months. The larger shocks can cause ground failure, landslides, liquefactions, uplifts and sand blows. Greene County could see an influx of people evacuating for months after the earthquake. However, the initial duration of the earthquake itself will only last a few seconds up to a few minutes.

EARTHQUAKE	DURATION
	1

CONSEQUENCE ANALYSIS: EARTHQUAKE-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	2	Limited	An earthquake that affected Green County would most likely result in few minor injuries and no deaths with only small safety concerns.
Safety and Functionality of Responders	1	Negligible	There would be little to no impact on responders and response functions in Greene County due to an earthquake.
Property Damage	2	Limited	Greene County would experience property damages to buildings that are not structurally sound or of poor quality.
Agriculture Damage	1	Negligible	An earthquake would result in little to no impact on agriculture.
Damage to the Environment	1	Negligible	The environment would experience little to no impact from an earthquake.
Infrastructure Damage	2	Limited	An earthquake could create a minor impact to some key infrastructure such as road damage or power losses in some areas, however, not widespread.
Facility Damage	2	Limited	An earthquake may cause weak facilities damage, windows could be broken, and other minor isolated instances of damage.
Delivery of Services	1	Negligible	An earthquake would cause little to no impact on service operations
Economic Impact	2	Limited	Damages to property, facilities, or infrastructure will have a very minor impact on the economy.
Public Confidence in Governance	2	Limited	An earthquake would result in little to no loss in public confidence in governance in Greene County.

VULNERABILITY: EXTREME TEMPERATURES

Extreme Cold

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
EXTREME COLD	3	2	1	3	2.40

Probability

Probability is determined by previous occurrences. For a full list of previous occurrences of extreme cold temperature in Greene County, refer to the individual hazard profile "Extreme Temperatures" starting on page 3.58.

Probability Summary

It is likely that Greene County will experience another extreme cold incident in the next 3 years.

EXTREME COLD	PROBABILITY
	3

Magnitude/Severity

Greene County does not experience many deaths from cold related illnesses and exposure. Property and crop damage can be found in isolated instances (Farms, frozen pipes, etc). Severity of extreme cold in Greene County is limited.

Extreme Cold	Magnitude/Severity
	2

Warning Time

With the forecasting abilities of the National Weather Service, extreme cold is normally predictable at least a day ahead.

Extreme Cold	Warning Time
	1

Duration

Extreme Cold incidents typically last between 1 day and 3 days, but less than 1 week.

Extreme Cold	Duration
	3

Extreme Heat

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
EXTREME HEAT	3	3	1	4	2.80

Probability

Probability is determined by previous events. For a full list of extreme heat incidents in Greene County, refer to the hazard profile “Extreme Temperatures” starting on page 3.58.

Probability Summary

Greene County has experienced many extreme heat incidents over the last several years. It is likely that Greene County will experience another event in the next three years.

EXTREME HEAT	PROBABILITY
	3

Magnitude/Severity

Extreme Heat is a big danger during the summer months in Missouri. Prolonged exposure can cause many heat related illnesses and even death. Extreme Heat in Greene County also includes widespread instances of property damage and other health problems. This classifies extreme heat as critical.

EXTREME HEAT	MAGNITUDE/SEVERITY
	3

Warning Time

Extreme heat can typically be forecasted out by 3-7 days.

EXTREME HEAT	WARNING TIME
	1

Duration

Extreme Heat can last for weeks, even months.

EXTREME HEAT	DURATION
	4

CONSEQUENCE ANALYSIS: EXTREME COLD-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	Although there have been no reports of death due to extreme cold in Greene County, death occur every year in Missouri. Greene County has documented cases of injuries and illness from extreme cold incidents.
Safety and Functionality of Responders	2	Limited	There are no reports of life threatening issues to responders, and no reports of impact on response functions. However, the extreme cold environment can create safety issues to responders.
Property Damage	2	Limited	Minor isolated instances of property damage such as frozen pipes can result from extreme cold incidents.
Agriculture Damage	3	Critical	Extreme cold may result in widespread damages to crops.
Damage to the Environment	2	Limited	Extreme cold can negatively affect wildlife, plants, and trees.
Infrastructure Damage	1	Negligible	There have been no reports of infrastructure damages due to extreme cold in Greene County.
Facility Damage	1	Negligible	There have been no reports of facility damages due to extreme cold in Greene County.
Delivery of Services	1	Negligible	There have been no reports of impact on service operations in Greene County.
Economic Impact	1	Negligible	There have been no reports of economic impact due to extreme cold in Greene County.
Public Confidence in Governance	1	Negligible	There have been no reports of impact on public confidence in governance due to extreme cold in Greene County

CONSEQUENCE ANALYSIS: EXTREME HEAT-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	4	Catastrophic	Greene County has documented cases of injuries and illnesses from extreme heat incidents every year. The elderly, youth, and over or underweight population are at increased risk for heat related illnesses. People are also extremely vulnerable to extreme heat if they work outdoors, are military personnel, or athletes.
Safety and Functionality of Responders	2	Limited	There are no reports of life threatening issues to responders, and no reports of impact on response functions. However, the extreme heat environment can create safety issues to responders.
Property Damage	2	Limited	Extreme heat in Greene County has resulted in minor isolated instances of property damages.
Agriculture Damage	3	Critical	Widespread significant crop damages occur due to extreme heat, especially when paired with lack of water. Livestock is also vulnerable and results in losses or illnesses during extreme heat. This can also negatively affect the environmental, economic, and public confidence consequences if foods become a short supply.
Damage to the Environment	3	Critical	Multiple instances of significant damage to the environment have occurred in Greene County due to extreme heat incidents. This includes death of wildlife and possible water shortages.
Infrastructure Damage	2	Limited	Greene County has experienced minor instances of infrastructure damages due to extreme heat.
Facility Damage	1	Negligible	There have been no reports of facility damages due to extreme heat in Greene County
Delivery of Services	1	Negligible	There have been no reports of impact on service operations due to extreme heat in Greene County
Economic Impact	2	Limited	Extreme heat incidents in Greene County have affected the economic condition in areas throughout Greene County. Cities need a large amount of water to keep injury and illness from growing. Many rural homes and areas that survive off their own wells will also suffer greatly from extreme heat if there is a lack of water. Extreme heat will also slow productivity.
Public Confidence in Governance	2	Limited	Public confidence can be affected water supplies are scarce in extreme heat. The confidence in the government can rise or fall depending on how the situation is handled

VULNERABILITY: FLOOD

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
FLOOD	4	3	4	3	3.60

Probability

Probability is determined by previous flooding events. For a full list of flooding events in Greene County, refer to the individual hazard profile “Flooding” starting on page 3.68.

Probability Summary

Some form of flooding takes place every year in Greene County. Flooding in Greene County will take place in the next year.

FLOOD	PROBABILITY
	4

Magnitude/Severity

Due to the lack of major rivers and tributaries, the flooding Greene County usually experiences are flash flood events. These events have caused major property damage in many areas of Missouri, including Greene County in recent years. Flash Flooding has also caused death in Greene County. These incidents are critical.

FLOOD	MAGNITUDE/SEVERITY
	3

Warning Time

Flash Flood events are characterized by rapidly rising water within six hours of the start of rainfall. Typically the warning time is less than 6 hours.

FLOOD	WARNING TIME
	4

Duration

Flooding in Greene County typically last 2 to 3 days.

FLOOD	DURATION
	3

CONSEQUENCE ANALYSIS: FLOODING-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	4	Catastrophic	Risk of death or injury is elevated from risking creeks, tributaries, and storm water run-off that cross a section or roadway. Floods also create health concerns from disease, and sanitation problems.
Safety and Functionality of Responders	3	Critical	The potential for dangerous life safety issues to responders is high in performing water rescues. Many flooding incidents in Greene County take hours to perform, impacting response functions. Flooded roads can also present a challenge.
Property Damage	4	Catastrophic	Numerous neighborhoods and businesses have had damages from flooding in Greene County. There have been multiple instances of significant widespread property damage
Agriculture Damage	3	Critical	Flooding and water run-offs can damage crops. Many crops can also be completely washed away.
Damage to the Environment	3	Critical	Flooding can negatively affect soil make-up and wildlife.
Infrastructure Damage	4	Catastrophic	Flooding in Greene County has washed out many roadways. Roads that are not permanently damaged are often impacted and typically experience a dangerous amount of water flowing over them. Critical infrastructures including banks, railroads, power lines, and power plants have also been affected by flooding. Infrastructure damages include multiple areas through-out the jurisdiction
Facility Damage	3	Critical	Flooding often results in widespread minor damages or sometimes significant damages to facilities
Delivery of Services	3	Critical	Multiple critical services and operations are suspended or delayed across the jurisdiction due to elements such as road safety, infrastructure damages, and power outages
Economic Impact	3	Critical	During floods roads, bridges, houses and automobiles either become unsafe or are destroyed. Additionally, the government deploys firemen, police and other emergency apparatuses to help the affected. Businesses can also be damaged or completely destroyed and unable to return to normalcy until repairs are done. This can greatly impact the economic condition through-out Greene County
Public Confidence in Governance	1	Negligible	Flooding has had little to no impact on public confidence in the governance.

VULNERABILITY: LAND SUBSIDENCE/SINKHOLES

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
LAND SUBSIDENCE	4	1	4	4	2.65

Probability

Probability is determined by previous occurrences. For a full list of previous land subsidence/sinkhole events, refer to the individual profile “Land Subsidence/Sinkholes” starting on page 3.84.

Probability Summary

It is very likely that more sinkholes will appear within Greene County in the next 3 years.

LAND SUBSIDENCE	PROBABILITY
	4

Magnitude/Severity Summary

Sinkholes will typically only result in limited instances of property damages.

LAND SUBSIDENCE	MAGNITUDE/SEVERITY
	1

Warning Time

Sinkholes can appear suddenly with no warning time.

LAND SUBSIDENCE	WARNING TIME
	4

Duration

Sinkholes can continue to grow larger after first appearing. Sinkholes will remain until they are properly filled.

LAND SUBSIDENCE	DURATION
	4

Consequence Analysis: Land Subsidence-Greene County-Greene County

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	Land subsidence can be very dangerous and creates many safety concerns for residential or commercial areas.
Safety and Functionality of Responders	1	Negligible	There would be little to no impact on responders and response functions in Greene County due to land subsidence
Property Damage	2	Limited	Greene County could experience minor isolated instances of property damage in forms such as building and home foundations.
Agriculture Damage	1	Negligible	Land Subsidence would result in little to no impact on agriculture.
Damage to the Environment	4	Catastrophic	Sinkholes create a direct link to the water supply, and depending on the location of the sinkhole, can directly contaminate drinking water. Contamination in the form of litter or trash, as well as chemicals from roadways can be washed into an open sinkhole especially if near a road or busy commercial area.
Infrastructure Damage	3	Critical	Sinkholes have caused destruction on roadways, and must be filled in to repair road or continue construction on new roadways. This has happened in multiple areas in Greene County.
Facility Damage	1	Negligible	Greene County has experienced little to no impact on facilities due to land subsidence.
Delivery of Services	1	Negligible	Land subsidence has little to no impact on service operations.
Economic Impact	2	Limited	Sinkholes can cause damage when expanding. Greene County has repaired multiple roadways in which a sinkhole caused damage. Land subsidence has a minor economic impact
Public Confidence in Governance	1	Negligible	Land subsidence causes little to no loss of public confidence in governance in Greene County.

VULNERABILITY: SEVERE THUNDERSTORMS (HIGH WINDS, HAIL AND LIGHTNING)

High Winds

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
WIND	4	3	4	1	3.45

Probability

Probability is determined by previous occurrences. A full list of previous events for Greene County is listed in the Individual Profile for Severe Thunderstorms on page 3.91.

Probability Summary

There are hundreds of wind events that have taken place in Greene County over the last few decades. Damaging winds occur every year in Greene County. The probability for damaging winds is highly likely.

WIND	PROBABILITY
	4

Magnitude/Severity

The high wind speeds can cause property damage and dangerous situations that can place lives at risk. More commonly utility services are likely to need repair. There has been widespread damages over the last 10 years. Damages totaling over \$17 Million.

WIND	MAGNITUDE/SEVERITY
	3

Warning Time

Doppler radar is a critical tool for damaging wind detection because these hazards have certain patterns in the data collected near the surface and in middle levels of the storm. Sometimes a thin line appears on the radar display indicating a gust front. While radar remains the number one tool for forecasters evaluating storms, lightning data may be able to provide additional clues because electrical charge generation in the storm updraft and ice microphysics are linked. NSSL is working to provide a physical understanding how three-dimensional lightning data may be used by forecasters for microburst or downburst prediction. However, for our purposes, warning time is less than 6 hour

WIND	WARNING TIME
	4

Duration

Storms that cause damaging winds and risk like microbursts generally last form 5 to 20 minutes; they do not last over 6 hours.

WIND	DURATION
	1

Hail

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
HAIL	4	2	1	1	2.65

Probability

Probability is determined by previous occurrences. For a full list of previous hail events in Greene County, refer to the individual hazard profile “Severe Thunderstorms” starting on page 3.91.

Probability Summary

There have been many reports of hail events in Greene County over the last 10 years.

HAIL	PROBABILITY
	4

Magnitude/Severity

Although deaths and injuries have happened in surrounding states and areas, Greene County has never experiences on of these consequences from hail. Hail has caused only minor instances of property damage. Over the last 10 years, NOAA reports that there have been over \$400,000 in damages from hail events. The severity of hail in Greene County is limited.

HAIL	MAGNITUDE/SEVERITY
	2

Warning Time

Due to the fact that hail is normally predicted by weather and the possibility if stormy weather, warning time is generally greater than 24 hours.

HAIL	WARNING TIME
	1

Duration

Hail will typically only last a short duration as a storm passes through. Hail does not exceed a matter of a few hours at most.

HAIL	DURATION
	1

Lightning

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
HAIL	4	2	1	1	2.65

Probability

Probability is determined on frequency of occurrence. For a list of previous occurrences refer to the individual profile for “Severe Thunderstorms” starting on page 3.91 .

Probability Summary

Lightning causes some form of consequence almost every year. IT is highly likely that Greene County will experience lightning incident in the next year.

LIGHTNING	PROBABILITY
	4

Magnitude/Severity

Deaths are not a normal consequence of lightning in Greene County. Lightning strikes typically cause minor isolated instances of property damage and treatable injuries.

LIGHTNING	MAGNITUDE/SEVERITY
	2

Warning Time

Thunderstorms often produce lightning; these can normally be predicted days in advance.

LIGHTNING	WARNING TIME
	1

Duration

Lightning itself happens quickly, in a fraction of a second. Lightning events with thunderstorms can last hours but typically does not last more than 6 hours.

LIGHTNING	DURATION
	1

CONSEQUENCE ANALYSIS: HIGH WINDS-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	1	Negligible	Although damaging winds can cause injury or even death, Greene County has never experienced any of these consequences. Damaging winds can create unsafe situations such as downed power lines and falling debris from trees.
Safety and Functionality of Responders	1	Negligible	Safety and functionality of responders can be impacted by road conditions (fallen trees or power lines) or from power failure. However, damaging wind has not caused these types of conditions to interfere with the safety and functionality of responders in Greene County.
Property Damage	3	Critical	Damaging winds cause many property damages. Trees and utility poles have been knocked over onto cars or even houses. Roofs have also been damaged from these strong winds. These damages are typically minor isolated instances, but frequently in Greene County
Agriculture Damage	1	Negligible	Damaging wind causes little to no damage to agriculture.
Damage to the Environment	2	Limited	Damaging winds have not affected the environment in terms of the floodplains or waste, but have downed numerous trees.
Infrastructure Damage	4	Catastrophic	Damaging winds create the most problems in taking down utility services and power to the community. This can impact all other critical infrastructure sectors.
Facility Damage	3	Critical	Facility damages occur frequently and typically have several instances of significant damage. As discussed in the damaging wind vulnerability, school buildings, stores, and other entities have had significant damage from damaging winds.
Delivery of Services	1	Negligible	Damaging wind has no record on impacting the delivery of services.
Economic Impact	2	Limited	The economy is impacted by damaging wind when power is no longer available. This can cause problems for businesses and their operations, and power also causes an economic impact on utility services.
Public Confidence in Governance	1	Negligible	Damaging winds have no impact on public confidence in the government.

CONSEQUENCE ANALYSIS: HAIL-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	1	Negligible	There is little to no impact on public safety in Greene County due to hail.
Safety and Functionality of Responders	1	Negligible	There is little to no impact on the safety and functionality in Greene County due to hail.
Property Damage	2	Limited	Hail causes minor isolated instances of property damage in Greene County.
Agriculture Damage	3	Critical	Hail has caused multiple instances of agricultural damage in Greene County.
Damage to the Environment	1	Negligible	Hail has caused little to no impact on the environment.
Infrastructure Damage	1	Negligible	Hail has caused little to no impact on critical infrastructure in Greene County.
Facility Damage	2	Limited	Hail can cause minor isolated instances of facility damage in Greene County.
Delivery of Services	1	Negligible	Hail has caused little to no impact on service operations.
Economic Impact	1	Negligible	Hail has caused little to no impact on the economy in Greene County.
Public Confidence in Governance	1	Negligible	Hail has caused little to no impact on public confidence in governance.

CONSEQUENCE ANALYSIS: LIGHTNING-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	There is a significant safety concern during lightning. Injuries and a minimal number of deaths have occurred.
Safety and Functionality of Responders	2	Limited	If lightning is still present at time of response, there is potential for safety issues. There should be no impact to response functions.
Property Damage	2	Limited	Lightning has been known to cause minor isolated instances of property damage.
Agriculture Damage	1	Negligible	Lightning incidents result in little to no impact on agriculture.
Damage to the Environment	1	Negligible	Lightning incidents result in little to no impact on the environment.
Infrastructure Damage	2	Limited	Lightning can cause power outages and disrupt the energy sector. This is rarely widespread.
Facility Damage	3	Critical	Facility damage occurs when lightning strikes a building. This can occur in multiple instances of significant damage.
Delivery of Services	1	Negligible	Lightning incidents result in little to no impact on delivery of services.
Economic Impact	1	Negligible	Lightning incidents result in little to no impact on the economy
Public Confidence in Governance	1	Negligible	Lightning incidents result in little to no impact on the public confidence in governance.

VULNERABILITY: SEVERE WINTER WEATHER (ICE AND SNOW)

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
SEVERE WINTER WEATHER	4	4	1	2	3.35

Probability

Probability is determined on frequency of occurrence. Please see the individual profile for “Severe Winter Weather” for a full list of ice and snow events in Greene County.

Probability Summary

There have been many ice and snow events that have happened in Greene County over the last 10 years. It is likely that Greene County could see a severe winter weather event in the next year.

ICE AND SNOW	PROBABILITY
	4

Magnitude/Severity

Winter weather has caused widespread, significant damages to all areas of Greene County over the last 20 years. Although no direct deaths have occurred from snow and ice hazards, conditions have shown to cause injury and death. The economy can also be significantly affected due to the possibility of complete shutdown of businesses for up to two weeks or more. These results can come from dangerous driving conditions, structure damages, or even loss of power for an extended amount of time. Ice and Snow in Greene County can be catastrophic.

ICE AND SNOW	MAGNITUDE/SEVERITY
	4

Warning Time

Technology has greatly increases the warning time available for tracking winter storms. Alerts are normally releases at least 24 hours before the event is present.

ICE AND SNOW	WARNING TIME
	1

Duration

Over the last 20 years, there have been many severe winter weather events in Greene County. Out of the many, there have only been a handful events that had effects lastly over a week. The majority of ice and snow events that take place in Greene County do last more than 6 hours but are less than one day.

ICE AND SNOW	DURATION
	2

CONSEQUENCE ANALYSIS: SEVERE WINTER WEATHER (ICE AND SNOW)-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	4	Catastrophic	Indirect fatalities, illnesses, and injuries occur including carbon monoxide poisoning (from generators) and health hazards such as frostbite and hypothermia. Roads create extremely dangerous driving hazards that cause serious accidents.
Safety and Functionality of Responders	4	Catastrophic	Potential life safety issues are present to responders. Response functions will also be severely impacted. This is not only from transportation hazards, but from overwhelming calls.
Property Damage	4	Catastrophic	Ice and snow causes multiple widespread property damages. There have been approximately \$122.5 million in damages since 1996. Houses and vehicles are damaged from the weather as well as the debris from fallen tree limbs, power lines, and other debris.
Agriculture Damage	3	Critical	There have been millions in crop damages. Crops and livestock are killed due to snow or ice. There are multiple instances of significant agriculture damages.
Damage to the Environment	3	Critical	In the 2007 Ice Storm, there was catastrophic tree damage. Greene County is still recovering from the widespread effect this storm had on the environment. Although this severity is not typical, there are usually multiple instances of significant damage.
Infrastructure Damage	3	Critical	Widespread power outages, downed telephone and cable lines as well as communication towers create damages to transportation, energy, and communication sectors.
Facility Damage	2	Limited	Structure damages to facilities can be minor or significant depending on the incident
Delivery of Services	3	Critical	Delivery of services level of impact will be heavily depended on the transportation and communication infrastructure status. Ice roads will create delays for almost all functions, and even suspension of some services.
Economic Impact	3	Critical	Damages and cost of debris removal are very costly. Businesses may have to shut down for weeks during the incident, and then once it is over, there may be a need for restoration.
Public Confidence in Governance	2	Limited	The community relies on the government to begin responding to the event as soon as it begins (clearing roads, setting up shelters etc.). If these types of tasks are not done well, there may be push back from the community.

VULNERABILITY: TORNADO

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
TORNADO	4	3	4	1	3.40

Probability

Probability is determined by frequency of previous occurrences. For a full list of tornado events in Greene County, please see the individual hazard profile for “Tornados” starting on page 3.119.

Probability Summary

The level of tornado activity in the region is unpredictable. However, it can be assumed that tornado activity as well as other severe weather events will continue to affect the area. Greene County experiences Tornadoes almost yearly at EF levels 0-2. It is very likely that Greene County could have another even in the next year.

TORNADO	PROBABILITY
	4

Magnitude/Severity

The two most common magnitudes for a tornado in Greene County fall under an EF-1 and EF-2. These storms have historically created a considerable amount of property damage. A tornado in Greene County would cause widespread minor damages or multiple instances of significant damage. Injuries and deaths are also possible, though there have only been a few in Greene County history. In the last 10 years, there have been multiple injuries.

TORNADO	MAGNITUDE/SEVERITY
	3

Warning Time

A Tornado Watch means tornadoes are possible in the area. A Tornado Warning means a tornado has been sighted or indicated by weather radar. The current average lead-time for tornado warnings is 13 minutes.

TORNADO	WARNING TIME
	4

Duration

Tornadoes can last from several seconds to more than an hour. Most tornadoes last less than 6 minutes.

TORNADO	DURATION
	1

CONSEQUENCE ANALYSIS: TORNADO-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	4	Catastrophic	Tornadoes in Greene County have caused injuries and death. There are widespread safety concerns associated with tornado incidents, and many times storms will produce more than 1 tornado, creating even more safety concerns.
Safety and Functionality of Responders	3	Critical	Responders face potentially life-threatening safety issues, and response functions can be impacted depending on weather conditions and debris amount and make up.
Property Damage	4	Catastrophic	Tornadoes have caused widespread significant damages within Greene County. Many homes have been heavily damaged or completely destroyed due to multiple tornadoes that have passed through the jurisdiction.
Agriculture Damage	2	Limited	Agriculture damage from a tornado in Greene County is limited, with minor isolated instances of damage.
Damage to the Environment	2	Limited	Minor isolated instances of environmental damages are found in a tornado incident in the form of fallen or damaged trees.
Infrastructure Damage	3	Critical	Infrastructure is damaged through downed power lines, poles, and communication towers. Transportation can also be affected through debris and downed trees that many block roads.
Facility Damage	4	Catastrophic	Facilities in Greene County have had widespread significant damages. Fair Grove High School, Glendale High School, the Harry Cooper Supply industrial building, and other businesses experienced severe damage.
Delivery of Services	3	Critical	Delivery of services can be hampered across the jurisdiction due to infrastructure damages and overwhelming demand.
Economic Impact	4	Catastrophic	The economic impact on Greene County can be major with widespread loss. Businesses may be destroyed or forced to make repairs before being operable again. This creates loss in the economy and for individuals.
Public Confidence in Governance	2	Limited	There may be minor isolated instances of loss in public confidence if response and recovery operations are not executed quickly and effectively.

VULNERABILITY: WILDFIRE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
WILDFIRE	4	2	4	2	3.20

Probability

Probability is determined by previous occurrences. For a full list of wildfire events in Greene County, please see the individual hazard profile for “Wildfires” starting on page 3.130.

Probability Summary

Greene County experiences wildfire events on a yearly basis. Most events are minor (although they may involve large acreage plots) and risks to people and property are frequently contained. Wildfire events do occur within city limits (e.g. on the outer skirts of Springfield), but occur less frequently than wildfires in rural areas of the county. Wildfires do occur every year.

WILDFIRE	PROBABILITY
	4

Magnitude/Severity

Wildfires in Missouri can be serious, especially in areas around the Lake of the Ozarks where hundred thousand dollar homes are built into forested areas with vegetation growing around the foundation. Most of the area in Greene County is open grassland with pockets of wooded areas throughout the area. Normal yearly precipitation is usually adequate to control large fires outbreaks by keeping vegetation moist and moisture levels high enough to quell large wildfire outbreaks. Minor isolated instances of property or environmental damage would occur.

WILDFIRE	MAGNITUDE/SEVERITY
	2

Warning Time

There is no warning time associated with wildfires. They are more prevalent with droughts and in the summer.

WILDFIRE	WARNING TIME
	4

Duration

Greene County wildfires typically last less than one day due to the normal moisture and quick responses.

WILDFIRE	DURATION
	2

CONSEQUENCE ANALYSIS: WILDFIRE-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	Wildfires create multiple isolated instances of safety concerns. Death or injury can occur from wildfire; however, this has not been a consequence to Greene County.
Safety and Functionality of Responders	1	Negligible	There would be little to no impact on responders and response functions in Greene County due to wildfires
Property Damage	2	Limited	Greene County has experienced minor isolated instances of property damage due to wildfires.
Agriculture Damage	2	Limited	Wildfires in Greene County have caused minor isolated instances of agricultural damage.
Damage to the Environment	3	Critical	Wildfires in Greene County can cause multiple instances of damage to the environment depending on what is burned. Wild life is also affected by wildfires.
Infrastructure Damage	3	Critical	Wildfires can cause minor impact to key infrastructure such as transportation or power, again, depending on the burn path of the fire.
Facility Damage	1	Negligible	Greene County has experienced little to no impact on facilities due to wildfire.
Delivery of Services	1	Negligible	Wildfires have had little to no impact on service operations.
Economic Impact	1	Negligible	Wildfires have caused Greene County little to no impact on the economy.
Public Confidence in Governance	1	Negligible	Wildfires cause little to no loss of public confidence in governance in Greene County.

VULNERABILITY: AIRPLANE CRASH

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
AIRPLANE CRASH	2	2	4	1	2.20

Probability

Probability is determined by previous occurrences. For a full list of airplane crash events in Greene County, please see the individual hazard profile for “Airplane Crash” starting on page 3.139.

Probability Summary

Greene County has not experienced a large airplane crash however, with facilities of high importance and the population size of Greene County, and the enhance of human error and technological malfunctions, plane crashed area a possibility in the next 10 years but are very unlikely.

Greene County has experienced many smaller aircraft incidents in the past 20 years. This raised the probability to probably within the next 5 years.

AIRPLANE CRASH	PROBABILITY
	2

Magnitude/Severity

Airplane can have a devastating magnitude of impact on the community depending on the size and location of the crash. A large commercial flight could lead to several deaths, property damages, a decline in public confidence, and potentially many more side effects. A commercial airplane crash would be catastrophic.

However, Greene County has only experienced small aircraft accidents and incidents. Therefore, the property severity rating is limited. Although death and injury has occurred, most other consequences are not affected. The severity of Greene County is limited

AIRPLANE CRASH	MAGNITUDE/SEVERITY
	2

Warning Time

There is little to no warning for an airplane crash.

AIRPLANE CRASH	WARNING TIME
	4

Duration

While the response and recovery could take days or even weeks, the duration of the crash would be over in less than 6 hours.

AIRPLANE CRASH	DURATION
	1

CONSEQUENCE ANALYSIS: AIRPLANE CRASH-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	Airplane incidents are often fatal to anyone that was in the aircraft. There are also safety to concerns for anyone that is in the immediate area of the crash.
Safety and Functionality of Responders	1	Negligible	There would be little to no impact on responders and response functions in Greene County due to an airplane crash.
Property Damage	1	Negligible	Greene County has experienced little to no property damage from airplane incidents
Agriculture Damage	1	Negligible	Airplane incidents have resulted in little to no impact on agriculture.
Damage to the Environment	1	Negligible	Airplane incidents result in little to no impact to the environment.
Infrastructure Damage	1	Negligible	Small aircraft incidents have little to no impact on infrastructure.
Facility Damage	1	Negligible	Airplane incidents have little to no impact on facilities
Delivery of Services	1	Negligible	Airplane incidents have little to no impact on service operations.
Economic Impact	1	Negligible	Airplane incidents have little to no impact on the economy
Public Confidence in Governance	1	Negligible	Airplane incidents cause little to no loss of public confidence in governance in Greene County.

VULNERABILITY: CAVE/MINE COLLAPSE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
CAVE/MINE COLLAPSE	1	1	4	1	1.45

Probability

Probability is determined by frequency of previous occurrences. For a full list of Cave/Mine Collapse events in Greene County, please see the individual hazard profile for “Cave/Mine Collapse” starting on page 3.144.

Probability Summary

With increasing regulations and safety procedures, the risk of a cave/mine collapse due to human error or accident is low, especially in popular show caves in Greene County. In addition, the probability of an earthquake affective the area is low but still present. There is still present risk of other mine shafts collapsing or subsiding beneath unaware people and buildings.

CAVE/MINE COLLAPSE	PROBABILITY
	1

Magnitude/Severity

Many undocumented mines are scattered underneath Greene County and many public spaces and private home have unknowingly been built above abandoned shafts. Public and private properties are vulnerable to the risk of an unknown mine shaft collapsing below. However, the severity of an old mine shaft subsiding would be negligible.

CAVE/MINE COLLAPSE	MAGNITUDE/SEVERITY
	1

Warning Time

Documented caves can be monitored for erosion. However, there is little warning time for small tremors, earthquakes, human error and sabotage.

CAVE/MINE COLLAPSE	WARNING TIME
	4

Duration

A Cave/Mine collapse last from a few minutes to a few hours. The recovery aspect could take weeks or even months.

CAVE/MINE COLLAPSE	DURATION
	1

CONSEQUENCE ANALYSIS: CAVE/MINE COLLAPSE-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	1	Negligible	Greene County has never experienced a cave/mine collapse. The most likely type of collapse would be an old mine shaft. These are abandoned and would not create much of a safety impact.
Safety and Functionality of Responders	3	Critical	If responders are called to the scene of a collapse, there are life safety issues if they must enter an unsafe structure. There may be another collapse.
Property Damage	1	Negligible	The collapse of an abandoned mine or cave would create little to no property damage
Agriculture Damage	1	Negligible	The collapse of a cave or mine would have little to no impact on agriculture.
Damage to the Environment	2	Limited	A cave or mine collapse could create isolated instances of environmental damage if the collapse occurs in a used water source.
Infrastructure Damage	1	Negligible	A cave or mine collapse would create little to no impact on critical infrastructure.
Facility Damage	1	Negligible	The collapse of a cave or mine would create little to no facility damage.
Delivery of Services	1	Negligible	A cave or mine collapse would cause little to no impact on service operations.
Economic Impact	1	Negligible	A collapse would cause little to no impact on the economy
Public Confidence in Governance	1	Negligible	The collapse of a cave or mine would cause little to no lose in public confidence in governance.

VULNERABILITY: DAM FAILURE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
DAM FAILURE	1	3	4	1	2.05

Probability

Probability is determined by frequency of previous occurrences. For a full list of dam failure events in Greene County, please see the individual hazard profile for “Dam Failure” starting on page 3.149.

Probability Summary

The regulated dams encompass three different hazard classifications. While the failure of Lake Springfield Dam and Fellows Lake Dam are of particular concern, they are inspected regularly and their reports do not articulate any major concerns. Similarly, Stonegate Dam and McDaniel’s Dam received passing inspections. Because the dams have passed inspection, and the engineers did not articulate any structural concerns, the future of dam failure appears to be unlikely in Greene County.

DAM FAILURE	PROBABILITY
	1

Magnitude/Severity

Actual dam failure does not only result in loss of life, but also considerable loss of capital investment, loss of income and property damage. Loss of a reservoir (drinking water source) can cause considerable hardship for the community that relies on it for its water supply. Loss of a reservoir can lead to an upset in the ecological balance of the area as well. Dam failure in Greene County would be critical.

DAM FAILURE	MAGNITUDE/SEVERITY
	3

Warning Time

There is no warning time associated with dam failure.

DAM FAILURE	WARNING TIME
	4

Duration

Cleaning the aftermath of a dam failure would take much longer than the actual duration of the dam failure. It could take weeks, even months. The dam failure itself would happen within the same 6 hours.

DAM FAILURE	DURATION
	1

CONSEQUENCE ANALYSIS: DAM FAILURE-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	4	Catastrophic	A dam failure in Greene County could result in the loss or severe limitation of drinking water. Health and safety concerns associated with dehydration would cause major widespread safety concerns, and possible illness and death.
Safety and Functionality of Responders	3	Critical	Responder safety and response functions would be impacted due to a lack of water. This would become even more of a safety issue if the dam failure occurred in times of extreme heat or drought.
Property Damage	1	Negligible	A dam failure in Greene County would cause little to no property damage.
Agriculture Damage	4	Catastrophic	A dam failure leading to limited water supply would be a widespread significant impact to crops and farms.
Damage to the Environment	3	Critical	The environment would experience multiple instances of significant damage in the event of a water shortage.
Infrastructure Damage	3	Critical	Utilities and essential facilities such as hospitals would not be able to operate efficiently without water.
Facility Damage	2	Limited	Facilities would experience little damage however; they would be impacted in a water shortage situation.
Delivery of Services	2	Limited	A shortage of water from a dam failure would create interruptions for some services, and others may be delayed.
Economic Impact	3	Critical	A dam failure would greatly impact the economic condition throughout the jurisdiction in areas affected by the dam failure.
Public Confidence in Governance	2	Limited	A water shortage from a dam failure would cause minor isolated instances of loss of public confidence in governance.

VULNERABILITY: HAZARDOUS MATERIALS

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
HAZARDOUS MATERIALS	4	3	4	2	3.50

Probability

Probability is determined by previous occurrences. For a full list of hazardous materials events in Greene County, please see the individual hazard profile for “Hazardous Materials” starting on page 3.163.

Probability Summary

According to the Environmental Emergency Response, there are more than 1,500 calls to the incident command center with more than 300 of them involving hazardous materials emergencies. Hazardous materials travel frequently in Greene County on both rail and interstate. A recent hazardous material incident in Springfield involving a train derailment carrying hazardous materials raises the probability to likely to occur.

HAZARDOUS MATERIALS	PROBABILITY
	4

Magnitude/Severity

A hazardous material incident could cause widespread and/or significant property damage, and create injuries or illnesses if human life is involved. For these reason, a hazardous material incident would be critical.

HAZARDOUS MATERIALS	MAGNITUDE/SEVERITY
	3

Warning Time

There is no warning time associated with a hazardous material incident.

HAZARDOUS MATERIALS	WARNING TIME
	4

Duration

Hazardous material incidents require immediate attention and can be cleaned up within one day of initial problem depending on the specifics of the event.

HAZARDOUS MATERIALS	DURATION
	2

CONSEQUENCE ANALYSIS: HAZARDOUS MATERIALS-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	Hazardous materials have caused documented injuries in Greene County. Fatalities have not occurred, however are very possible
Safety and Functionality of Responders	3	Critical	Depending on the type of hazardous material (s) that is involved, there could be significant safety risks for responders. Response functions may also be impacted.
Property Damage	4	Catastrophic	Areas around modes of transportation are especially vulnerable due to the number of hazardous materials that go through the Greene County area. Hazardous materials in various forms can cause damage to buildings, homes and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways and pipelines
Agriculture Damage	3	Critical	Hazardous materials in Greene County have caused groundwater and contamination by chemicals and/or agriculture waste, contamination entering the groundwater system via sinkholes is a very real possibility.
Damage to the Environment	3	Critical	Hazardous materials in Greene County can cause multiple instances of damage to the environment if the spill creates a runoff of the roadway.
Infrastructure Damage	2	Limited	Some infrastructure functions such as transportation may have minor impact, especially if the incident occurs on highway.
Facility Damage	1	Negligible	Greene County has experienced little to no impact on facilities due to hazardous materials.
Delivery of Services	1	Negligible	Hazardous materials have had little to no impact on service operations.
Economic Impact	2	Limited	Hazardous materials could have a minor impact on the economy in Greene County.
Public Confidence in Governance	1	Negligible	Hazardous materials incidents cause little to no loss of public confidence in governance.

VULNERABILITY: POWER FAILURE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
POWER FAILURE	3	2	1	2	2.30

Probability

Probability is determined by frequency of previous occurrences. For a full list of power failure events in Greene County, please see the individual hazard profile for “Power Failure” starting on page 3.169.

Probability Summary

Power Failures happen frequently throughout the year in Greene County. However, these failures only last for a short period and affect a small portion of the community. Large-scale power failures are must more rare, but still happen roughly every year. The probability of a serious power failure happening in the next three years is likely.

POWER FAILURE	PROBABILITY
	3

Magnitude/Severity

Greene County normally experiences mild and limited power outages. Therefore, the severity is generally limited with little property damage and no injuries, or shutdown of critical facilities for greater than 24 hours. Infrastructure sectors can be heavily impacted with loss of power.

POWER FAILURE	MAGNITUDE/SEVERITY
	2

Warning Time

Widespread power outages can occur without warning or as a result of a natural disaster. Generally warning times will be short in the case of technological failure such as a fire at a sub-station, traffic accident, human error or terrorist attacks. In cases where a power failure is caused by natural hazards, greater warning time is possible.

POWER FAILURE	WARNING TIME
	1

Duration

Power outages can last anywhere from one minute to a few days. Usually, power outages last no more than a few hours. However, in some circumstances people have been without power for over a week. Greene County history tends to last from a few minutes to a few hours, and generally does not exceed 1 day.

POWER FAILURE	DURATION
	2

CONSEQUENCE ANALYSIS: POWER FAILURE-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	2	Limited	Power failure can cause minor injuries or illnesses and a few safety concerns. A power failure in Greene County can cause illnesses if spoiled food is consumed, and lack of power can be a safety concern in weather extremes such as heat or cold.
Safety and Functionality of Responders	2	Limited	Response functions are slightly impacted during a power failure. There are no life safety issues for responders.
Property Damage	1	Negligible	Power failure in Greene County has caused little property damage.
Agriculture Damage	3	Critical	Most farms are dependent on electrical power and all activities are interconnected long-term outages. However, most power outages in Greene County have had no impact on agriculture.
Damage to the Environment	1	Negligible	Power failure in Greene County has caused little environment.
Infrastructure Damage	4	Catastrophic	Infrastructure is very dependent on power. Fire alarms and water sprinklers that cease to function, inability to communicate via phone or email with emergency services. Major critical infrastructure is impacted in all key sectors in power failure.
Facility Damage	1	Negligible	Power failure in Greene County has caused little facility damage.
Delivery of Services	3	Critical	Power failure can cause many service operations to be delayed or even suspended.
Economic Impact	3	Critical	A power failure would greatly impact the economic condition for the industrial and business operations.
Public Confidence in Governance	2	Limited	Power failure would cause minor isolated instances of loss of public confidence in governance.

VULNERABILITY: TRAIN DERAILMENT

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
TRAIN DERAILMENT	1	2	4	1	1.75

Probability

Probability is determined by frequency of previous occurrences. For a full list of train derailment events in Greene County, please see the individual hazard profile for “Train Derailment” starting on page 3.174.

Probability Summary

Springfield is home to a large BNSF railway location. The area may see train derailment frequently, but they are small isolated events that do not cause much affects. Missouri has had a few larger train derailment over the years, but Greene County rarely sees large derailment events. It is unlikely that Greene County will experience a large train derailment in the next 10 years.

TRAIN DERAILMENT	PROBABILITY
	1

Magnitude/Severity

With lack of history it is hard to estimate just how severe a train derailment could be. If we were to have an incident, like the previous Missouri train derailments described in probability, the severity would be limited. This would include minor or isolated instances of property damage and possibly injuries as well as shut down of critical facilities for less than 1 week.

TRAIN DERAILMENT	MAGNITUDE/SEVERITY
	2

Warning Time

There is little to now warning time for a train derailment. Train derailment does have an immediate consequence. It is a matter of seconds when a train goes form hitting an object, running over a broken tie, or taking a turn to fast, to derailing.

TRAIN DERAILMENT	WARNING TIME
	4

Duration

A train derailment happens in a matter of seconds. However, the resulting consequences of a derailment could cause problems that will last longer.

TRAIN DERAILMENT	DURATION
	1

CONSEQUENCE ANALYSIS: TRAIN DERAILMENT-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	2	Limited	A train derailment has not caused any safety or health concerns in Greene County. However, there is a possibility for injuries and there are definite safety concerns if a train derailment occurs.
Safety and Functionality of Responders	2	Limited	Responders and response functions may be impacted depending on what the train was carrying (hazardous materials) and the severity of the derailment.
Property Damage	3	Critical	A train derailment could cause multiple instances of significant damage in Greene County.
Agriculture Damage	1	Negligible	A train derailment in Greene County would cause little to no damage in agriculture.
Damage to the Environment	2	Limited	A train derailment could cause minor instances of environmental damage depending on what type of chemicals are involved and amount of the environment contaminated.
Infrastructure Damage	3	Critical	Minor impacts to some key infrastructure sectors may occur from a train derailment incident depending on the train load, the location of the incident, and situation.
Facility Damage	1	Negligible	A train derailment would result in little to no facility damages.
Delivery of Services	2	Limited	Minor service operations may be interrupted and there may be some delay of services depending on the train load, location of the incident, and the situation.
Economic Impact	2	Limited	A train derailment may have a minor economic impact depending on the train load, location of the incident and the situation.
Public Confidence in Governance	1	Negligible	There is little to no effect on public confidence in governance from a train derailment incident.

VULNERABILITY: URBAN FIRE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
URBAN FIRE	1	3	4	2	2.15

Probability

Probability is determined by frequency of previous occurrences. As noted in the individual profile for “Urban Fire” starting on page 3.178, Greene County has not experienced an urban fire.

Probability Summary

With no history of any occurrences of a major urban fire in Greene County Missouri, the probability is very unlikely. There is no evidence that there will be an urban fire in the next 10 years. As population grows in Green County and buildings continue to age, this may need to be re-assessed.

URBAN FIRE	PROBABILITY
	1

Magnitude/Severity

There is no history of a major incident occurring, however, if an urban fire were to transpire, the damage would be controlled by the fire departments, and building codes such as sprinkler systems and open space between buildings. However, not all of the older building are complaint will fire codes. There may also be safety risks to the public and to responders.

URBAN FIRE	MAGNITUDE/SEVERITY
	3

Warning Time

A fire may grow out of control quickly. There will be less than 6 hours of warning time to know if a smaller fire is going to endure and engulf more building to become a more disastrous fire.

URBAN FIRE	WARNING TIME
	4

Duration

Fires move downwind as long as favorable conditions exist. The spread of an urban fire can last days depending on the number of firefighters available, form and amount of fuel the fire is using, and changing or current weather conditions (rain, or drought). Without history of previous occurrence in Greene County, we must use other examples to conclude duration. According to the National Fire Protection Association most urban fires only last the extent of 1 day. It is reasonable to assume that an urban fire would not last longer than 1 day in Greene County.

URBAN FIRE	DURATION
	2

CONSEQUENCE ANALYSIS: URBAN FIRE-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	The safety of the public is of significant concern if an urban fire were to take place. Older neighborhoods in Greene County could create a large number of injuries or fatalities.
Safety and Functionality of Responders	3	Critical	An urban fire in Greene County could present life threatening issues and challenges for response functions.
Property Damage	4	Catastrophic	An urban fire could cause widespread significant property damages. Large urban fires are most likely to occur in areas of dense population, crowded buildings with little or no open spaces, or in buildings that do not meet building code requirements.
Agriculture Damage	1	Negligible	An urban fire would have little to no impact on agriculture in Greene County.
Damage to the Environment	2	Limited	An urban fire would have a very limited effect on the environment, because it is located in an urban area. There may be minor isolated instances of damage to the environment.
Infrastructure Damage	3	Critical	An urban fire could cause multiple critical infrastructure sectors to be impacted such as bank and finance, emergency responders, etc.
Facility Damage	3	Critical	An urban fire in Greene County could cause widespread or multiple instances of facility damage.
Delivery of Services	1	Negligible	An urban fire would have little to no impact on service operations in Greene County.
Economic Impact	2	Limited	An urban fire could greatly impact the economic system due to damages in Greene County
Public Confidence in Governance	1	Negligible	An urban fire would cause little to no loss of public confidence in governance in Greene County.

VULNERABILITY: BIOLOGICAL

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
BIOLOGICAL	1	4	4	4	2.65

Probability

Probability is determined by frequency of previous occurrences. As stated in the individual hazard profile for Biological starting on page 3.183, there have been no events in Greene County or surrounding counties.

Probability Summary

Greene County has not experienced a biological terrorist attack. For these reasons, it is unlikely that a biological terrorist attack will occur in the future. There is not a history of our plants and animals being deliberately targeted. The event has not occurred, but Greene County is still a strong contributor to the cattle/beef production industry. Due to these facts, we have rate the probability of a biological hazard is unlikely.

BIOLOGICAL	PROBABILITY
	1

Magnitude/Severity

Due to the extensive economic damage to the agricultural industry, the damage to the environment, and health related issues that a biological event would cause, we have classified the severity and magnitude of a biological hazard as catastrophic.

BIOLOGICAL	MAGNITUDE/SEVERITY
	4

Warning Time

Biological weapons are also the hardest to detect, especially with today’s ease and rapidity of international transport and the spread of disease is enhanced by the increased human and animal resistance to antibiotics. With the possibility of having no warning time in the event of a biological event or, we classify the warning time for Greene County as less than 6 hours.

BIOLOGICAL	WARNING TIME
	4

Duration

A biological hazard and its effects can last various lengths of time depending on the type and amount of agent used, area the hazard occurs in, and the amount of area affected. However, even with a small biological events, the duration of the effect would last months if not years.

BIOLOGICAL	DURATION
	4

CONSEQUENCE ANALYSIS: BIOLOGICAL-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	A biological attack can deliver any of a large range of safety and health consequences. A biological attack would create a severe number of illnesses, and possibly death.
Safety and Functionality of Responders	3	Critical	Responders will become overwhelmed in a biological incident. There will also be potential life safety issues for responders as well. Response functions will be impacted.
Property Damage	2	Limited	A biological attack would result in minor isolated instances of property damage (where it was detonated or released).
Agriculture Damage	4	Catastrophic	A biological attack typically targets the agriculture sector. Livestock and crops will be killed and the soil will become contaminated.
Damage to the Environment	4	Catastrophic	The environment would experience widespread significant damage from a biological incident.
Infrastructure Damage	3	Critical	Multiple critical infrastructure sectors will be impacted by a biological hazard. Hospitals and emergency response will be overwhelmed.
Facility Damage	2	Limited	A biological attack would result in minor isolated instances of facility damage (where it was detonated or released).
Delivery of Services	2	Limited	Minor service operations may be interrupted (any to do with food and water), and many may be delayed.
Economic Impact	4	Catastrophic	A biological incident would be catastrophic for the economy. The agriculture sector would be in ruins, and non-contaminated food and water will be scarce possibly for very long distances
Public Confidence in Governance	2	Limited	Lack of food and water after a biological attack could result in major widespread loss of public confidence in governance.

VULNERABILITY: CHEMICAL

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
CHEMICAL	3	2	4	1	2.65

Probability

Probability is determined by frequency of previous occurrences. For a full list of previous chemical events in Greene County, please see the hazard profile for “Chemicals” starting on page 3.187.

Probability Summary

Greene County has a high volume of traffic, especially along the I-44 Corridor; it is highly likely that a chemical event could happen. Further, due to the number in the area that house large quantities of hazardous materials on site, it is also likely that a spill or accident may happen.

CHEMICAL	PROBABILITY
	3

Magnitude/Severity

Health of individuals and the environment is a risk with chemical hazards. With the possibility of injury, minor isolated instances of property damage, and shut down of critical facilities for 24 hours, the probable severity is limited.

CHEMICAL	MAGNITUDE/SEVERITY
	2

Warning Time

There is no warning time in the event of the chemical hazard.

CHEMICAL	WARNING TIME
	4

Duration

Duration of the cleanup process after a chemical incident could take days or years depending on the type and severity of the chemical hazard. The chemical hazard itself will take place in less than 6 hours.

CHEMICAL	DURATION
	1

CONSEQUENCE ANALYSIS: CHEMICAL-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	2	Limited	Chemical incidents in Greene County cause significant safety concerns. There have been reported injuries, but no deaths.
Safety and Functionality of Responders	2	Limited	Responders would face some safety concerns in a nuclear incident and there may be minor impact to response functions.
Property Damage	3	Critical	Chemical incidents in Greene County have resulted in significant property damages.
Agriculture Damage	2	Limited	There is no record of a chemical incident effecting agriculture in Greene County. However, this could possibly cause isolated instances of agricultural damage.
Damage to the Environment	2	Limited	There is no record of a chemical incident effecting the environment in Greene County. However, this could possibly cause isolated instances of environmental damage.
Infrastructure Damage	2	Limited	Greene County has experienced no damages to infrastructure due to a chemical incident. However there could be impact to the transportation sector if incident occurs on railway, roadways, airport, etc.
Facility Damage	1	Negligible	Greene County has experienced no damages to facilities due to a chemical incident.
Delivery of Services	1	Negligible	Greene County has experienced no impact on delivery of services due to a chemical incident.
Economic Impact	2	Limited	Greene County has experienced minor economic impact from chemical incidents.
Public Confidence in Governance	1	Negligible	Greene County has experienced no impact on the public confidence in governance due to a chemical incident.

VULNERABILITY: CIVIL UNREST

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
CIVIL UNREST	2	3	4	2	2.60

Probability

Probability is determined by frequency of previous occurrences. For a full list of previous civil unrest events in Greene County, please see the hazard profile for “Civil Unrest” starting on page 3.193.

Probability Summary

Greene County regularly experiences small civil unrest events, such as peaceful protests. Missouri has encountered civil unrest in 2014 after the Ferguson shooting, and for that reason, our risk is elevated.

CIVIL UNREST	PROBABILITY
	2

Magnitude/Severity

Civil unrest can include violence and property damages. During the unrest in Ferguson Missouri, building and police cars were burned. Due to the size of the unrest, many building burned without firefighters being able to control all of them. There were multiple instances of damage. If this were to occur in Greene County, it could be just as damaging to the businesses and buildings here. This would be a critical severity level.

CIVIL UNREST	MAGNITUDE/SEVERITY
	3

Warning Time

As mentioned on the civil unrest profile, civil unrest may occur at any time. However, civil unrest is usually preceded by periods of increased tension fueled by questionable social and political events (jury trials and elections). This can be sudden, or take time to organize. Most are organized directly following the incident provoking the unrest (less than 6 hours).

CIVIL UNREST	WARNING TIME
	4

Duration

Civil unrest can vary in the duration that it takes place. Crowds may be disbursed in a matter of hours, or a riot could continue for weeks. Using the history of Missouri’s civil unrest incidents since Greene County has no statistics; civil unrest will last less than 1 day based on other incidents.

CIVIL UNREST	DURATION
	2

CONSEQUENCE ANALYSIS: CIVIL UNREST-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	Civil unrest could result in a severe number of injuries and minimal deaths. There are also multiple instances of safety concerns.
Safety and Functionality of Responders	3	Critical	Civil unrest creates a potential for life safety issues. Response functions are also greatly impacted and may be delayed due to safety concerns.
Property Damage	3	Critical	Civil unrest could create widespread minor damages or multiple instances of severe damage through riot caused fires and destruction.
Agriculture Damage	1	Negligible	Civil unrest in Greene County has caused little to no impact on agriculture.
Damage to the Environment	2	Limited	Civil unrest in Greene County may cause minor isolated instances of damage to the environment.
Infrastructure Damage	3	Critical	Civil unrest can cause damage to multiple critical infrastructures throughout the jurisdiction.
Facility Damage	3	Critical	Civil unrest can cause widespread minor damages or significant damages.
Delivery of Services	2	Limited	Civil unrest can result in service operation interruptions or delays depending on size and duration of unrest.
Economic Impact	3	Critical	Civil unrest can cause the economic condition to be greatly impacted through-out the jurisdiction through theft and damages.
Public Confidence in Governance	3	Critical	Civil unrest can greatly impact public confidence in governance through-out the jurisdiction.

VULNERABILITY: CYBER

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
CYBER	4	2	4	4	3.40

Probability

Probability is determined by frequency of previous occurrences. For a full list of previous cyber incidents please see the individual profile for “Cyber” starting on page 3.199.

Probability Summary

Tracking and detecting cyber attacks can be challenging. However, cyber hazards are everywhere and Greene County businesses have been affected in small- cyber attacks for years. The likelihood of a larger incident is entirely possible and highly likely.

CYBER	PROBABILITY
	4

Magnitude/Severity

Cyber-attacks vary in severity depending on what information is hacked, and how quickly the system can be restored. Based on the previous examples described, critical facilities may be shut down for 24 hours to a week to regain control of infrastructure.

CYBER	MAGNITUDE/SEVERITY
	2

Warning Time

Cyber-attacks or cyber terrorism has no warning time. Some cyber incidents may go undetected for a long period of time before even being recognized.

CYBER	WARNING TIME
	4

Duration

Cyber-attacks could last years, and more than likely going to last for longer than 1 week. Sometimes cyber attacks go undetected for months, or even years.

CYBER	DURATION
	4

CONSEQUENCE ANALYSIS: CYBER-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	A cyber incident would have few safety concerns, such as medical records and availability of prescriptions if system is destroyed.
Safety and Functionality of Responders	3	Critical	There are no potential life safety issues for responders; however the impact to response functions could be critical.
Property Damage	2	Limited	A cyber incident could cause minor isolated instances of property damage if malfunctions occur in electronic systems.
Agriculture Damage	2	Limited	Some agriculture systems rely on a programed system. There could be damage if this is affected.
Damage to the Environment	2	Limited	There may be minor isolated instances of environmental damage if hazardous material is spilled during a cyber-incident.
Infrastructure Damage	4	Catastrophic	Major critical infrastructure sectors can be impacted through-out the jurisdiction because of the dependence on information technology.
Facility Damage	2	Limited	A cyber incident could cause minor isolated instances of facility damage if malfunctions occur in electronic systems.
Delivery of Services	3	Critical	Cyber incidents can lead to critical services that are hampered or even suspended across the jurisdiction.
Economic Impact	4	Catastrophic	A cyber incident could cause major economic impact on the economy. Especially cyber threats to information about money, accounts, or company information.
Public Confidence in Governance	4	Catastrophic	A cyber-attack could cause a catastrophic impact on public confidence in governance. Major widespread significant loss will occur when personal information and company information is lost or compromised.

VULNERABILITY: EXPLOSIVE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
EXPLOSIVES	2	1	4	1	1.90

Probability

Probability is determined by previous occurrences. For a full list of previous occurrences of explosive events in Greene County, please see the individual hazard profile “Explosives” starting on page 3.204.

Probability Summary

The risk of explosives in Greene County Missouri is occasional. These event are likely within a 5 year span.

EXPLOSIVES	PROBABILITY
	2

Magnitude/Severity

Explosive devises can cause destruction and even death. Fortunately, Greene County has not experienced an incident of this magnitude. All explosives in Greene County have been negligible.

EXPLOSIVES	MAGNITUDE/SEVERITY
	1

Warning Time

There is little to no warning time in explosive hazards.

EXPLOSIVES	WARNING TIME
	4

Duration

Explosives last only a few seconds to minutes. Sometimes, a secondary or tertiary explosion is planted to target emergency workers and first responders. Generally, though an explosive incident does not last more than 6 hours.

EXPLOSIVES	DURATION
	1

CONSEQUENCE ANALYSIS: EXPLOSIVES-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	An explosive has the potential to cause multiple injuries and fatalities. There has only been one recorded fatality due to an explosion in Greene County. Explosives can also cause significant safety concerns.
Safety and Functionality of Responders	3	Critical	Functionality and safety of responders has not been impacted in Greene County due to an explosive. There is a potential for life threatening issues if structural integrity is compromised or another explosive device is present that has not been detonated. This would also greatly impact response functions.
Property Damage	2	Limited	Greene County has experienced limited property damage from explosives. An explosive could possibly create multiple instances of property damage, but this has not occurred at this time within Greene County.
Agriculture Damage	1	Negligible	Explosives in Greene County have caused little to no impact on agriculture.
Damage to the Environment	1	Negligible	Explosives in Greene County have caused little to no impact on the environment.
Infrastructure Damage	1	Negligible	Explosives in Greene County have caused little to no damage to infrastructure.
Facility Damage	1	Negligible	Explosives in Greene County have caused little to no facility damage.
Delivery of Services	1	Negligible	Explosives in Greene County have caused little to no impact on the delivery of services.
Economic Impact	1	Negligible	Explosives in Greene County have caused little to no impact on the economy.
Public Confidence in Governance	1	Negligible	Explosives in Greene County have caused little to no impact on public confidence in governance.

VULNERABILITY: NUCLEAR

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
NUCLEAR	1	2	4	1	1.75

Probability

Probability is determined by previous occurrences. As stated in the individual hazard profile starting on page 3.209, there have been no nuclear incidents reported in Greene County.

Probability Summary

Nuclear waste does travel through Greene County. Due to the frequency of I-44's use to transport hazardous materials, the probably risk of a transportation incident could happen, although it is unlikely. There are no statistics available regarding a spill o nuclear materials during transport.

NUCLEAR	PROBABILITY
	1

Magnitude/Severity

A nuclear detonation would cause substantial damage and several casualties. A nuclear attack has the potential to affect the total population in the vicinity of the impacted area. While portions of the area would experience the direct effects (blast, heat and initial radiation), areas further away from the impacted area would experience indirect effects, which would primarily be radioactive fallout. Some areas may experience non-life-threatening levels of radiation while other areas may experience lethal levels of exposure. A transportation incident is far more likely in Greene County. If nuclear waste were spilled in Greene County travelling down any of the roadways or railroads, it would be a serious incident. The probable severity is rated as limited based on the isolated instances of property damage.

NUCLEAR	MAGNITUDE/SEVERITY
	2

Warning Time

There is no warning time for nuclear attacks or a nuclear transportation incident. This hazard has no warning time.

NUCLEAR	WARNING TIME
	4

Duration

The cleanup work however could take days or weeks in transportations. However, the initial nuclear incident would happen instantaneously.

NUCLEAR	DURATION
	1

CONSEQUENCE ANALYSIS: NUCLEAR-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	1	Negligible	There are no reported nuclear incidents in Greene County. Therefore, there are no recorded injuries or deaths. A nuclear spill would have significant safety concerns. A nuclear attack however, would easily prove catastrophic.
Safety and Functionality of Responders	2	Limited	Responders would face some safety concerns in a nuclear incident, but are protected if they possess proper personal protective equipment.
Property Damage	1	Negligible	There are no records of property damage due to a nuclear incident in Greene County. A nuclear spill on the highway would result in minor isolated damages (limited). A large scale nuclear attack could be catastrophic.
Agriculture Damage	1	Negligible	A nuclear incident would have little to no effect on agriculture. This would be vastly different (catastrophic) in the event of a nuclear attack.
Damage to the Environment	1	Negligible	The environment would be destroyed in the event of an attack; however Greene County has no records of damage to the environment due to a nuclear incident.
Infrastructure Damage	1	Negligible	Damage to infrastructure would be catastrophic in a large-scale incident. Greene County has experienced no damages to infrastructure due to a nuclear incident.
Facility Damage	1	Negligible	Damage to facilities would be catastrophic in a largescale incident. Greene County has experienced no damages to facilities due to a nuclear incident.
Delivery of Services	1	Negligible	Delivery of services would be catastrophic in a largescale incident. Greene County has experienced no impact on delivery of services.
Economic Impact	1	Negligible	The economy would be catastrophic in a large-scale incident. Greene County has experienced no impact on the economy.
Public Confidence in Governance	1	Negligible	The public confidence in public confidence in Governance would be catastrophic in a large-scale incident. Greene County has experienced no impact on the public confidence in governance.

VULNERABILITY: RADIOLOGICAL

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
RADIOLOGICAL	1	1	4	1	1.45

Probability

Probability is determined by frequency of previous occurrences. To see a full list of previous occurrences of radiologic events in Greene County, refer to the individual hazard “Radiological” starting on page 3.215.

Probability Summary

There are several sites that house radioactive materials in the area like hospitals with x-ray machines or construction sites with gauges. Because of this, some citizens may encounter radioactive materials at varying levels. The probability risk of a dirty bomb or a large release of radioactive materials in the county is very unlikely. The only incident in Greene County was in 2008. The probability of another radiological event in Greene County is unlikely.

RADIOLOGICAL	PROBABILITY
	1

Magnitude/Severity

An intentional attack would be devastating in Greene County. A dirty bomb could explode in the center of a small community and cause significant property and health damage. An accidentally release (more likely to occur) left no property damages or injuries in 2008. Due to this history, a radiation hazard is negligible to the Greene County community.

RADIOLOGICAL	MAGNITUDE / SEVERITY
	1

Warning Time

Intentional or un-intentional radiation can happen quickly and at any time. The warning time for a radiological hazard is less than 6 hours.

RADIOLOGICAL	WARNING TIME
	4

Duration

The duration of a radiological event fluctuates depending on the type (intentional or un-intentional), the amount dispersed, and the quality of control (quarantined, number of responders, etc). Given Greene County’s history, the 2008 event was resolved in a matter of hours.

RADIOLOGICAL	DURATION
	1

CONSEQUENCE ANALYSIS: RADIOLOGICAL-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	1	Negligible	The only recorded radiological incident resulted in no injuries or deaths. An attack however, could prove catastrophic.
Safety and Functionality of Responders	2	Limited	Responders face some safety concerns, but are protected if they possess proper personal protective equipment.
Property Damage	1	Negligible	The only radiological incident in Greene County left no property damage. A large scale attack could be catastrophic.
Agriculture Damage	1	Negligible	Radiological hazards have no record of damaging agriculture in Greene County. This would be vastly different (catastrophic) in the event of an attack.
Damage to the Environment	1	Negligible	The environment would be destroyed in the event of an attack; however history shows radiological incidents have caused no damage to the environment.
Infrastructure Damage	1	Negligible	Damage to infrastructure would be catastrophic in a large-scale incident. Greene County has experienced no damages to infrastructure.
Facility Damage	1	Negligible	Damage to facilities would be catastrophic in a largescale incident. Greene County has experienced no damages to facilities.
Delivery of Services	1	Negligible	Delivery of services would be catastrophic in a largescale incident. Greene County has experienced no impact on delivery of services.
Economic Impact	1	Negligible	The economy would be catastrophic in a large-scale incident. Greene County has experienced no impact on the economy
Public Confidence in Governance	1	Negligible	The public confidence in public confidence in Governance would be catastrophic in a large-scale incident. Greene County has experienced no impact on the public confidence in governance.

VULNERABILITY: TARGETED VIOLENCE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
TARGETED VIOLENCE	2	3	4	1	2.50

Probability

Probability is determined by frequency of previous events. For a full list of previous events involving targeted violence, please see the individual hazard profile for “Targeted Violence” starting on page 3.222.

Probability Summary

Greene County is the fourth most populated county in Missouri and has one of the highest student populations in Missouri. People and targeted violence are unpredictable. There have not been major occurrences for targeted violence in the Greene County area, however, there are religious and education facilities that could be identified high targets for violence.

TARGETED VIOLENCE	PROBABILITY
	2

Magnitude/Severity

Acts of targeted violence can come in many forms, and based off these forms, cause different severities. However, the intentions are always to cause injury or death. A severe number of injuries and minimal fatalities would be a critical incident.

TARGETED VIOLENCE	MAGNITUDE/SEVERITY
	3

Warning Time

There is rarely any warning time with targeted violence. As targeted violence is a seemingly senseless act, there is generally no warning that a violent assault will occur. In some cases, the perpetrator will tell someone or announce over social media their intentions; however, this rarely happens. Many institutions and security officials are attempting to profile at-risk people. While this can identify potential threats, it provides little information on when and where an attack can occur.

TARGETED VIOLENCE	WARNING TIME
	4

Duration

Typically, the initial targeted violence incident is already over once law enforcement arrives on scene, or shortly after. Duration is normally less than 6 hours.

TARGETED VIOLENCE	DURATION
	1

CONSEQUENCE ANALYSIS: TARGETED VIOLENCE-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	Targeted violence can result in injuries and fatalities. The number of people injured or deceased depends on the situation. However, history has shown targeted violence typically ends in a severe number of injuries and minimal deaths.
Safety and Functionality of Responders	3	Critical	There may be a potential for life safety issues for responders depending on the situation. Response functions may also be impacted depending on number of attackers, amount of public at risk, types and amounts of weapons, etc.
Property Damage	2	Limited	Targeted violence could have isolated instances of property damage, depending on location, and methods of offender.
Agriculture Damage	1	Negligible	Targeted violence in Greene County would have little to no impact on agriculture.
Damage to the Environment	1	Negligible	The environment would experience little to no impact from targeted violence in Greene County.
Infrastructure Damage	1	Negligible	Targeted violence will have little to no impact on critical infrastructure sectors.
Facility Damage	2	Limited	Targeted violence could have isolated instances of facility damage, depending on location, and methods of the offender.
Delivery of Services	1	Negligible	Targeted violence would have little to no impact on the delivery of services.
Economic Impact	1	Negligible	Targeted violence would have little to no impact on the economy.
Public Confidence in Governance	2	Critical	Targeted violence would have a limited effect on public confidence in governance. The public can lose this confidence if it is believed responders did not arrive quickly enough or take appropriate actions to prevent, contain, or end violence.

VULNERABILITY: WASTE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
WASTE	1	2	4	1	1.75

Probability

Probability is determined by frequency of previous events. For a full list of previous events involving waste, please see the individual hazard profile for “Waste” starting on page 3.228.

Probability Summary

While the severity of hazardous waste would be critical, there are strict regulations regarding the transportation and storage of hazardous waste. Because the regulations are stringent and various governmental agencies are proactive in preventing a hazardous waste event, a hazardous waste event is rated unlikely.

WASTE	PROBABILITY
	1

Magnitude/Severity

The magnitude of a waste event could be devastating depending on what the waste was and how large the event was. Health and environmental affects are the main concerns for a waste incident. The severity of a hazardous waste incident would cause minor isolated instances of property damage.

WASTE	MAGNITUDE/SEVERITY
	2

Warning Time

There is no warning time associated with a hazardous waste incident, and one could occur at any time.

WASTE	WARNING TIME
	4

Duration

A hazardous waste incident could take days to clean-up depending on the amount and type of waste. However, the initial event would happen quickly.

WASTE	DURATION
	1

CONSEQUENCE ANALYSIS: WASTE-GREENE COUNTY

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	3	Critical	A waste incident creates many safety concerns for the public. Injuries and illnesses are likely, and possibly death if exposed to hazardous waste.
Safety and Functionality of Responders	2	Limited	First responders will have proper equipment and training to handle a waste incident. The safety measures may create a delay of some response functions.
Property Damage	2	Limited	Greene County would experience minor isolated instances of property damage in the event of a hazardous waste incident.
Agriculture Damage	1	Negligible	Waste incidents would result in little to no impact on agriculture.
Damage to the Environment	3	Critical	Hazardous waste is very harmful to the environment. Water contamination also occurs from this type of incident.
Infrastructure Damage	1	Negligible	Waste incidents would have little to no impact on infrastructure.
Facility Damage	1	Negligible	Waste incidents would have little to no impact on facilities.
Delivery of Services	1	Negligible	Waste incidents would have little to no impact on service operations.
Economic Impact	1	Negligible	Waste incidents would have little to no impact on the economy.
Public Confidence in Governance	2	Limited	Waste incidents could have a minor effect of loss in public confidence, depending on the situation, and if the government is at fault.

VULNERABILITY: ANIMAL DISEASE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
ANIMAL DISEASE	3	3	1	4	2.8

Probability

Probability is determined based on previous occurrences'. For a full list of previous animal disease occurrences', please see the individual hazard profile for "Animal Disease" starting on page 3.235.

Probability Summary

Missouri livestock is considered to be healthy and free of diseases such as Tuberculosis, Brucellosis, and Pseudorabies and has no recent occurrences in Missouri, or near Greene County. However, other diseases such as Anaplasmosis, Bovine Leukosis Virus, Johnes' disease, Trichomoniasis, Porcine Epidemic Diarrhea Virus, Avian Influenza, Campylobacteriosis, and rabies have been seen in Missouri, in Greene County, or in nearby states within the last 10 years, with some occurring every year or almost every year. Other diseases, such as Pullorum, have been seen in Missouri, but not in the last 10 years. Based off of this data, an incident of some rare animal disease outbreak is unlikely. However, an incident of some other more common disease outbreaks is likely or highly likely to occur.

ANIMAL DISEASE	PROBABILITY
	3

Magnitude/Severity

This type of incident could cause multiple deaths in animals and humans as well as cause major economic losses. However, because most animal infectious diseases have associated screening and control processes, the potential severity can be diminished. Although many animals may still become infected, protocols regarding control and prevention of spread can limit the number of exposed animals. While a wide-spread animal disease outbreak in Greene County Missouri would be catastrophic, a small scale outbreak would be manageable and result in minimal losses when compared to a large scale spread.

ANIMAL DISEASE	MAGNITUDE/SEVERITY
	3

Warning Time

Knowing where diseased, exposed, and at-risk animals are located; where they've been; and when they may have been in contact with others is very important for ensuring a quick, effective response in the event of an animal disease event. Animal disease traceability helps reduce the impact of disease investigations to both animals and producers. Depending on the relative location of the first case of disease, it is very possible to get warning time. If an infectious disease is nearby geographically, measures can be taken to prevent the spread of the disease, look for signs and symptoms of disease transmission, and prevent adverse effects. However, it is also possible to receive no warning time at all. Many diseases are only discovered after they have killed a large portion of animals or resulted in severe adverse effects within an animal population.

ANIMAL DISEASE	WARNING TIME
	1

Duration

An animal disease outbreak would last for many months if not years depending on the type of disease and severity of the outbreak.

ANIMAL DISEASE	DURATION
	4

CONSEQUENCE ANALYSIS: ANIMAL DISEASE

IMPACTED AREA	CPRI RATING	RATING EXPLANATION
Safety and Health of the Public	3 Critical	An animal disease could cause illness and death if the disease is transmitted to humans. However, deaths from animal diseases are rare. This would cause multiple safety concerns when around animals, or potential infected produce.
Safety and Functionality of Responders	3 Critical	An animal disease outbreak would cause potential life threatening safety issues to responders. Diseases that can spread from person-to-person may be passed on to a responder. Additionally, if responders become ill response functions will be impacted greatly.
Property Damage	2 Limited	Minor property damage may occur on farms if equipment becomes contaminated.
Agriculture Damage	4 Catastrophic	Animal diseases can cause widespread significant damage to agriculture. Animal diseases create a loss of livestock, animal power, and pain and suffering to animals
Damage to the Environment	3 Critical	The wildlife in the area can be affected by animal diseases in many ways. Illness, infertility, and death can cause extinctions or a large decline in populations. The problem could become widespread.
Infrastructure Damage	3 Critical	Hospitals, veterinary clinics, and first responders would be overwhelmed. Grocery stores that get food from a local farm or butcher will also be greatly impacted. Multiple infrastructure sectors will be impacted through-out the jurisdiction
Facility Damage	1 Negligible	Animal diseases would have little to no impact of facilities.
Delivery of Services	1 Negligible	Delivery of services has had no reports of animal diseases impacting operations or delivery.
Economic Impact	4 Catastrophic	An animal disease could have a major economic impact with widespread loss due to the fact that Greene County’s economy is so dependent on agriculture. Diseased animals would cause a great loss in profits, and it would be expensive to replenish livestock, euthanize the ill, and dispose of the diseased properly.
Public Confidence in Governance	3 Critical	The government is seen as responsible for providing food and medical opportunities to the community. Lack of food and availability of hospitals would create a significant loss in public confidence of the government.

VULNERABILITY: COMMUNICABLE DISEASE

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
COMMUNICABLE DISEASE	3	3	4	4	3.25

Probability

Probability is determined by previous occurrences. For a full list of previous occurrences of communicable disease, refer to the individual hazard profile “Communicable Disease” starting on page 3.248.

Probability Summary

Communicable diseases happen in Greene County all year. With recent problems like Ebola and Hepatitis A, it is highly likely that another communicable disease will appear in the next year in Missouri. However, Greene County itself has had no severe outbreaks.

COMMUNICABLE DISEASE	PROBABILITY
	3

Magnitude/Severity

A global outbreak caused by a new strand of virus never seen before by the human population would significantly impact the global economy. This event would likely cause millions of deaths globally due to individuals not being immune to the strand, unavailable vaccinations and a limited supply of medicine. A pandemic would place everything on hold. Most of the population would be infected, unable to work and may not receive medication due to limited supplies. According to the CDC, several scientists believe a pandemic caused by the Avian Flu is possible. Some estimates suggest the virus could travel around the world in four days. However, scientists have had experience dealing with human infections from the Avian Influenza, thus having more time to prepare for a future global outbreak. A communicable disease outbreak in Greene County would have many different severities depending on the disease itself. However, if current global communicable diseases were to reach Greene County, the severity would be critical with many illnesses, and shut down of critical facilities for at least 2 weeks.

COMMUNICABLE DISEASE	MAGNITUDE/SEVERITY
	3

Warning Time

Outbreaks that begin occurring in certain parts of the country can be helpful in determining the potential for an impact in the Springfield-Greene County area. Individuals may travel before they begin showing any signs or symptoms of illness, diseases that occur in one area of the country can quickly spread to many other regions. The Center for Disease Control is often able to predict the severity of illnesses after an outbreak begins. The amount of warning time depends on the infectivity of the pathogen. Some illnesses will show symptoms within a few hours whereas others take several weeks to incubate and replicate within its human host. Most food-borne illnesses will show symptoms beginning after a few hours. Some viruses, like the measles virus, can take two weeks to cause illness.

COMMUNICABLE DISEASE	WARNING TIME
	4

Duration

The Duration of the illness depends on the pathogen itself, the amount of the pathogen, and the body's own immune system. Cases of influenza typically occur throughout the winter months and subside in the spring and summer. The duration of an outbreak may be shortened by the availability of vaccinations and public safety measures to limit the amount of people exposed. If a communicable disease incident were to take place, an outbreak would last months.

COMMUNICABLE DISEASE	DURATION
	4

CONSEQUENCE ANALYSIS: COMMUNICABLE DISEASE

IMPACTED AREA	CPRI RATING		RATING EXPLANATION
Safety and Health of the Public	4	Catastrophic	A widespread communicable disease would cause a significant impact. Depending on which communicable disease is affecting the community, a large number of the population would be ill and death could result to a few or many.
Safety and Functionality of Responders	4	Catastrophic	A communicable disease would bring many safety concerns to first responders. If a large number of the population is ill, the demand for responders would be overwhelming, especially if responders are ill.
Property Damage	1	Negligible	An animal disease would cause little to no property damage
Agriculture Damage	2	Limited	A communicable disease would cause limited damage to agriculture. People that work in agriculture would be the most affected if they were to become ill. The illness would create a lack of productivity and farming. If livestock becomes ill, please refer to the hazard for animal disease.
Damage to the Environment	1	Negligible	A communicable disease would create little to no impact on the environment. If wildlife becomes infected with disease, please refer to the hazard for animal diseases.
Infrastructure Damage	3	Critical	Hospitals, veterinary clinics, and first responders would be overwhelmed. Infrastructure owners and operators contracting the disease would impact multiple infrastructure sectors in the jurisdiction.
Facility Damage	1	Negligible	A communicable disease would have little to no impact of facilities.
Delivery of Services	3	Critical	Delivery of services would be heavily impacted if a large number of the population becomes ill. Operations may be delayed, suspended, or overwhelmed.
Economic Impact	4	Catastrophic	A communicable disease would create major economic impact and widespread loss. Illness would create a small workforce, and demand for many businesses would dissipate with all income going toward hospital bills and medication.
Public Confidence in Governance	3	Critical	The government is seen as responsible for providing medical opportunities to the community and ultimately a cure. Long term illness and deaths would create a significant loss in public confidence of the government.

LIST OF VULNERABILITIES: GREENE COUNTY

RISK	PROBABILITY	MAGNITUDE/SEVERITY	WARNING TIME	DURATION	CPRI
Flood	4	3	4	3	3.60
Hazardous Materials	4	3	4	2	3.50
Severe Thunderstorm (High Wind)	4	3	4	1	3.45
Tornado	4	3	4	1	3.40
Cyber	4	2	4	4	3.40
Severe Winter Weather (Ice and Snow)	4	4	1	2	3.35
Drought	3	3	4	4	3.25
Communicable Disease	3	3	4	4	3.25
Drought	3	3	4	4	3.25
Wildfire	4	2	4	2	3.20
Animal Disease	3	3	1	4	2.80
Extreme Temperature (Heat)	3	3	1	4	2.80
Severe Thunderstorm (Hail)	4	2	1	1	2.65
Severe Thunderstorm (Lightning)	4	2	1	1	2.65
Land Subsidence/Sinkholes	4	1	4	4	2.65
Biological	1	4	4	4	2.65
Chemical	3	2	4	1	2.65
Civil Unrest	2	3	4	2	2.60
Targeted Violence	2	3	4	1	2.50
Extreme Temperatures (Cold)	3	2	1	3	2.40
Power Failure	3	2	1	2	2.30
Airplane Crash	2	2	4	1	2.20
Urban Fire	1	3	4	2	2.15
Dam Failure	1	3	4	1	2.05
Explosive	2	1	4	1	1.90
Nuclear	1	2	4	1	1.75
Waste	1	2	4	1	1.75
Train Derailment	1	2	4	1	1.75
Earthquake	1	2	4	1	1.75
Cave/Mine Collapse	1	1	4	1	1.45
Radiological	1	1	4	1	1.45

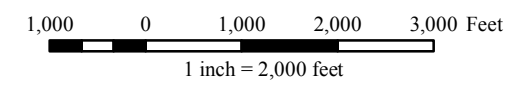
Hazard Mitigation Plan:

Ash Grove Floodplain

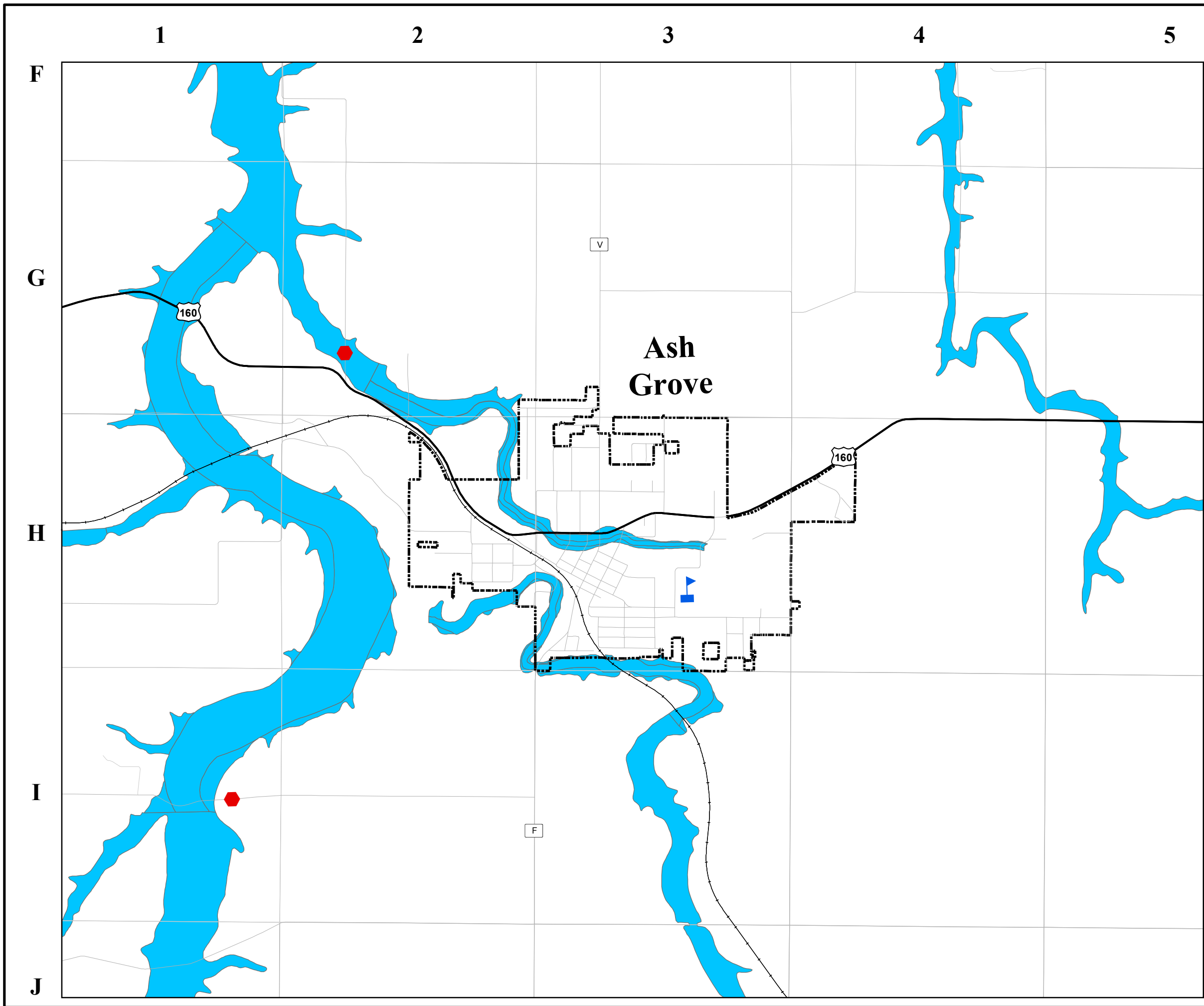


Flooding Events

- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closures
- 3-18-2008 Road Closures
- ▢ R12 and Rural Schools
- ▢ Colleges - Universities
- Springfield City Limits
- City Limits
- Greene County
- 100 Year Floodplain



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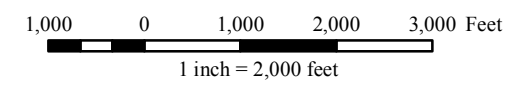
Hazard Mitigation Plan:

Battlefield Floodplain

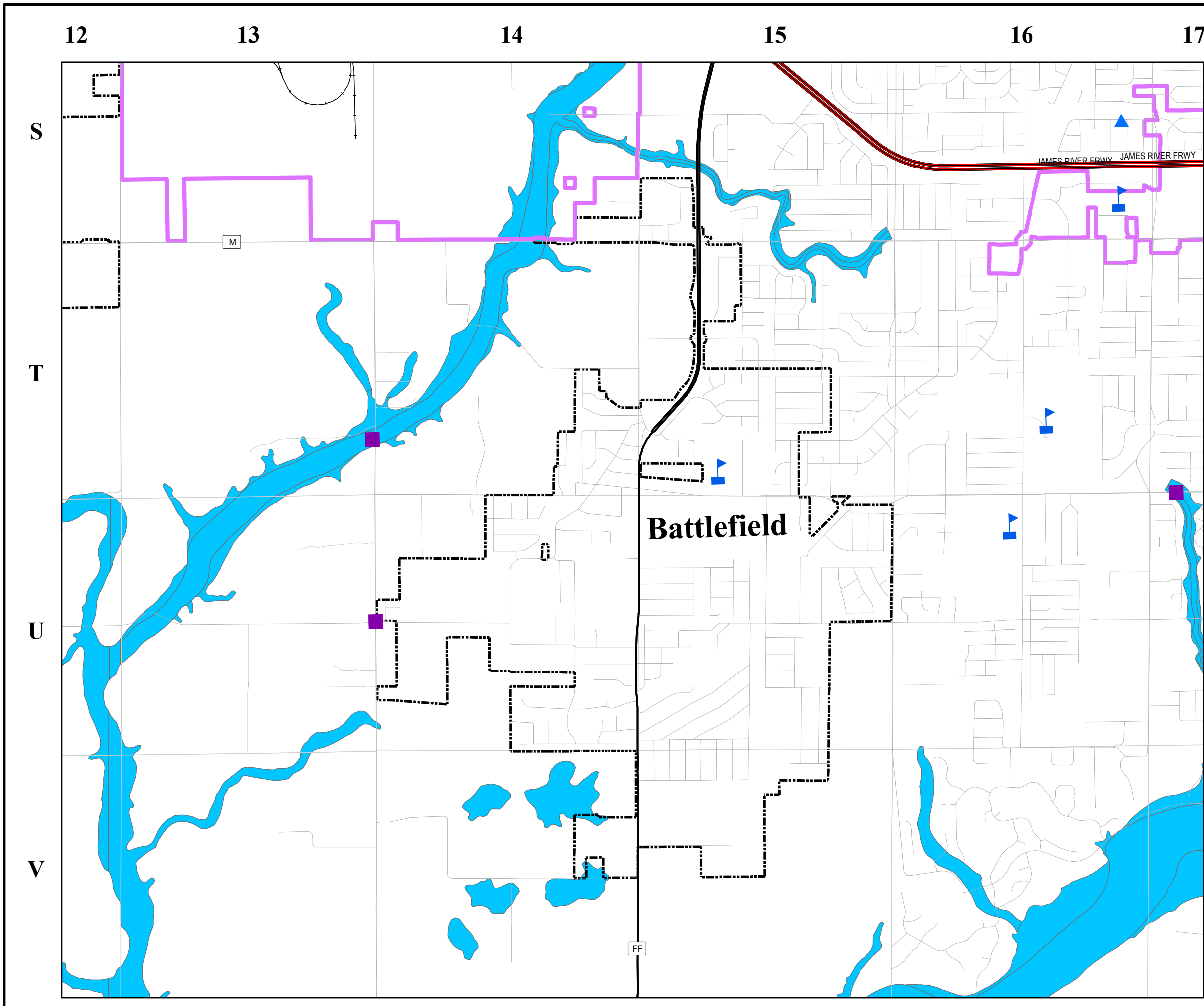


Flooding Events

- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closings
- 3-18-2008 Road Closings
- ▢ R12 and Rural Schools
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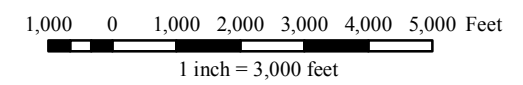
Hazard Mitigation Plan:

Fair Grove Floodplain

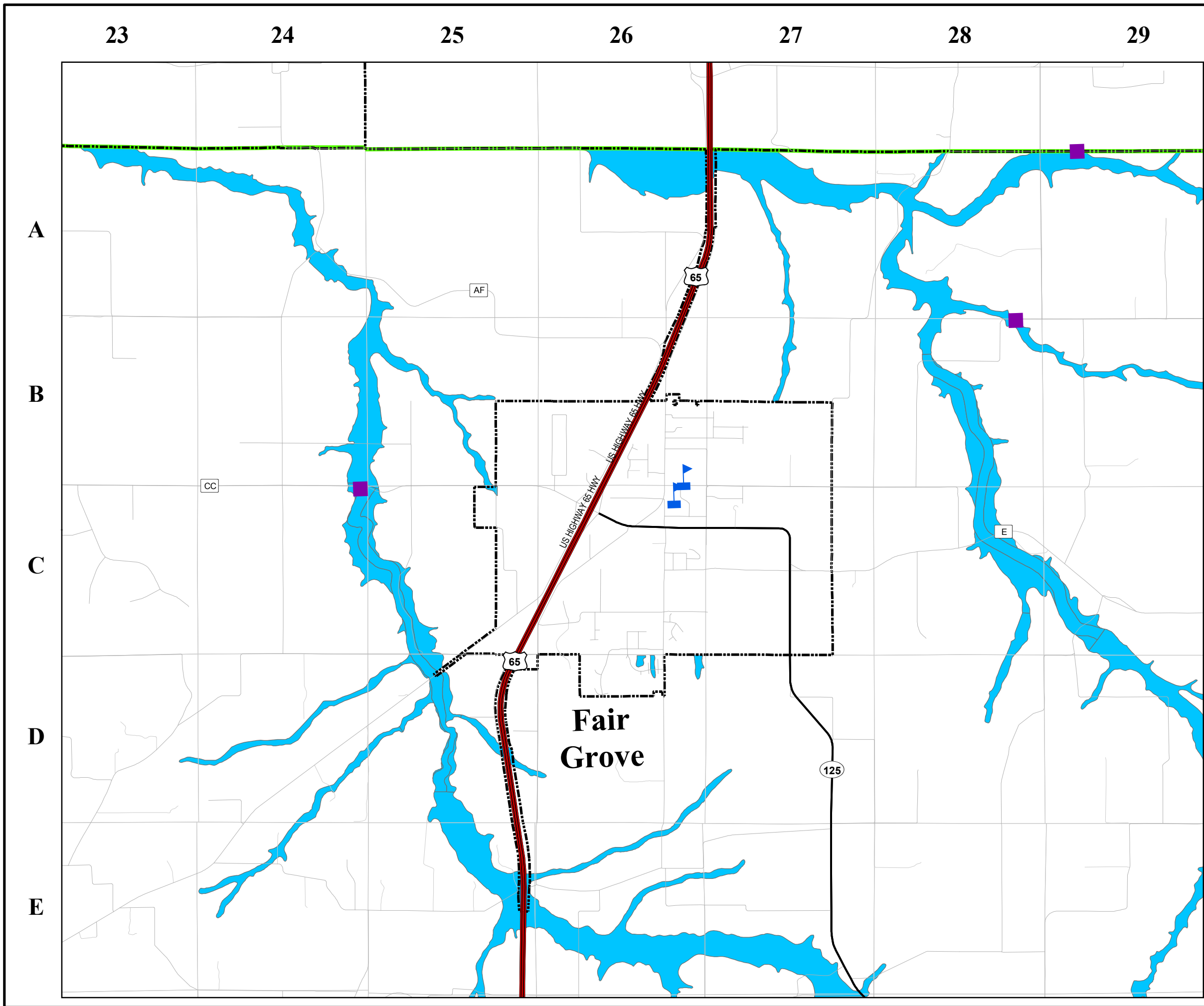


Flooding Events

- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closings
- 3-18-2008 Road Closings
- ▤ R12 and Rural Schools
- ▥ Colleges - Universities
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- Greene County
- 100 Year Floodplain



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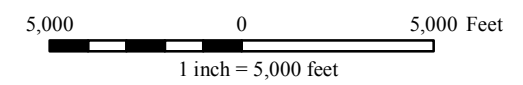


Hazard Mitigation Plan:

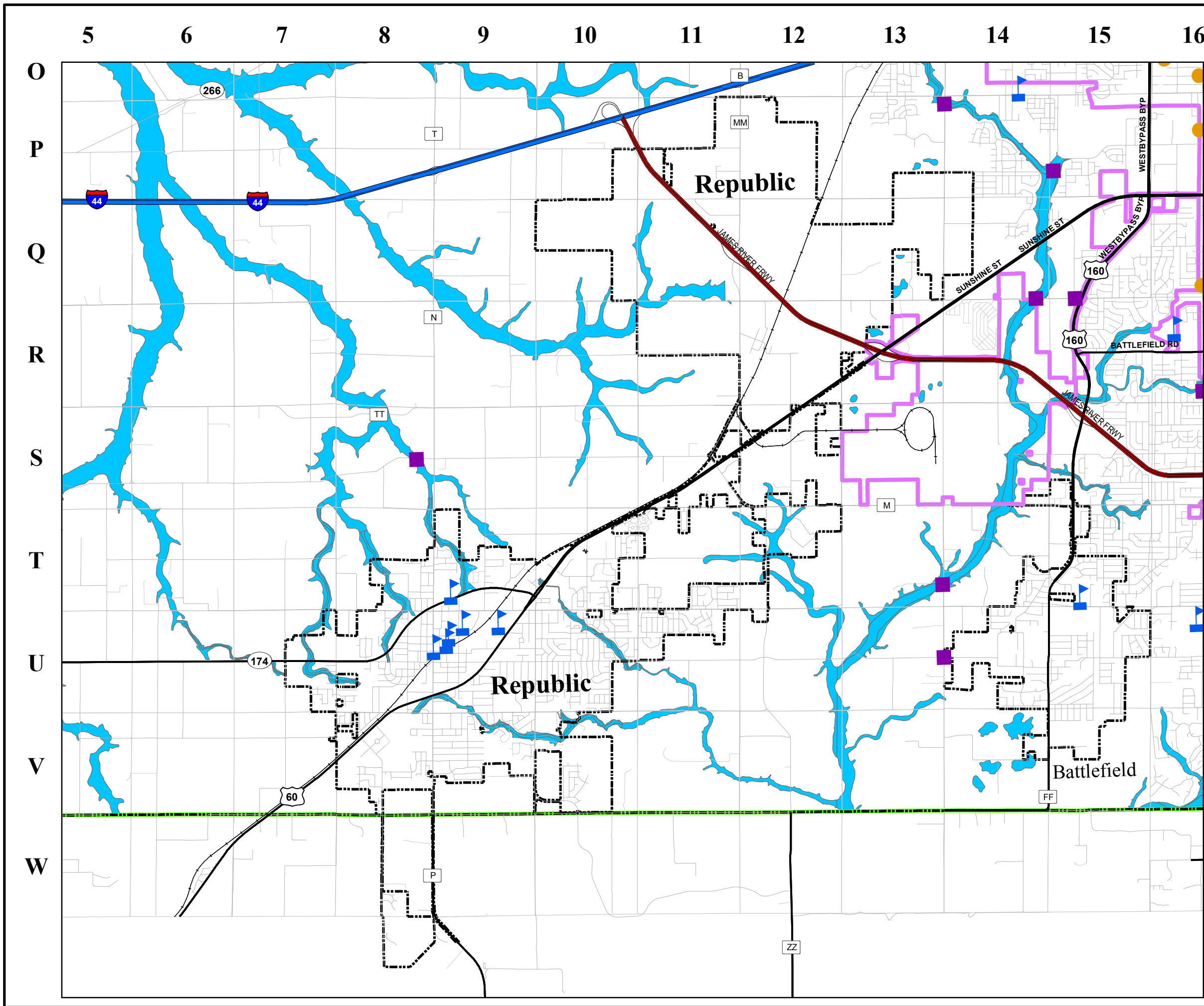
Republic Floodplain



- Flooding Events**
- 9-24-1993 Flood Damage
 - ▲ 7-12-2000 Flood Damage
 - ◆ 8-2007 Road Closings
 - 3-18-2008 Road Closings
 - ▶ R12 and Rural Schools
 - ▶ Colleges - Universities
 - Springfield City Limits
 - City Limits
 - Greene County
 - 100 Year Floodplain

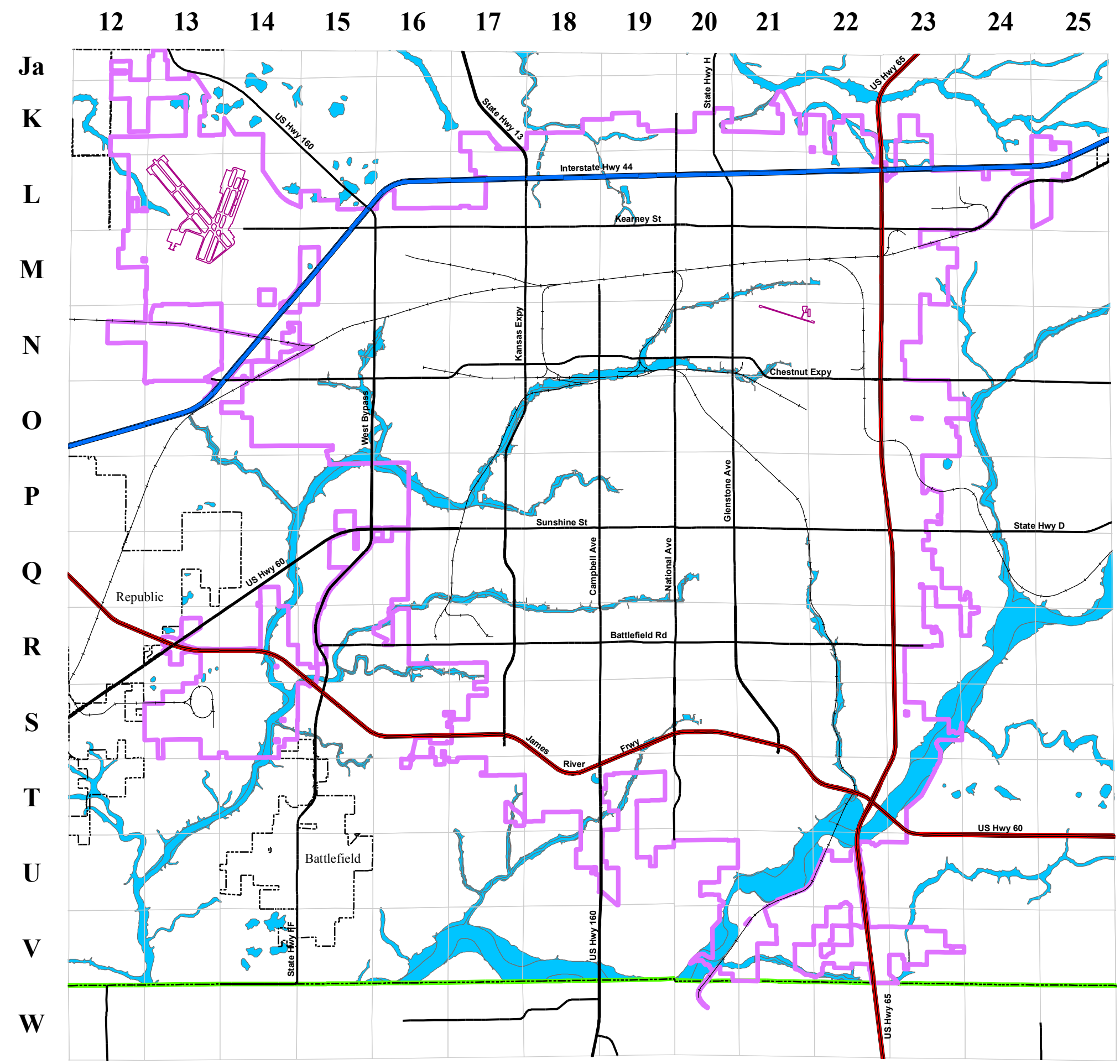


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Hazard Mitigation Plan:

Springfield Floodplain

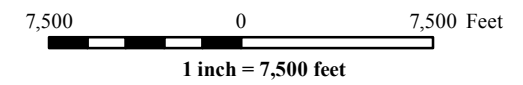


Legend

- Springfield City Limits
- City Limits
- Greene County

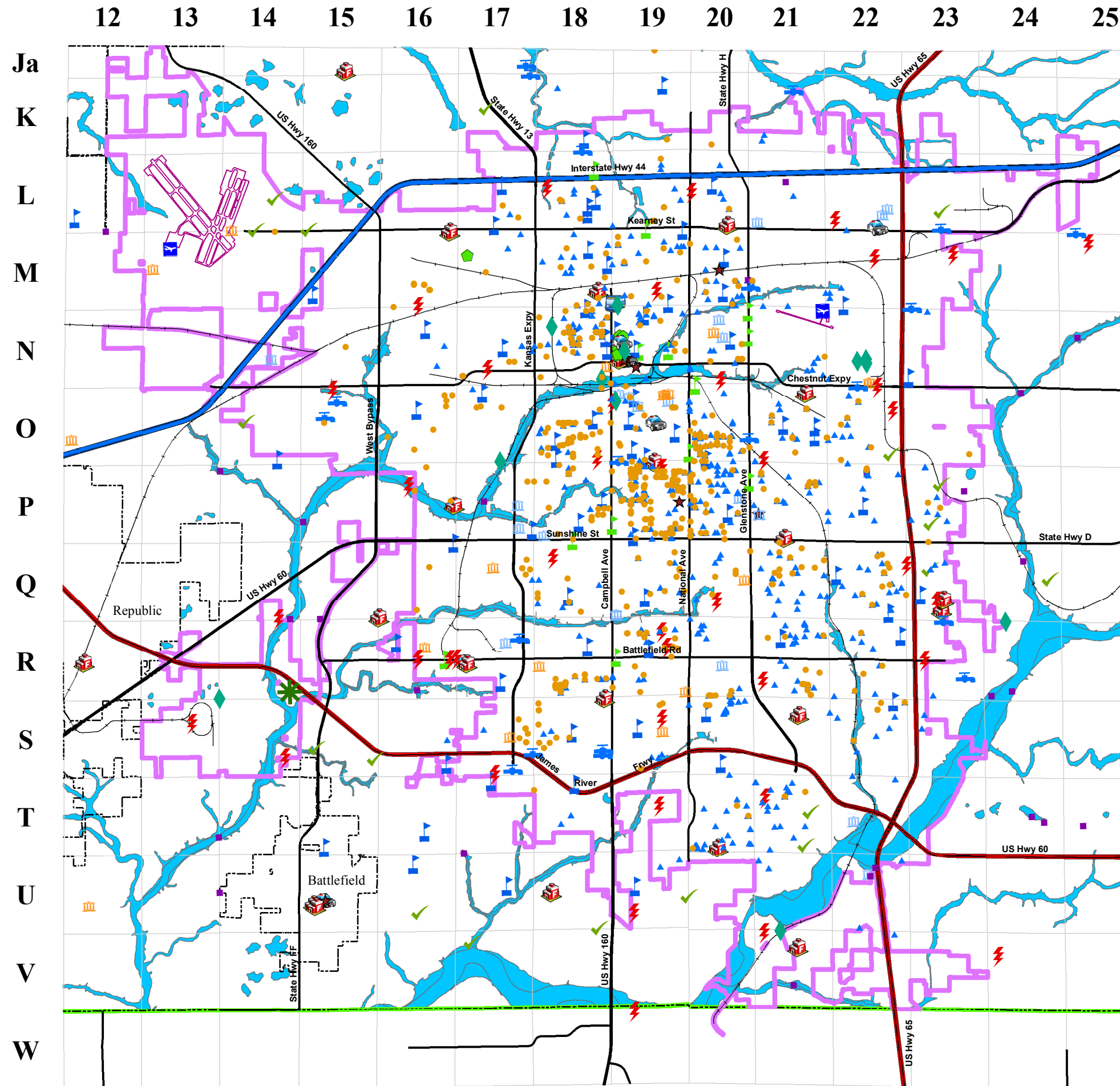
Floodplain

- 100 Year

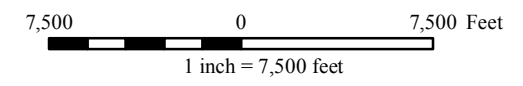


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Hazard Mitigation Plan: Springfield Floodplain



- Flooding Events**
- 9-24-1993 Flood Damage
 - ▲ 7-12-2000 Flood Damage
 - 8-2007 Road Closings
 - 3-18-2008 Road Closings
- Utilities**
- ◆ City Utilities
 - ⚡ CU Substations
 - ⚙️ CU Water Facilities
 - ✓ Lift Stations
 - ✳️ Northwest Wastewater Treatment Plant
 - ✳️ Southwest Wastewater Treatment Plant
- Government Facilities**
- ✈️ Airports
 - 🚌 Bus Transportation
 - 🚒 Fire Stations
 - 🚓 Police Departments
 - ★ City Government
 - 🏛️ County Government
 - 🏛️ State Government
 - 🏛️ Federal Government
 - 🎓 R12 and Rural Schools
 - 🎓 Colleges - Universities
- Other Features**
- 📐 Springfield City Limits
 - ⋯ City Limits
 - 🟢 Greene County
 - 🟦 100 Year Floodplain



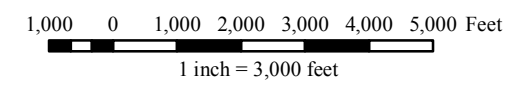
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Hazard Mitigation Plan: Strafford Floodplain

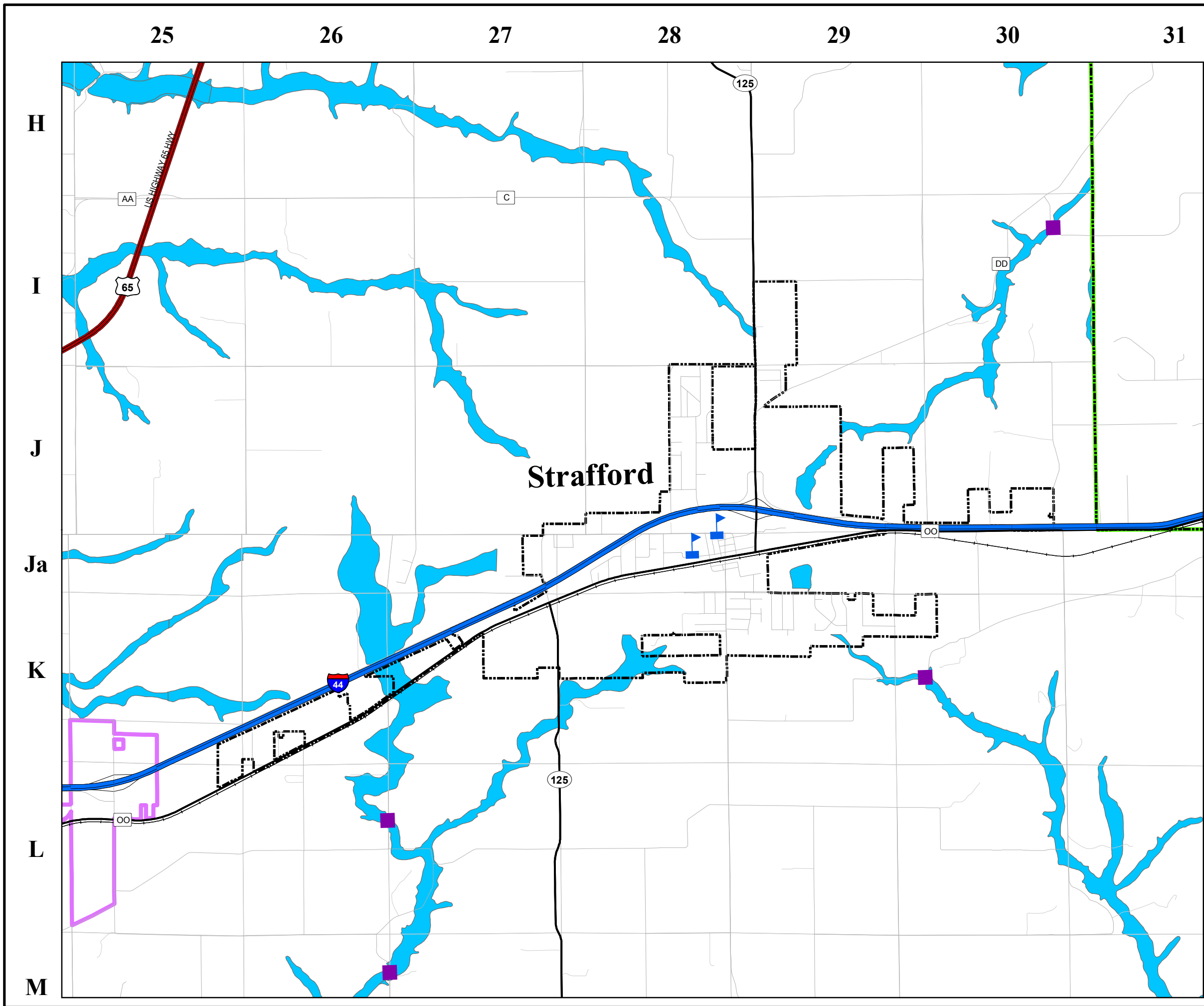


Flooding Events

- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closings
- 3-18-2008 Road Closings
- ▤ R12 and Rural Schools
- ▤ Colleges - Universities
- Springfield City Limits
- City Limits
- Greene County
- 100 Year Floodplain



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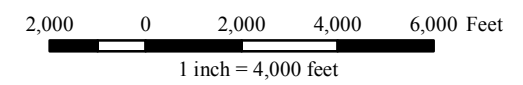
Hazard Mitigation Plan:

Willard Floodplain

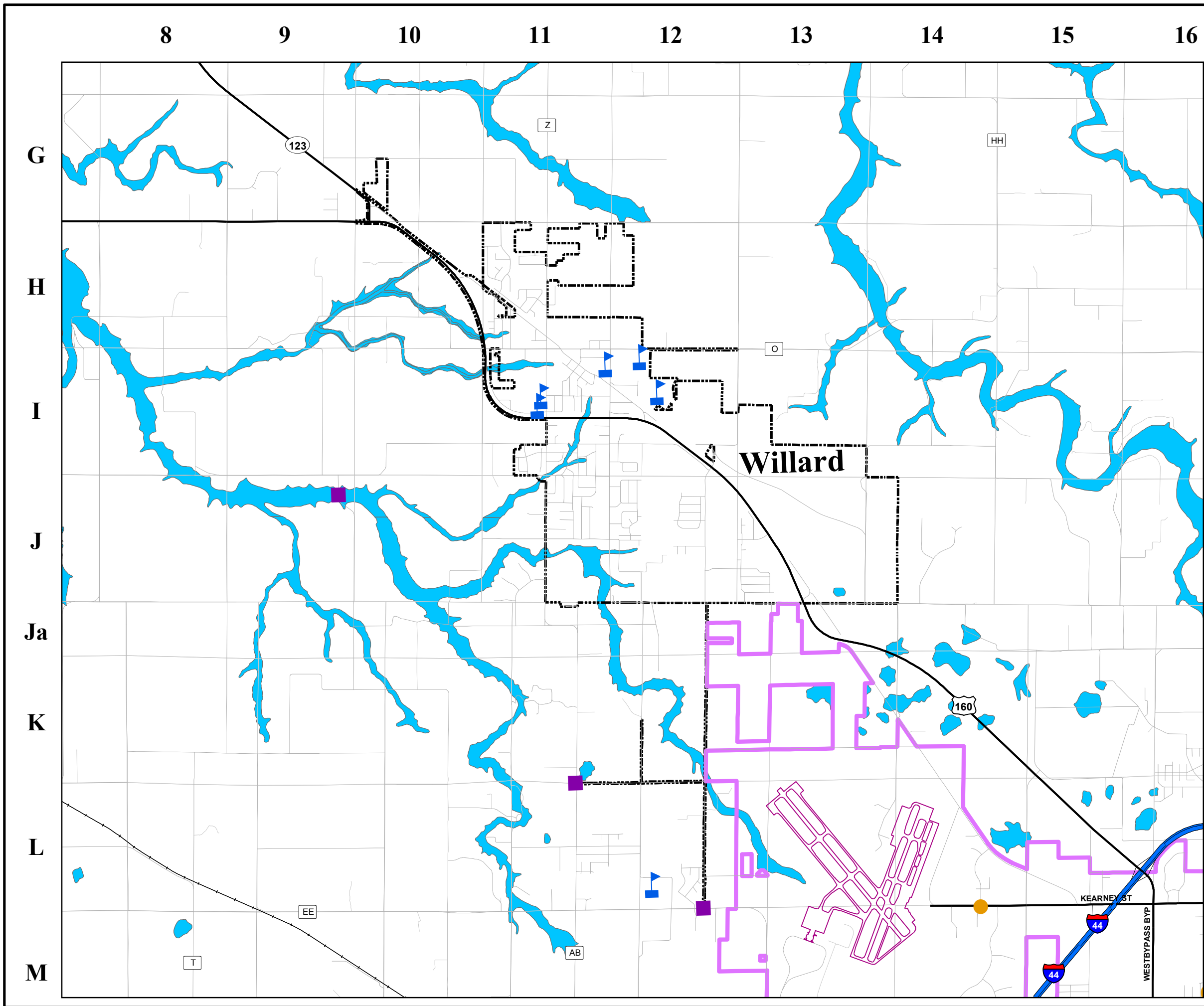


Flooding Events

- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closures
- 3-18-2008 Road Closures
- ▤ R12 and Rural Schools
- ▥ Colleges - Universities
- Springfield City Limits
- City Limits
- Greene County
- 100 Year Floodplain



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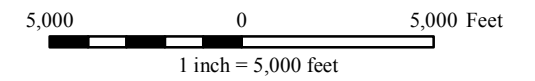


Hazard Mitigation Plan:

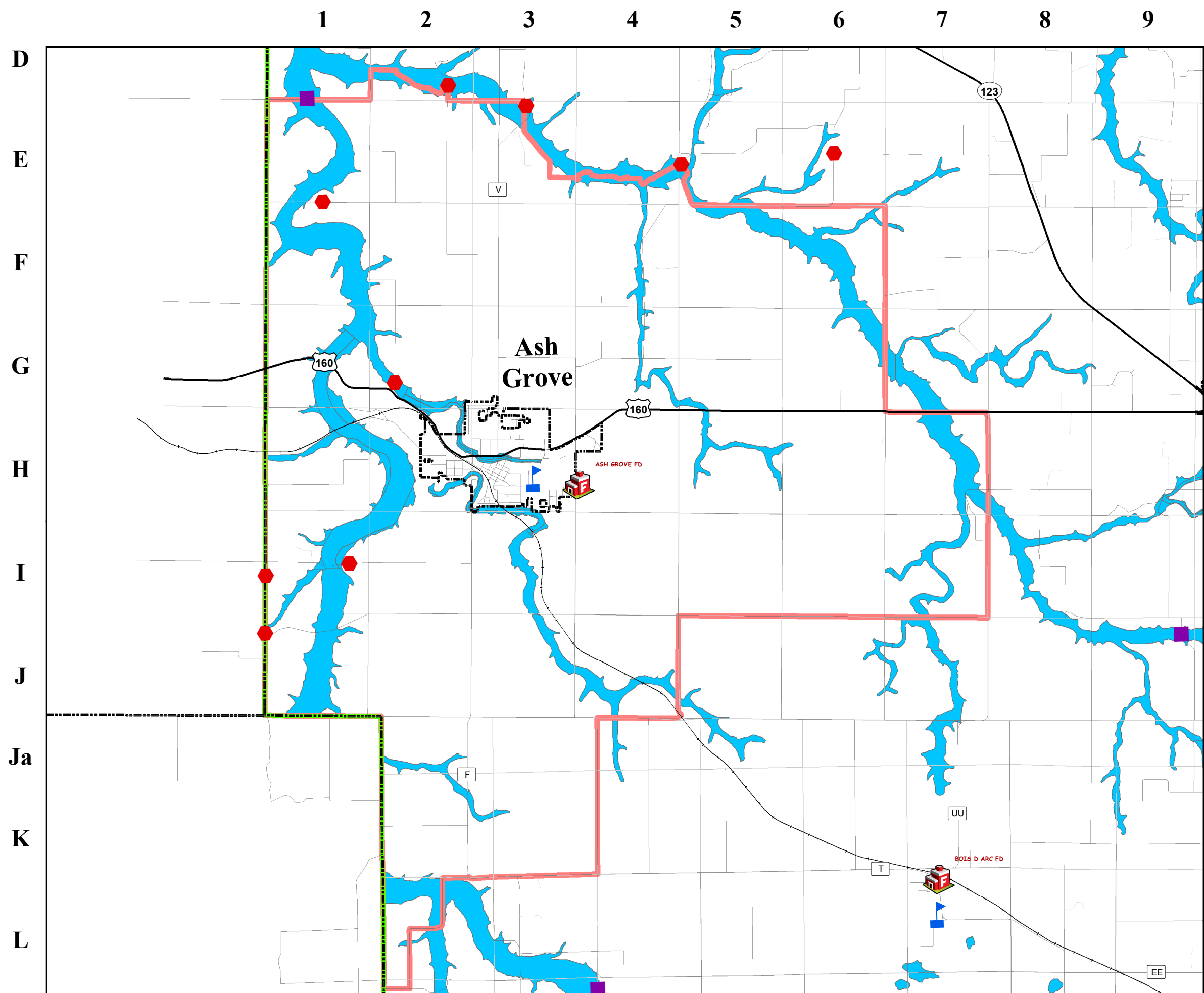
Ash Grove Fire District Floodplain



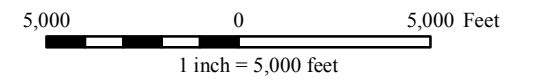
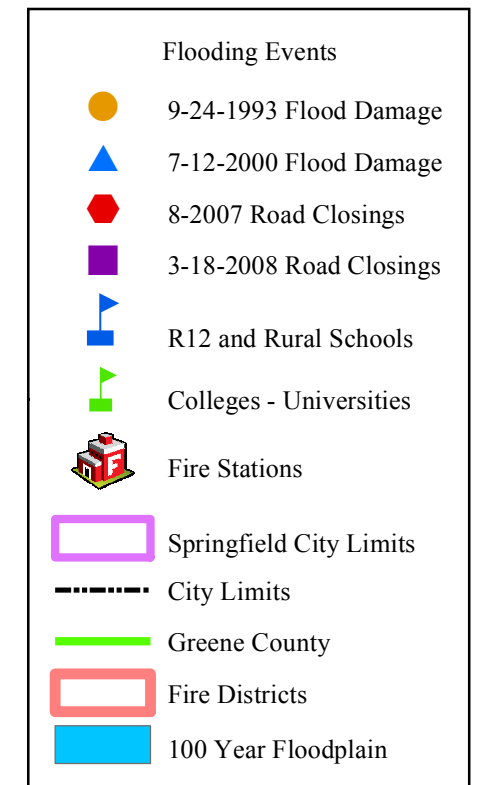
- Flooding Events**
- 9-24-1993 Flood Damage
 - ▲ 7-12-2000 Flood Damage
 - ◆ 8-2007 Road Closings
 - 3-18-2008 Road Closings
 - ▤ R12 and Rural Schools
 - ▤ Colleges - Universities
 - Fire Stations
 - Springfield City Limits
 - City Limits
 - Greene County
 - Fire Districts
 - 100 Year Floodplain



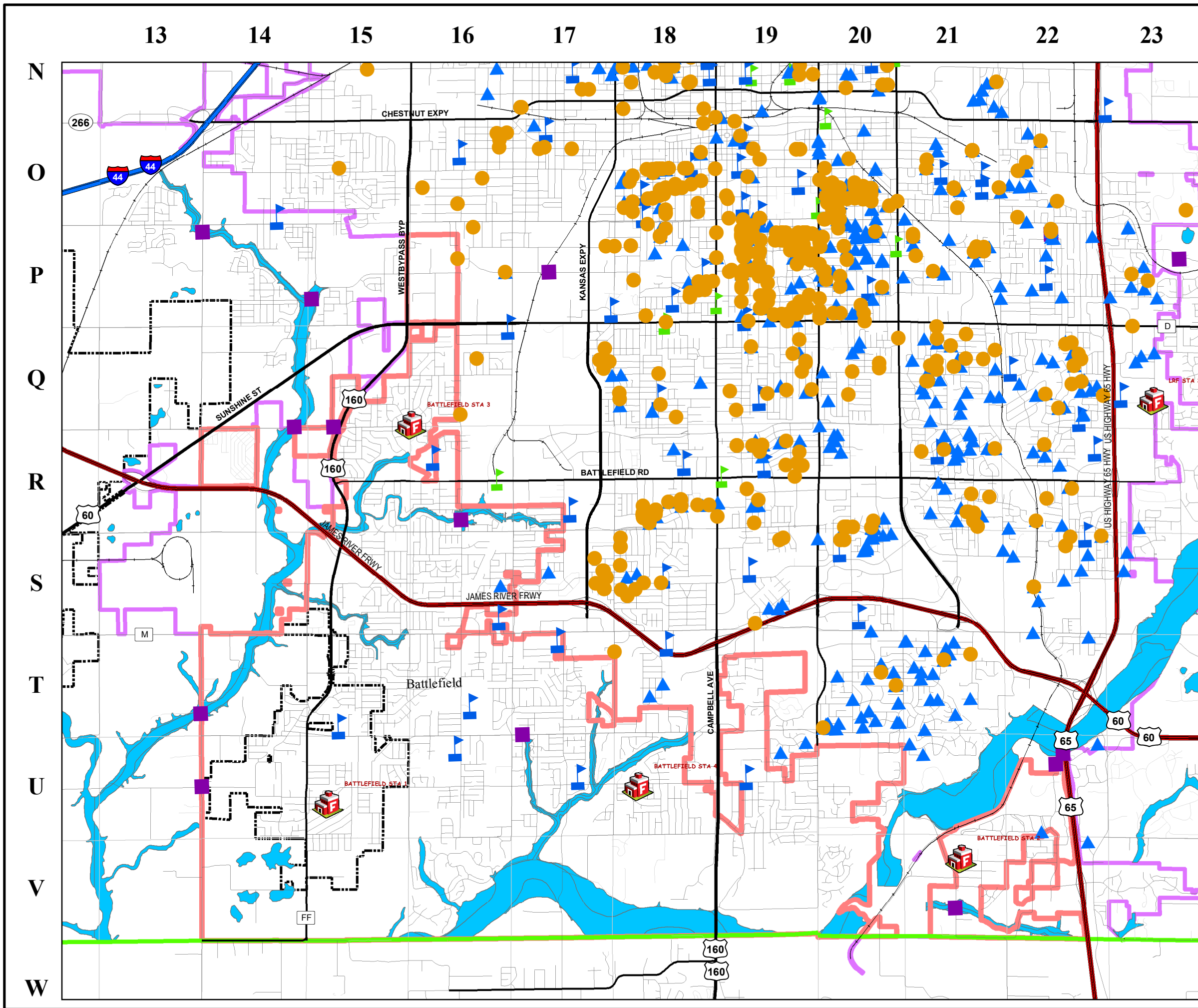
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Hazard Mitigation Plan: Battlefield Fire District Floodplain



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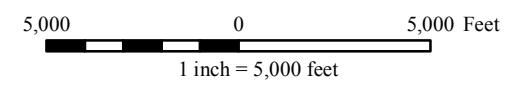
Hazard Mitigation Plan:

Bois D'Arc Fire District Floodplain

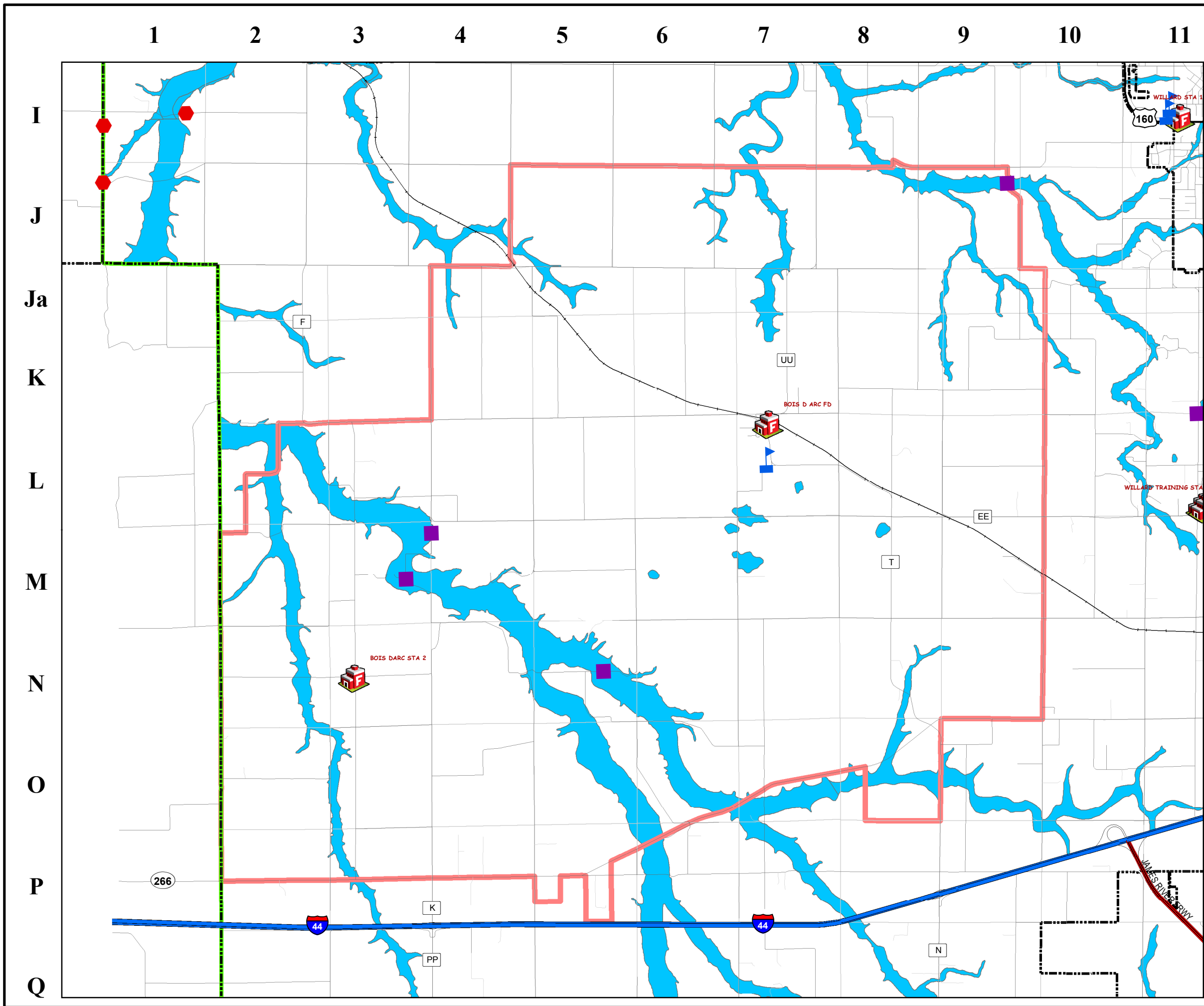


Flooding Events

- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closings
- 3-18-2008 Road Closings
- ▤ R12 and Rural Schools
- ▤ Colleges - Universities
- Fire Stations
- Springfield City Limits
- City Limits
- Greene County
- Fire Districts
- 100 Year Floodplain



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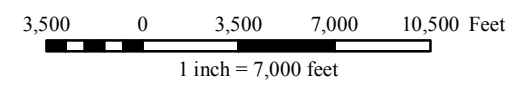


Hazard Mitigation Plan: Ebenezer Fire District Floodplain

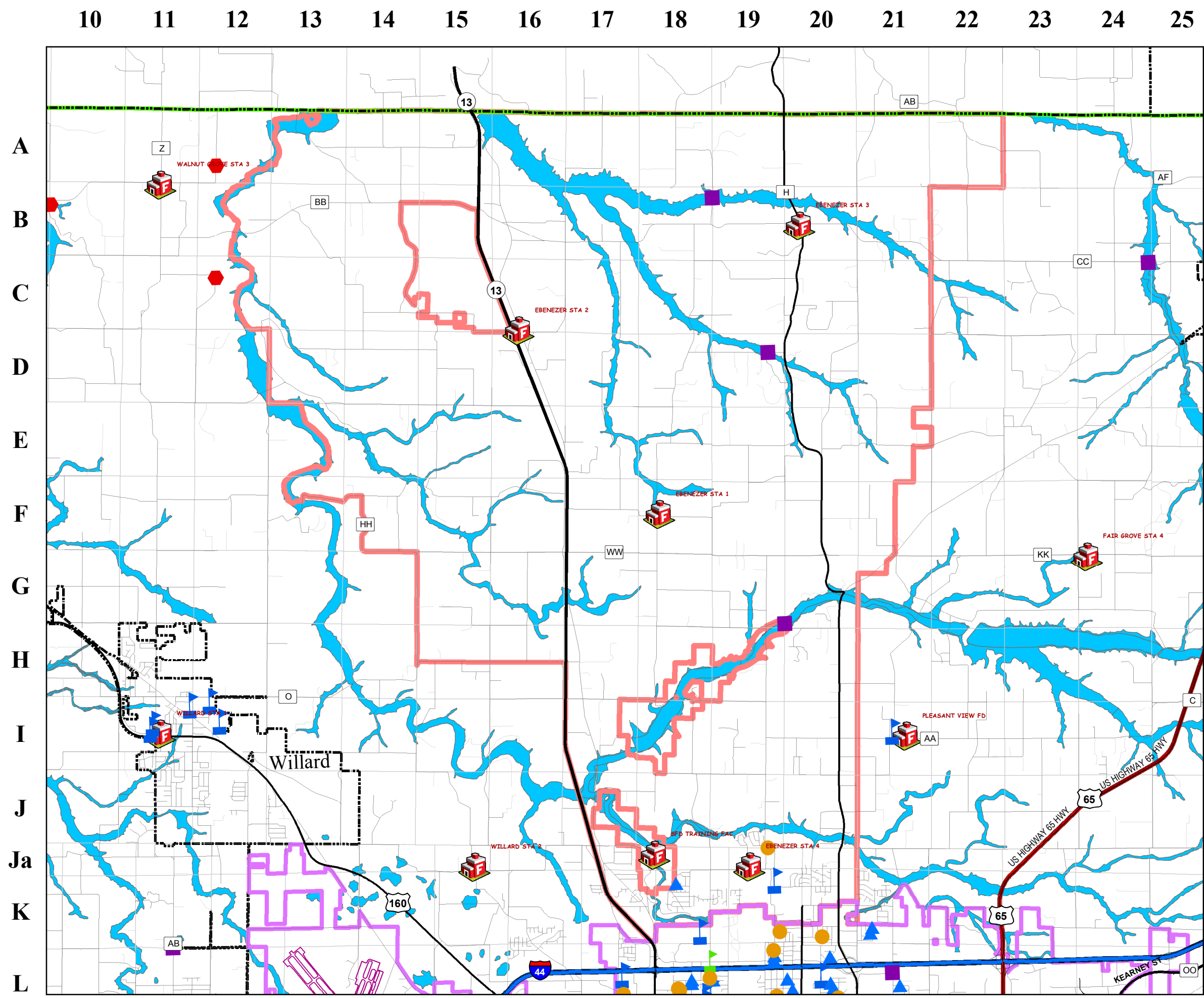


Flooding Events

- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closings
- 3-18-2008 Road Closings
- ▢ R12 and Rural Schools
- ▢ Colleges - Universities
- Fire Stations
- Springfield City Limits
- City Limits
- Greene County
- Fire Districts
- 100 Year Floodplain



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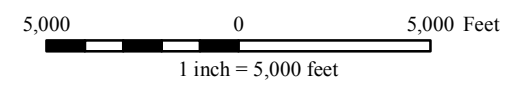
Hazard Mitigation Plan:

Fair Grove Fire District Floodplain

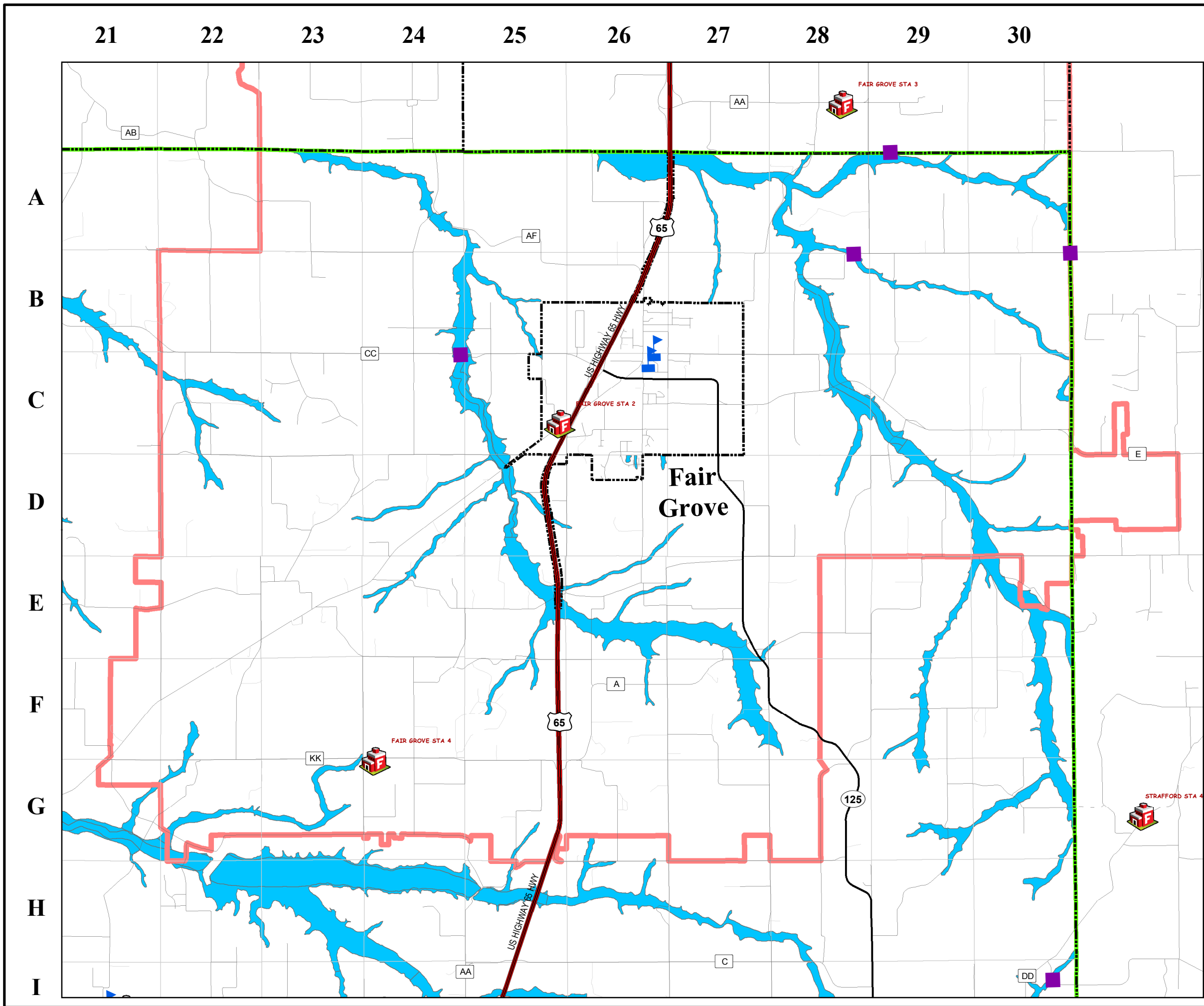


Flooding Events

- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closings
- 3-18-2008 Road Closings
- ▤ R12 and Rural Schools
- ▤ Colleges - Universities
- Fire Stations
- Springfield City Limits
- City Limits
- Greene County
- Fire Districts
- 100 Year Floodplain



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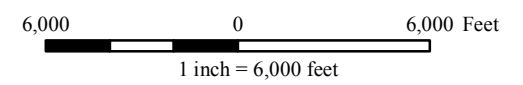


Hazard Mitigation Plan:

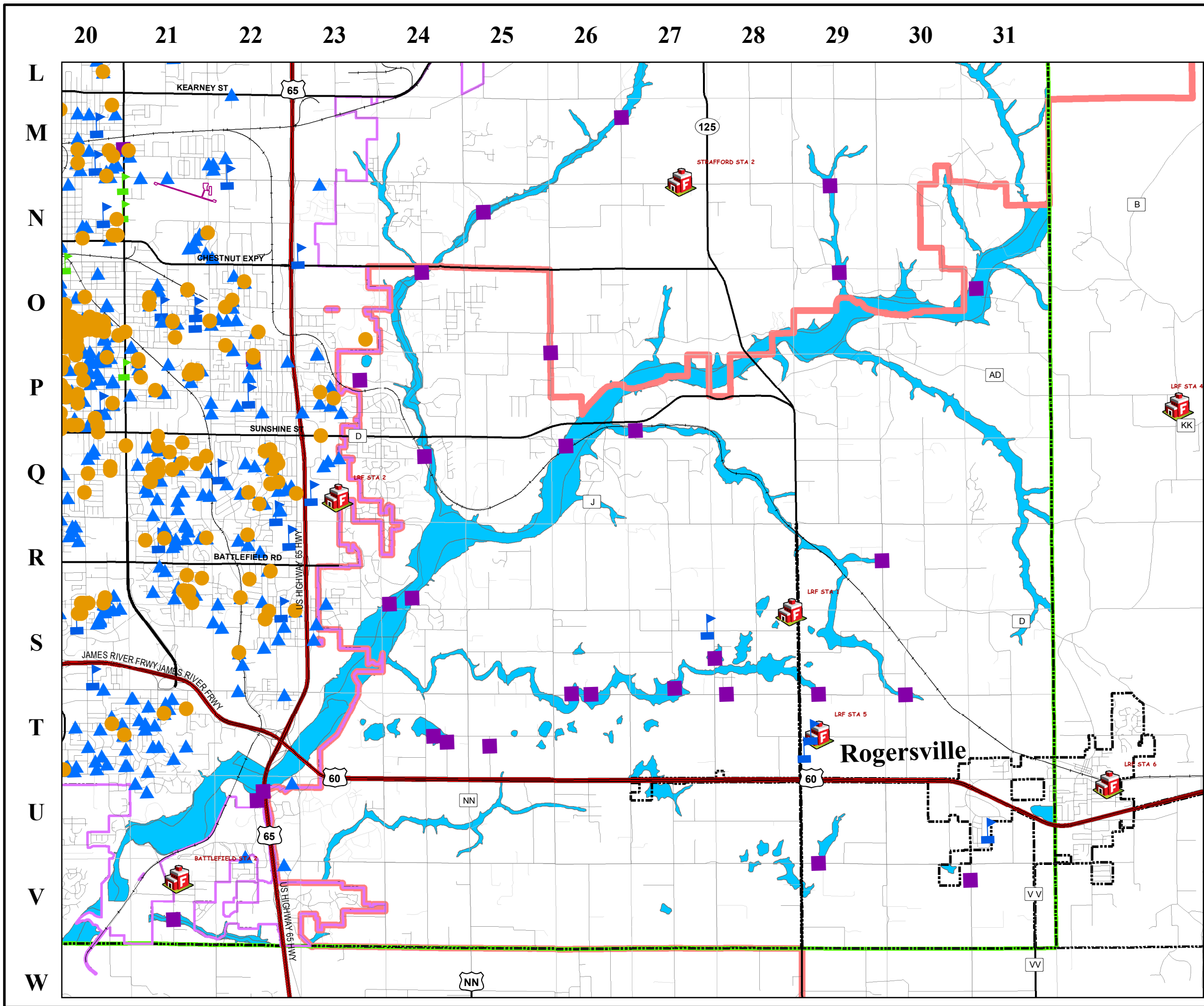
Logan-Rogersville Fire District Floodplain



- | Flooding Events | |
|-----------------|-------------------------|
| | 9-24-1993 Flood Damage |
| | 7-12-2000 Flood Damage |
| | 8-2007 Road Closings |
| | 3-18-2008 Road Closings |
| | R12 and Rural Schools |
| | Colleges - Universities |
| | Fire Stations |
| | Springfield City Limits |
| | City Limits |
| | Greene County |
| | Fire Districts |
| | 100 Year Floodplain |



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Hazard Mitigation Plan:

Pleasant View Fire District Floodplain

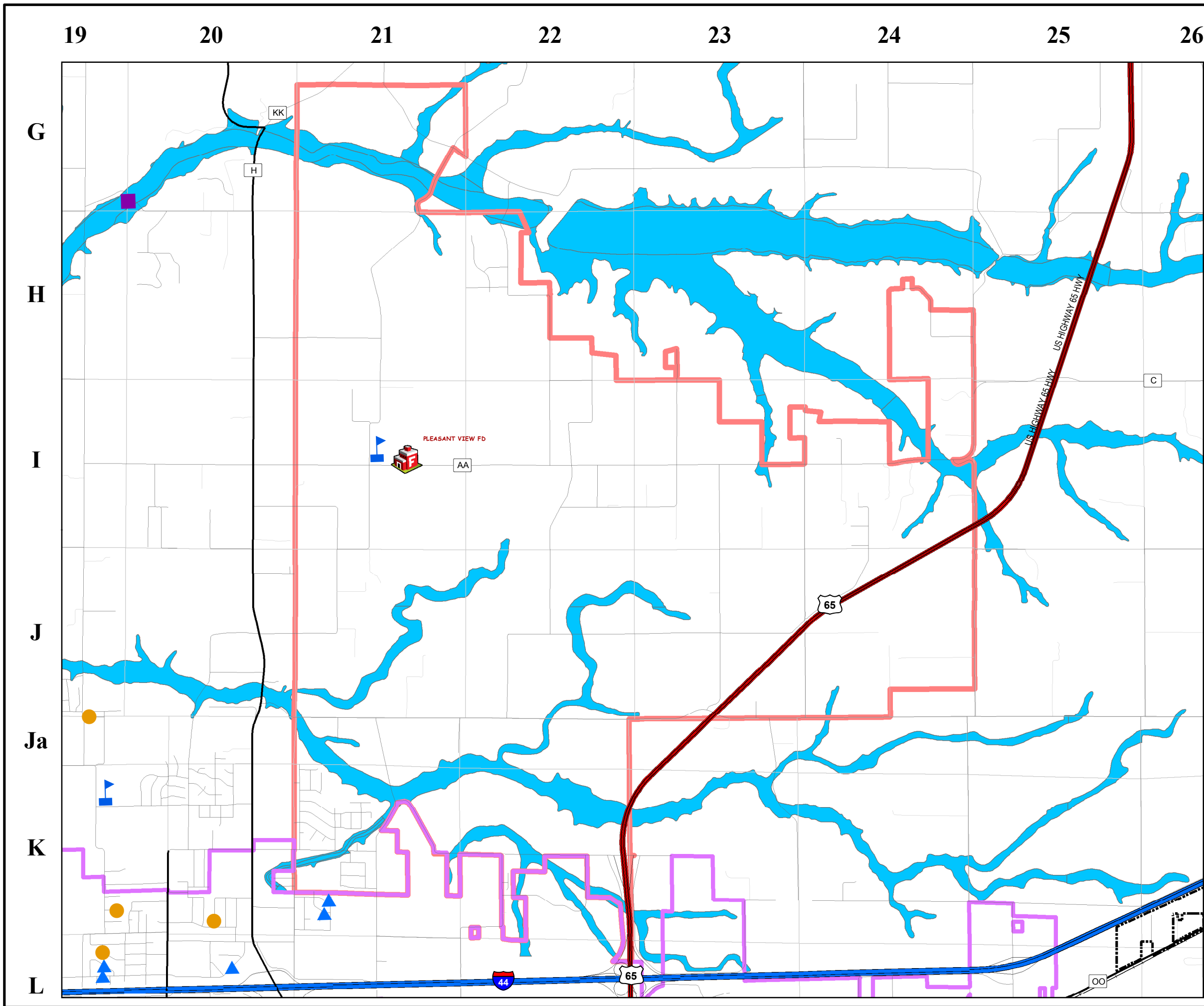


Flooding Events	
	9-24-1993 Flood Damage
	7-12-2000 Flood Damage
	8-2007 Road Closings
	3-18-2008 Road Closings
	R12 and Rural Schools
	Colleges - Universities
	Fire Stations
	Springfield City Limits
	City Limits
	Greene County
	Fire Districts
	100 Year Floodplain



1,000 0 1,000 2,000 3,000 4,000 Feet
1 inch = 3,000 feet

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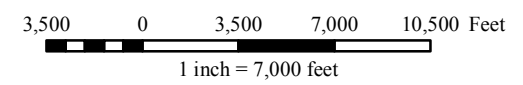


Hazard Mitigation Plan:

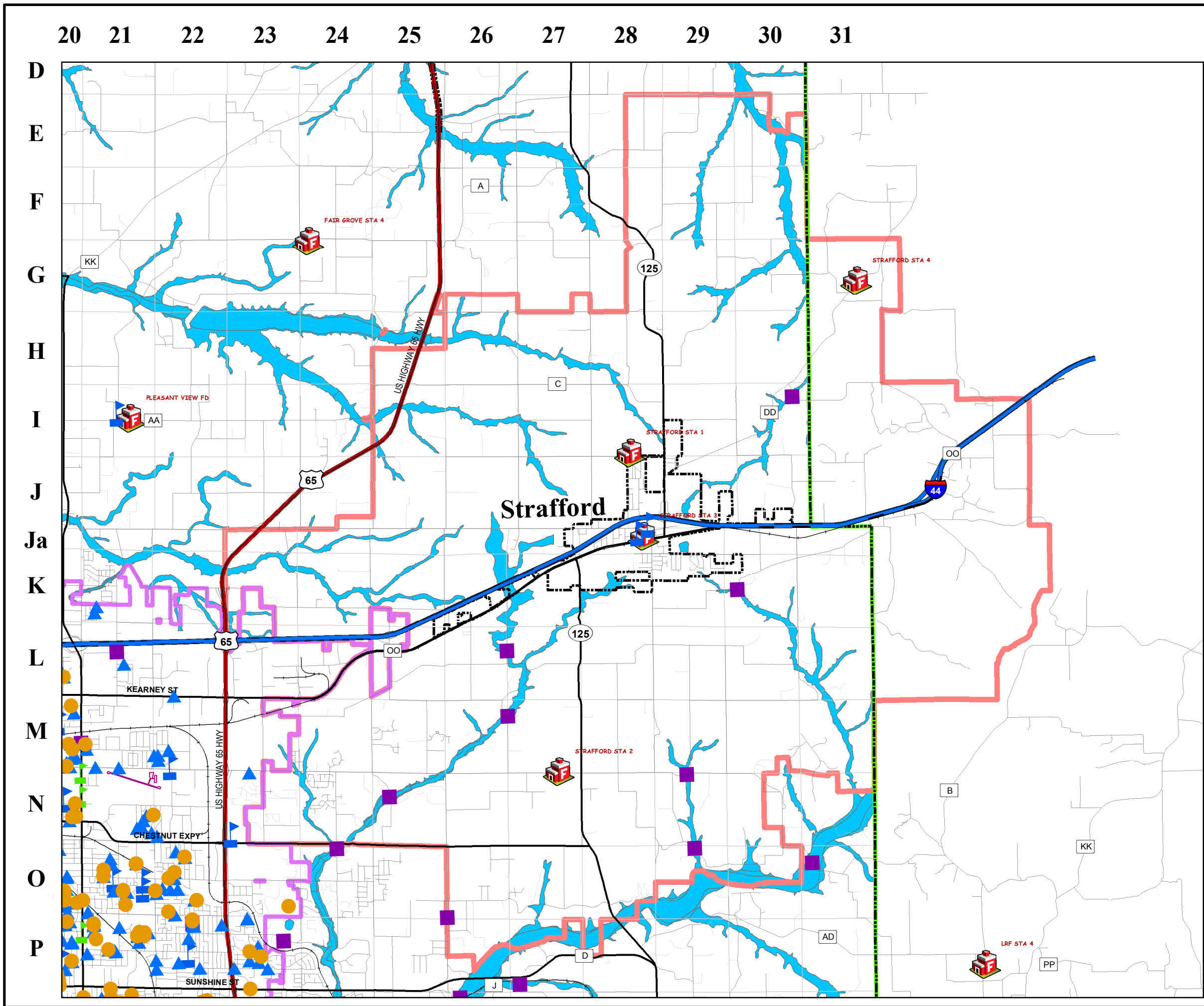
Strafford Fire District Floodplain



- Flooding Events**
- 9-24-1993 Flood Damage
 - ▲ 7-12-2000 Flood Damage
 - ◆ 8-2007 Road Closings
 - 3-18-2008 Road Closings
 - ▤ R12 and Rural Schools
 - ▤ Colleges - Universities
 - Fire Stations
 - Springfield City Limits
 - City Limits
 - Greene County
 - Fire Districts
 - 100 Year Floodplain



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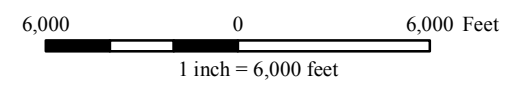
Hazard Mitigation Plan:

Willard Fire District Floodplain

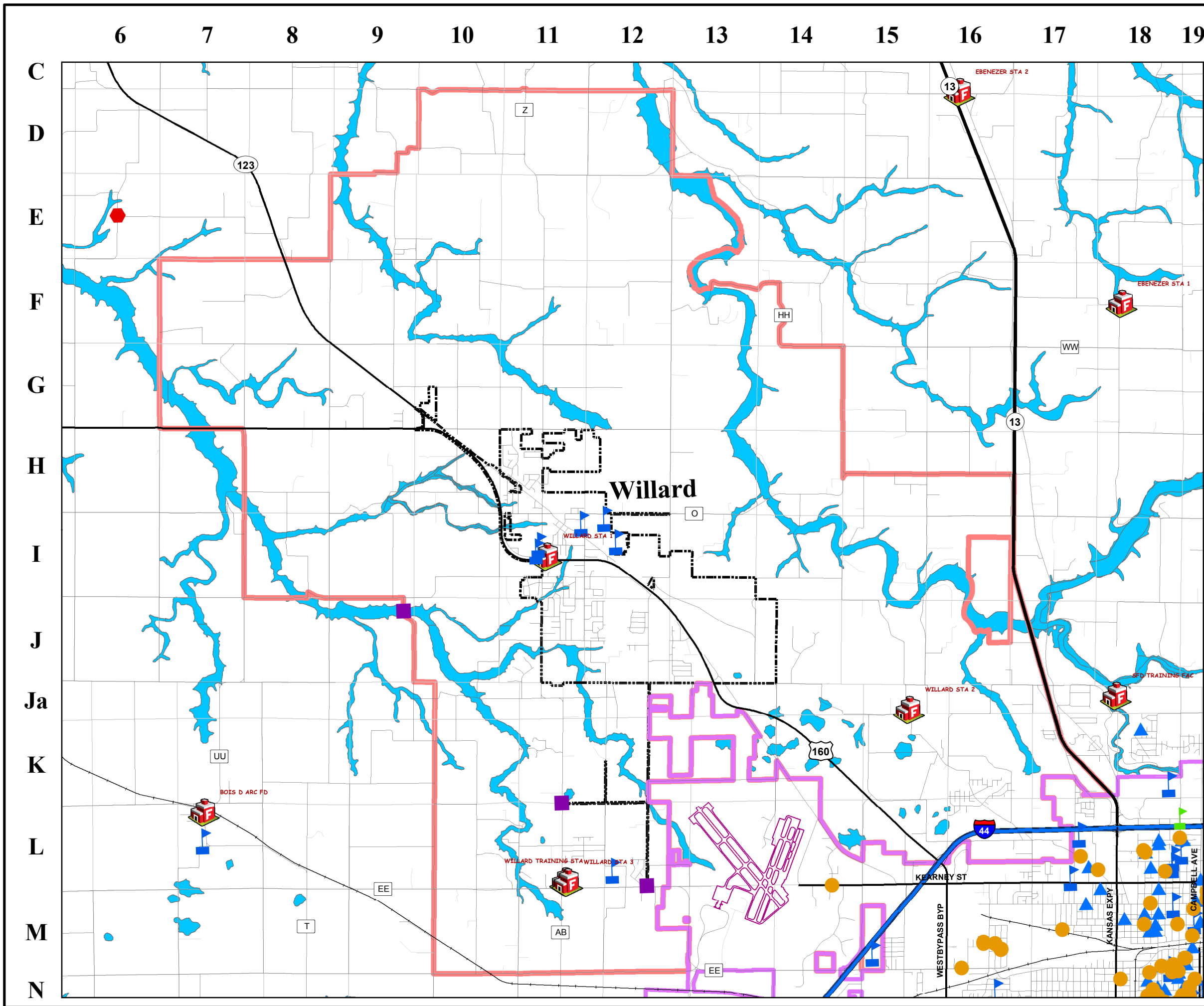


Flooding Events

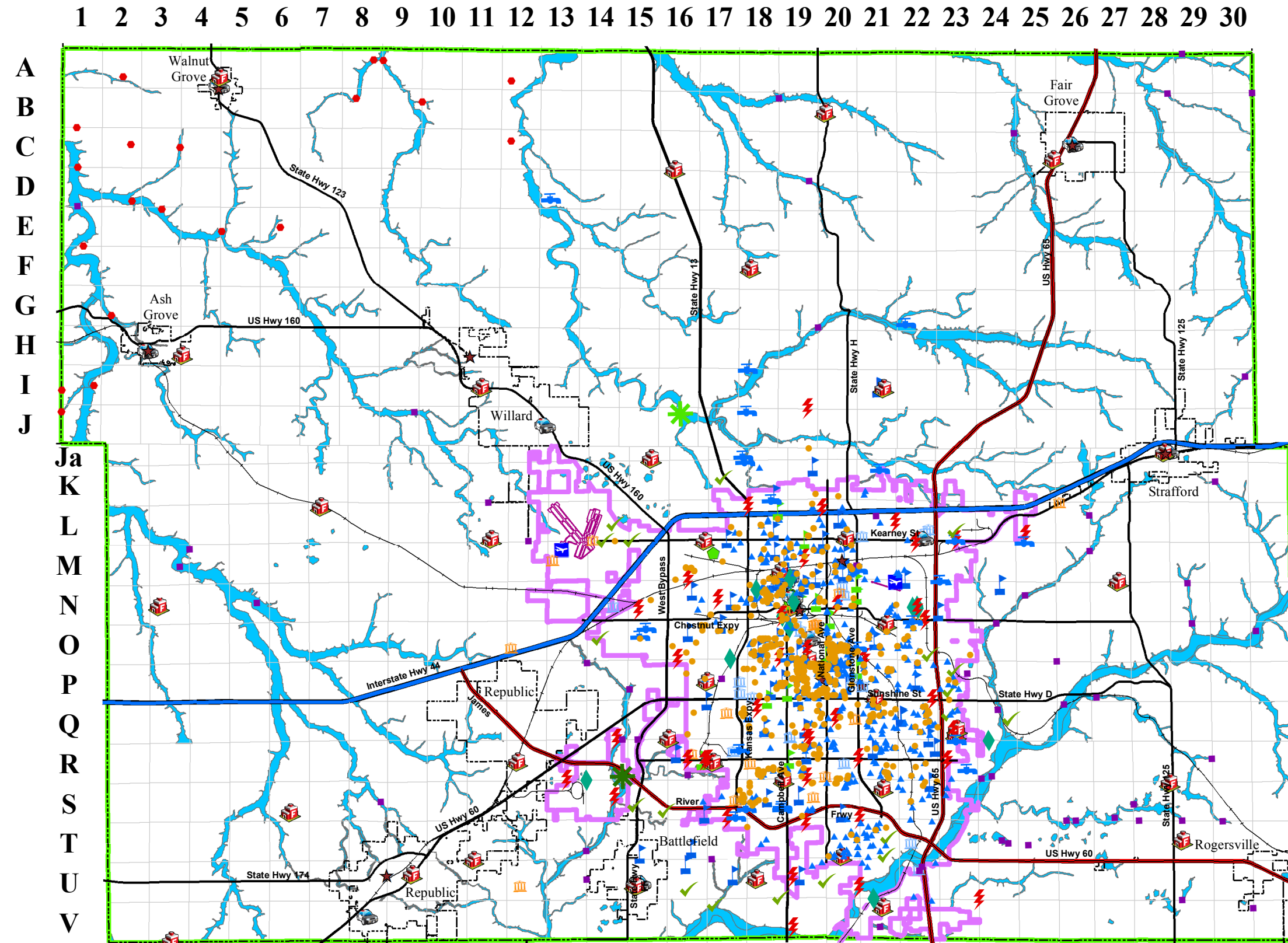
- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- ◆ 8-2007 Road Closings
- 3-18-2008 Road Closings
- ▤ R12 and Rural Schools
- ▤ Colleges - Universities
- Fire Stations
- Springfield City Limits
- City Limits
- Greene County
- Fire Districts
- 100 Year Floodplain



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Hazard Mitigation Plan: Greene County Floodplain



Flooding Events



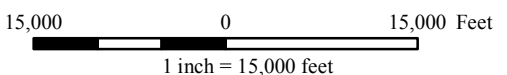
- 9-24-1993 Flood Damage
- 7-12-2000 Flood Damage
- 8-2007 Road Closings
- 3-18-2008 Road Closings

Utilities

- City Utilities
- CU Substations
- CU Water Facilities
- Lift Stations
- Northwest Wastewater Treatment Plant
- Southwest Wastewater Treatment Plant

Government Facilities

- Airports
- Bus Transportation
- Fire Stations
- Police Departments
- City Government
- County Government
- State Government
- Federal Government
- R12 and Rural Schools
- Colleges - Universities
- Springfield City Limits
- City Limits
- Greene County
- 100 Year Floodplain

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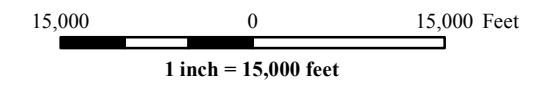
Hazard Mitigation Plan: Floodplain



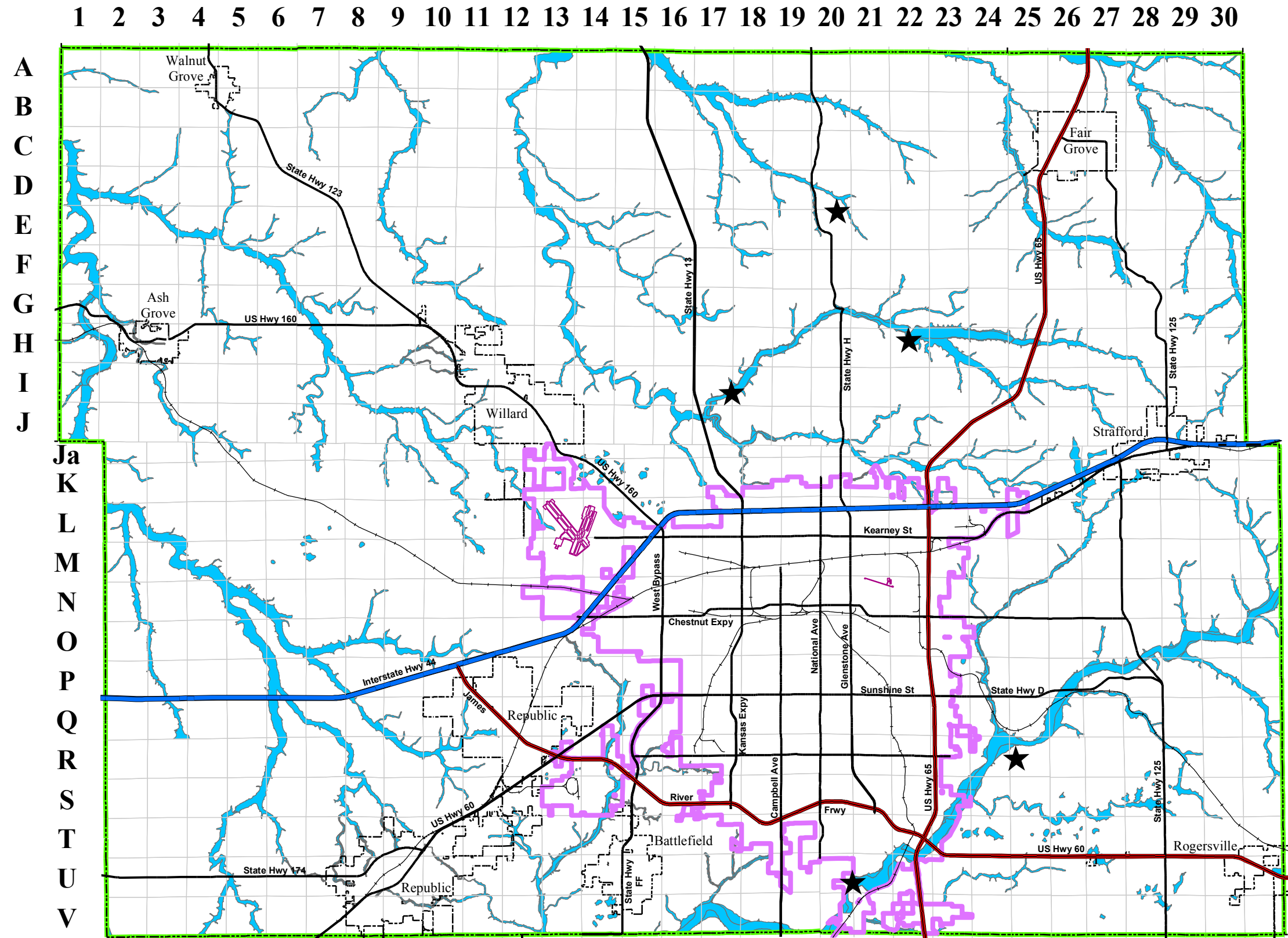
Dam failure inundation for Fellows and McDaniel lakes are estimated to be between the 100 and 500 year flood parameters. These are estimates and should not be construed as all inclusive.

Legend

- Floodplain
 - 100 Year
 - Dams
 - Springfield City Limits
 - City Limits
 - Greene County



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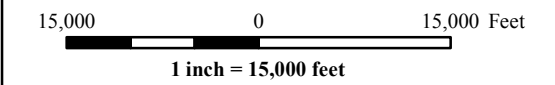
Hazard Mitigation Plan:

Historic Significant Flooding Events

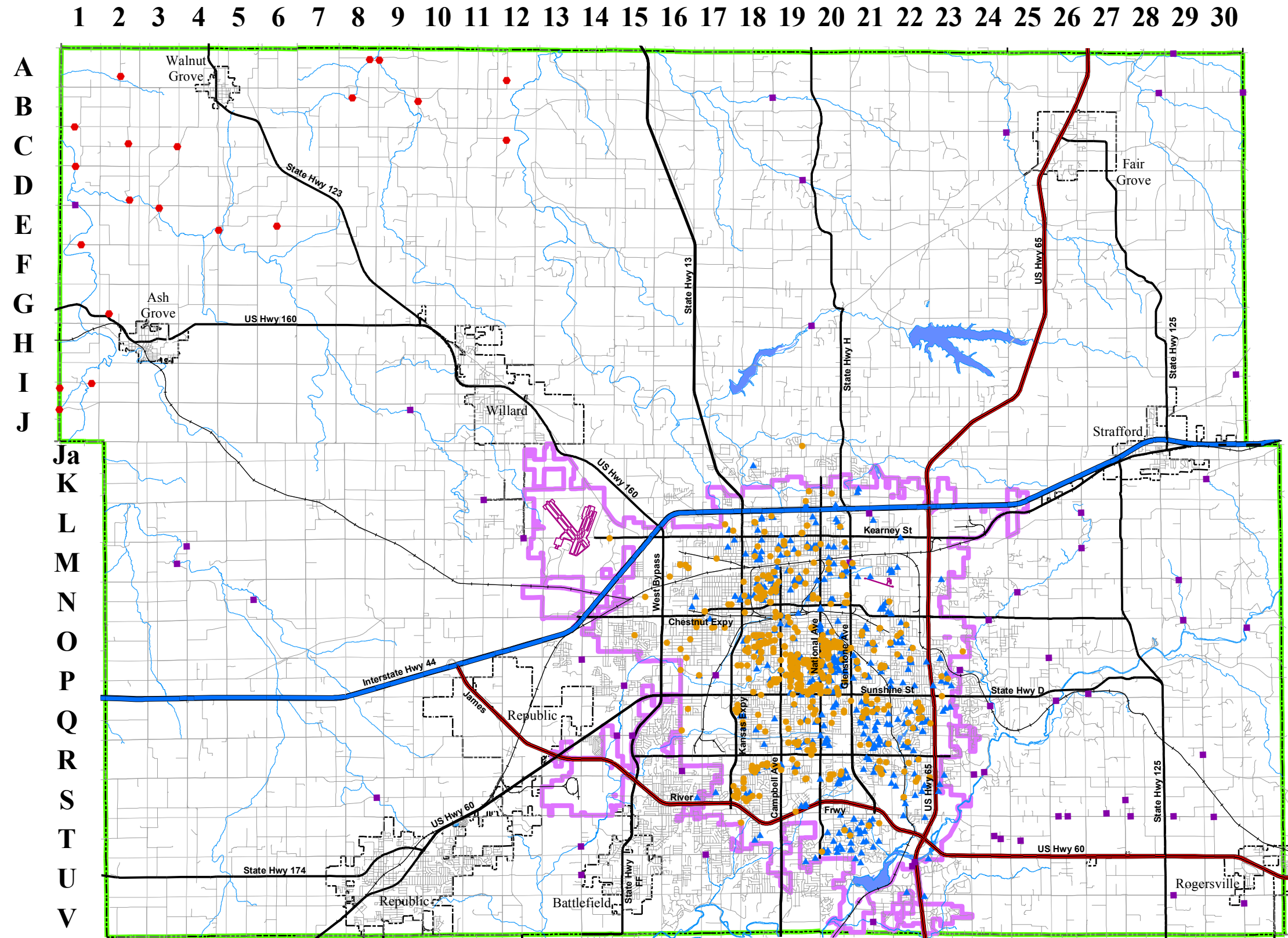


Legend

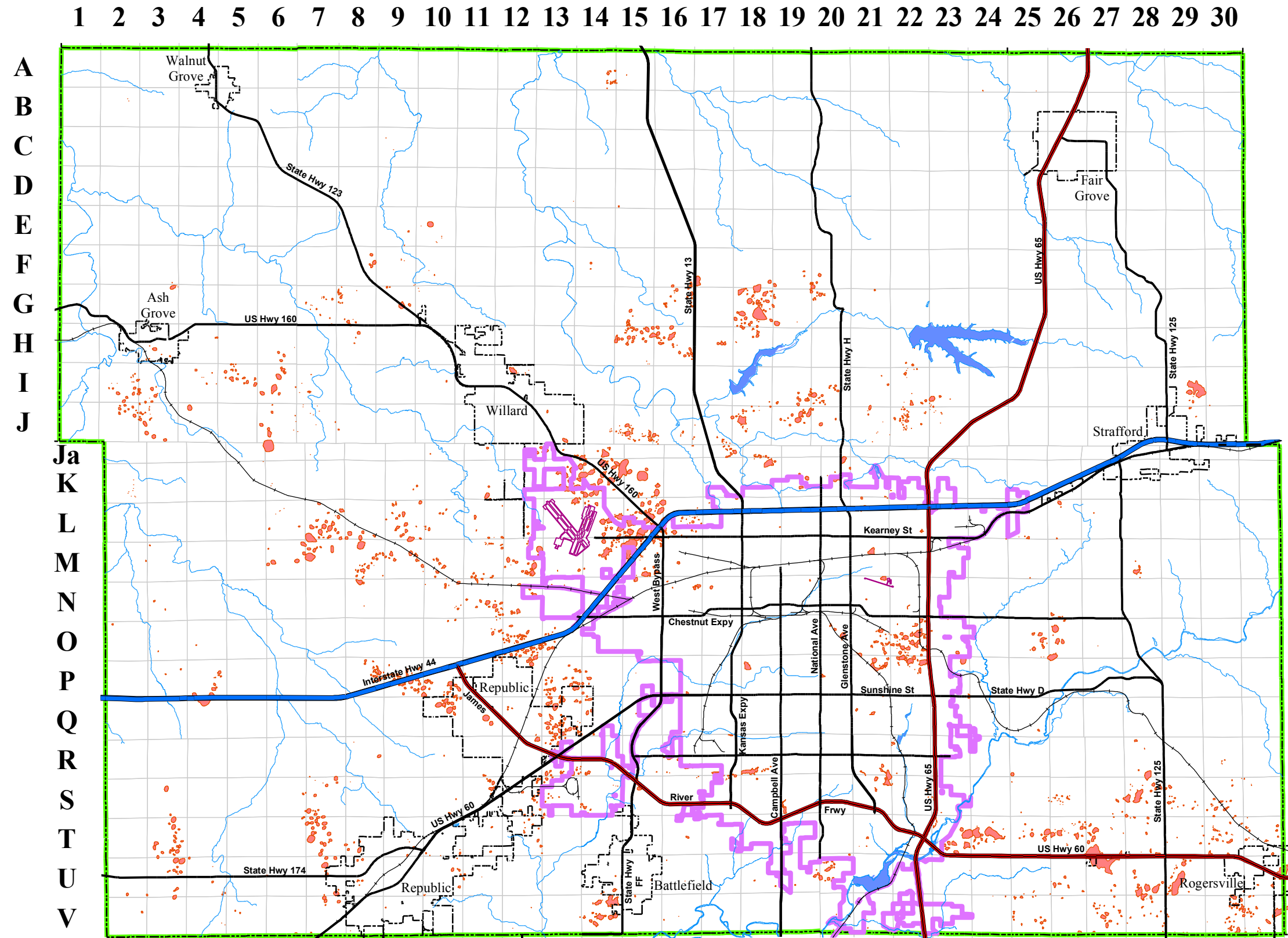
- 9-24-1993 Flood Damage
- ▲ 7-12-2000 Flood Damage
- 8-2007 Road Closings
- 3-18-2008 Road Closings
- Springfield City Limits
- City Limits
- Greene County



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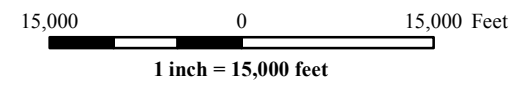


Hazard Mitigation Plan: Greene County Sinkholes



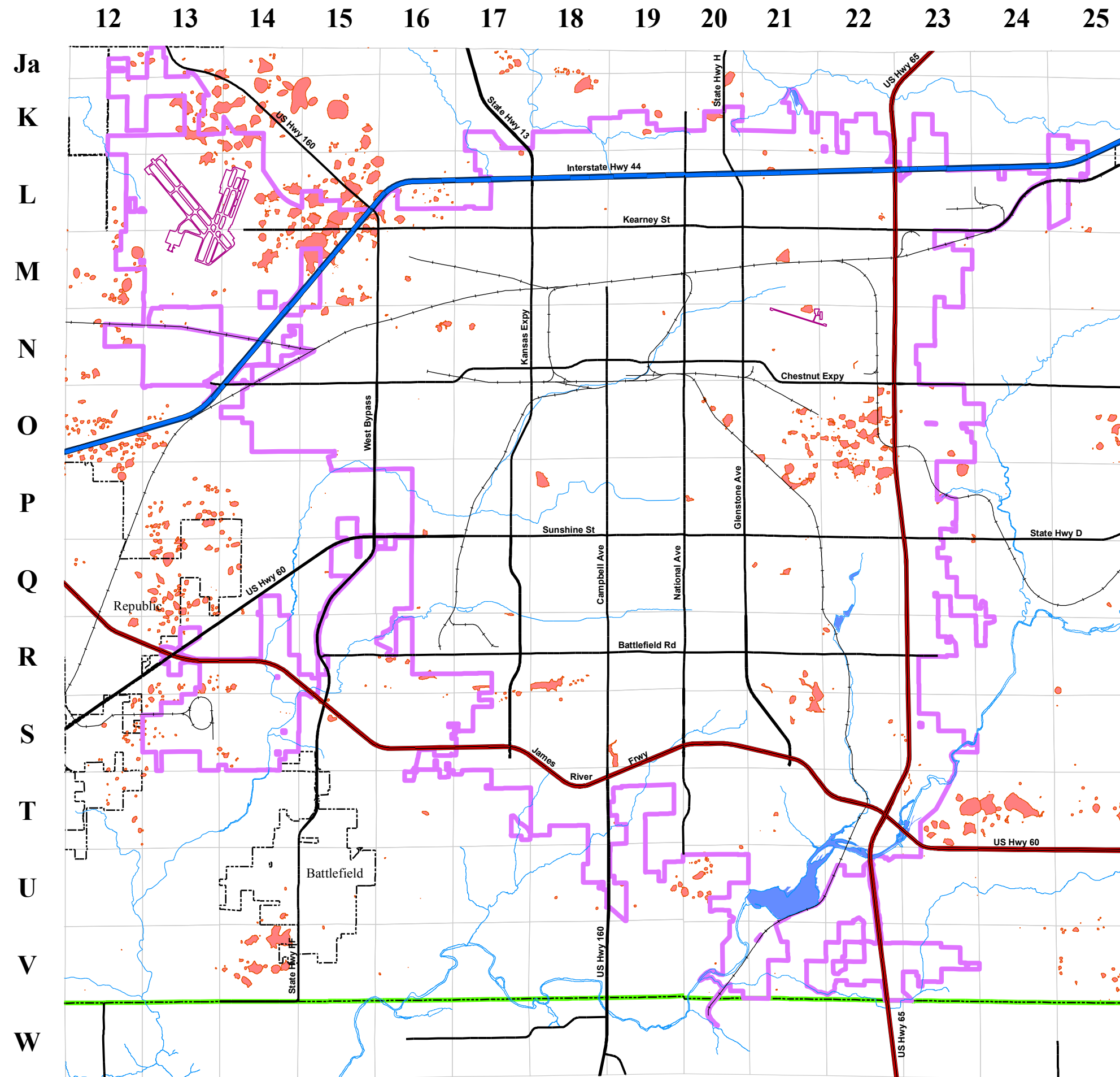
Legend

- Sinkholes
- Springfield City Limits
- City Limits
- Greene County



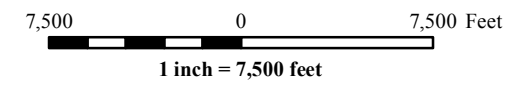
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Hazard Mitigation Plan: Springfield Sinkholes



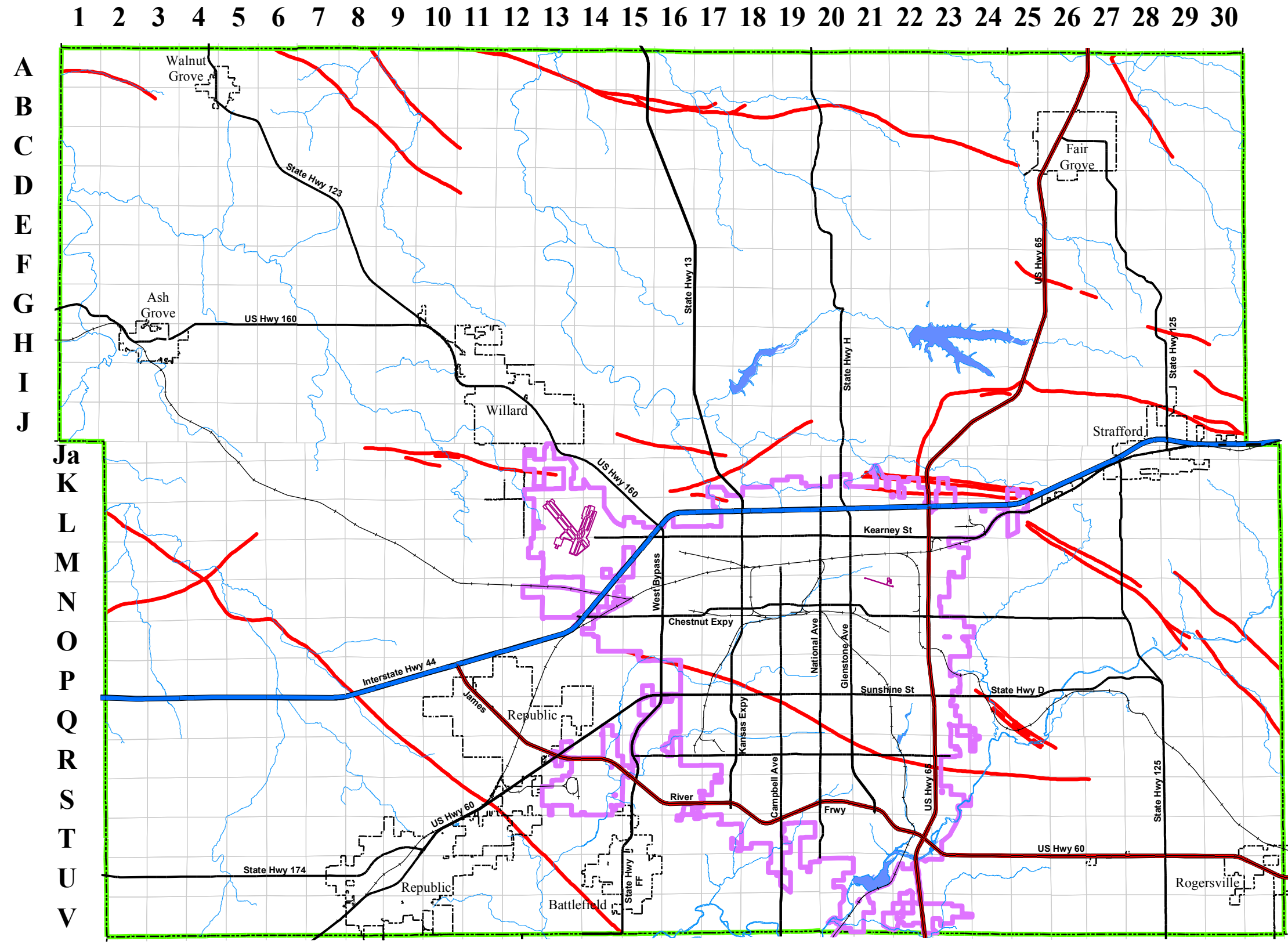
Legend

- Sinkholes
- Springfield City Limits
- City Limits
- Greene County



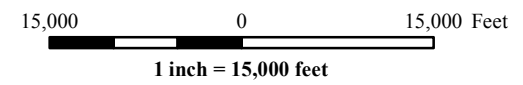
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Hazard Mitigation Plan: Faults



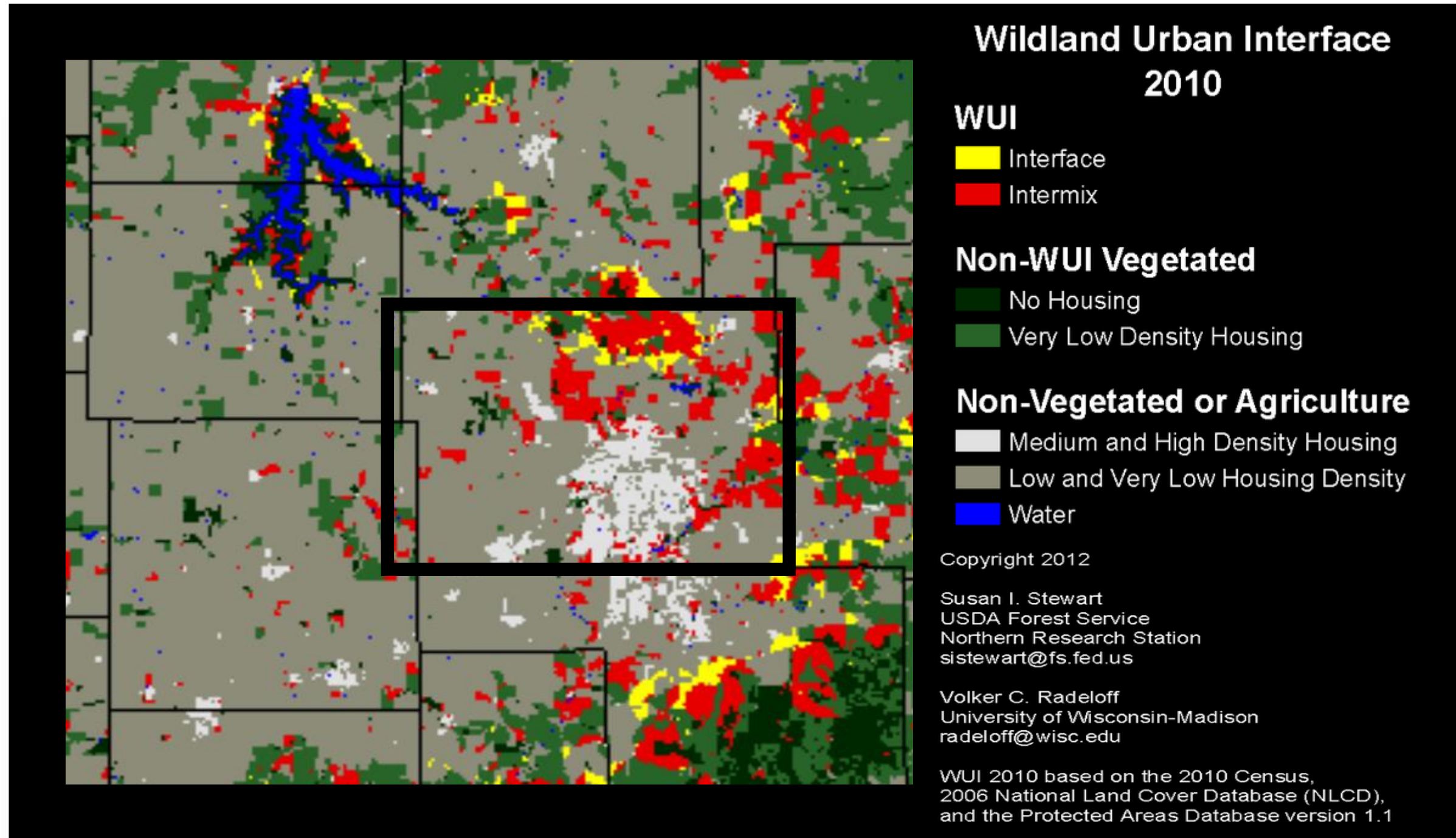
Legend

- Faults
- Springfield City Limits
- - - - - City Limits
- Greene County



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Greene County Wildland-Urban Interface (WUI)



The wildland–urban interface (WUI) is the area where houses meet or intermingle with undeveloped wildland vegetation. The WUI is thus a focal area for human–environment conflicts, such as the destruction of homes by wildfires, habitat fragmentation, introduction of exotic species, and biodiversity decline.

Hazard Mitigation Plan:

Historic Significant Disaster Events



Legend

- Lightning Events
 - 7/28/2000
 - 8/23/2002
- Tornado Events
 - 4/29/1983
 - 4/30/1983
 - 11/11/1991
 - 4/26/1994
 - 5/27/1995
 - 6/26/2001
 - 10/10/2001
 - 5/10/2003
 - Springfield City Limits
 - City Limits
 - Greene County



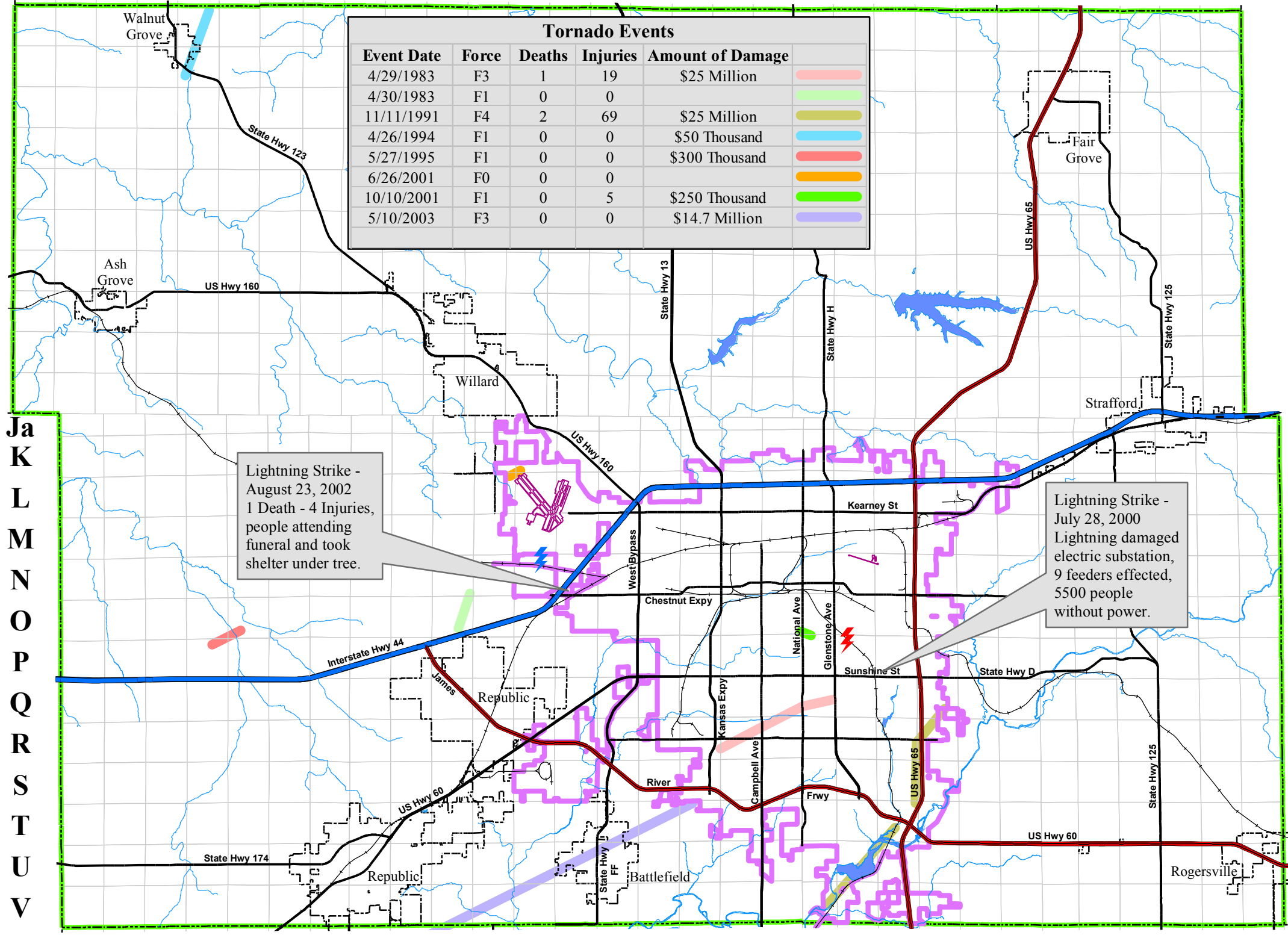
15,000 0 15,000 Feet
1 inch = 15,000 feet

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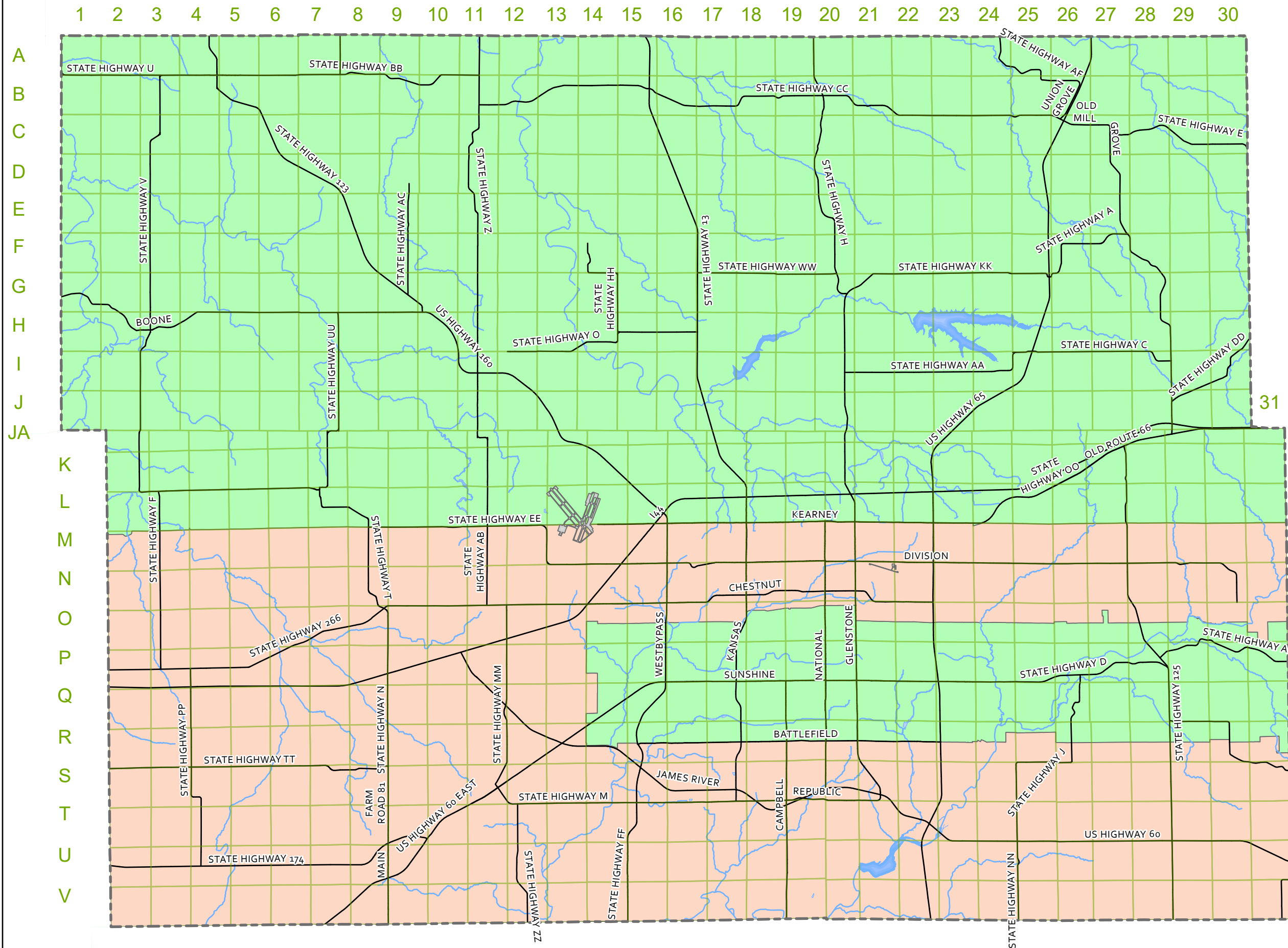
Tornado Events				
Event Date	Force	Deaths	Injuries	Amount of Damage
4/29/1983	F3	1	19	\$25 Million
4/30/1983	F1	0	0	
11/11/1991	F4	2	69	\$25 Million
4/26/1994	F1	0	0	\$50 Thousand
5/27/1995	F1	0	0	\$300 Thousand
6/26/2001	F0	0	0	
10/10/2001	F1	0	5	\$250 Thousand
5/10/2003	F3	0	0	\$14.7 Million



Lightning Strike - August 23, 2002
1 Death - 4 Injuries,
people attending funeral and took shelter under tree.

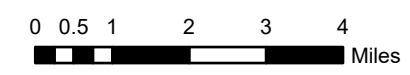
Lightning Strike - July 28, 2000
Lightning damaged electric substation,
9 feeders effected,
5500 people without power.

Hazard Mitigation Plan: EMS Zones



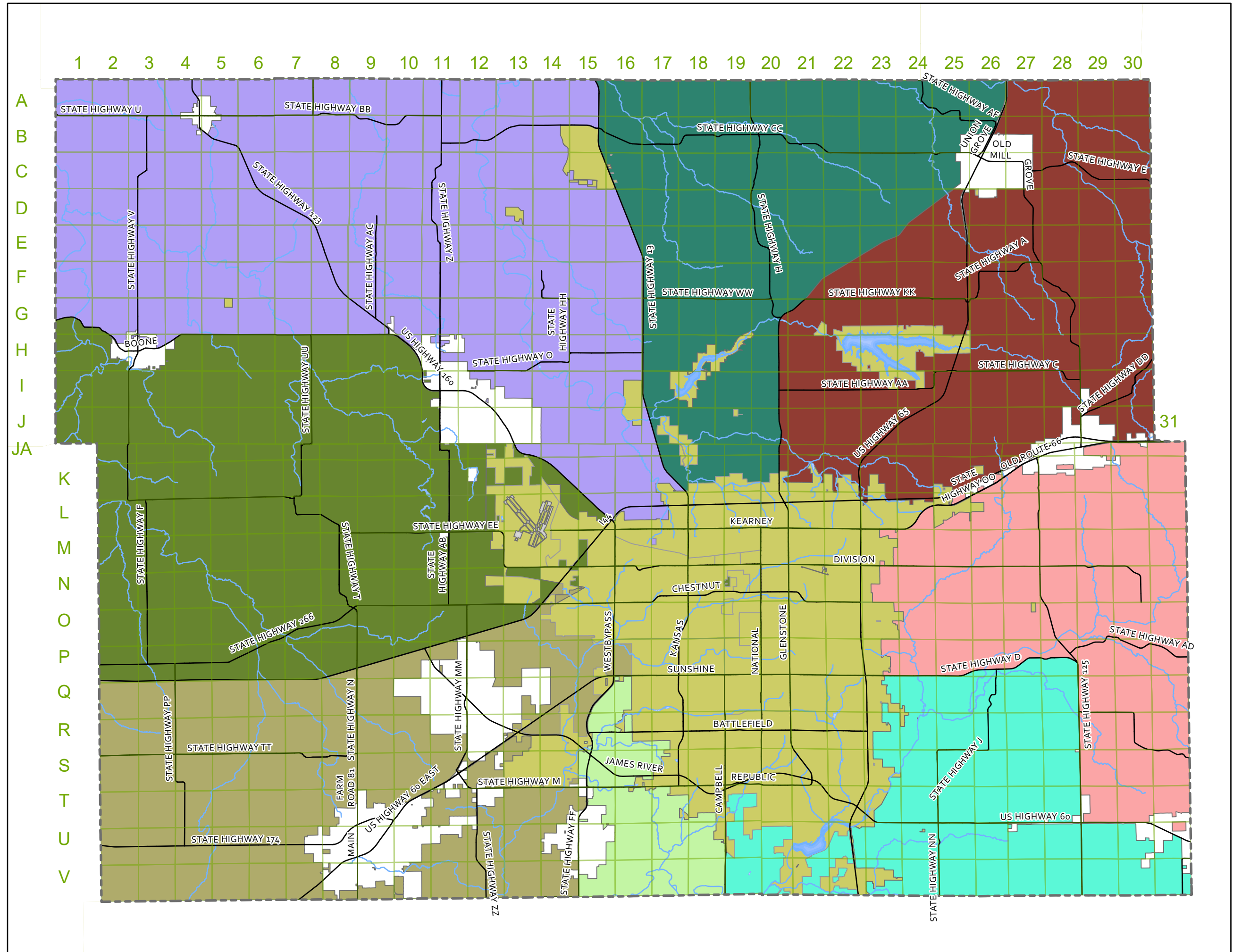
- Greene
- Map Grid
- Cox
- Mercy

Data Source:
City of Springfield GIS



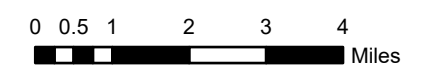
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Hazard Mitigation Plan: Law Enforcement



- Greene
- Map Grid
- Greene Co Sherrif 1A
- Greene Co Sherrif 1B
- Greene Co Sherrif 2A
- Greene Co Sherrif 2B
- Greene Co Sherrif 3A
- Greene Co Sherrif 3B
- Greene Co Sherrif 4
- Greene Co Sherrif 5
- Springfield PD

Data Source:
City of Springfield GIS



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Hazard Mitigation Plan: Springfield Police Zones



- Greene County
- Map Grid
- NAME**
- Airport
- Commercial Street
- Drury
- MSU
- Park Central
- SPD 11
- SPD 12
- SPD 13
- SPD 21
- SPD 22
- SPD 23
- SPD 31
- SPD 32

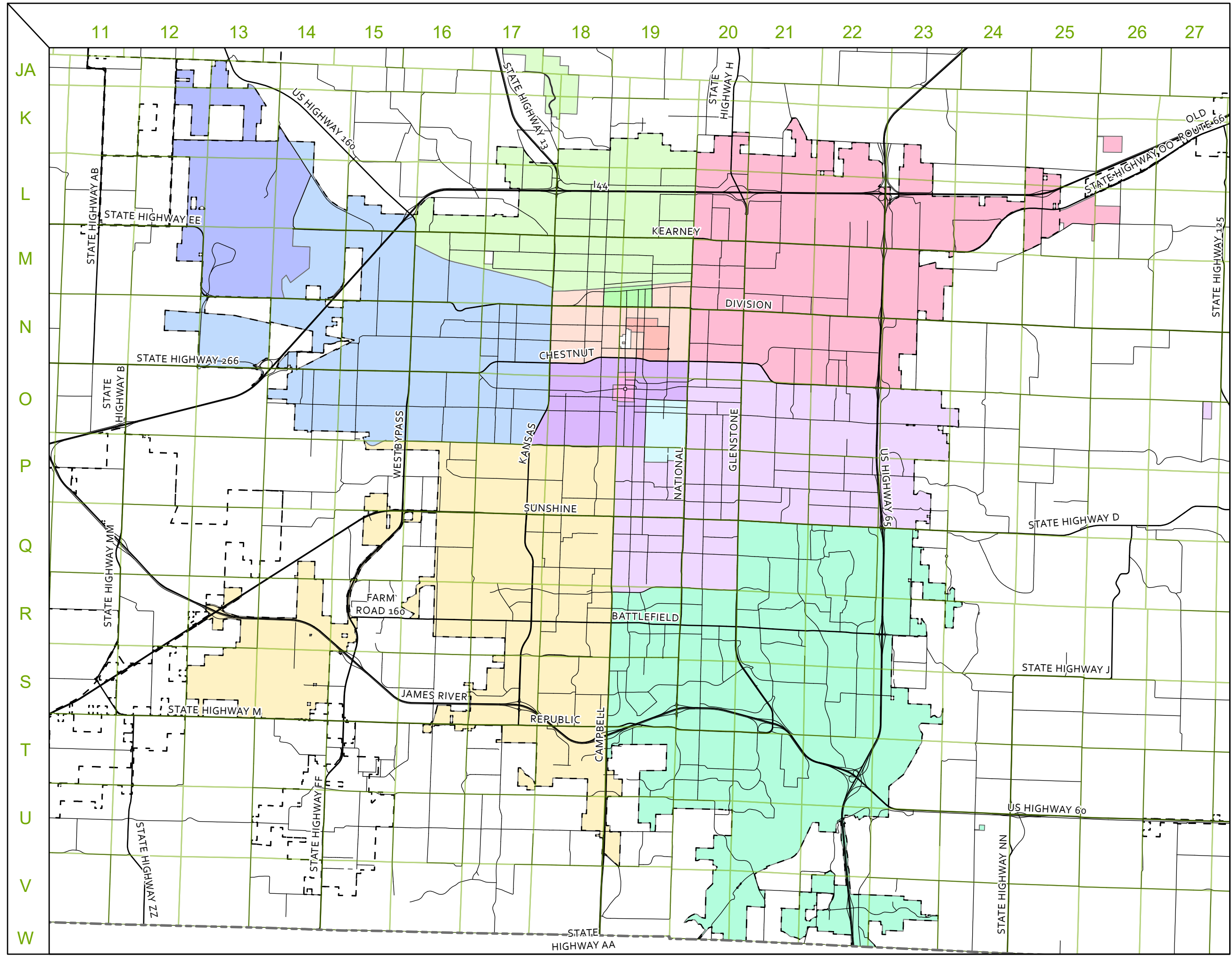
Data Source:
City of Springfield GIS



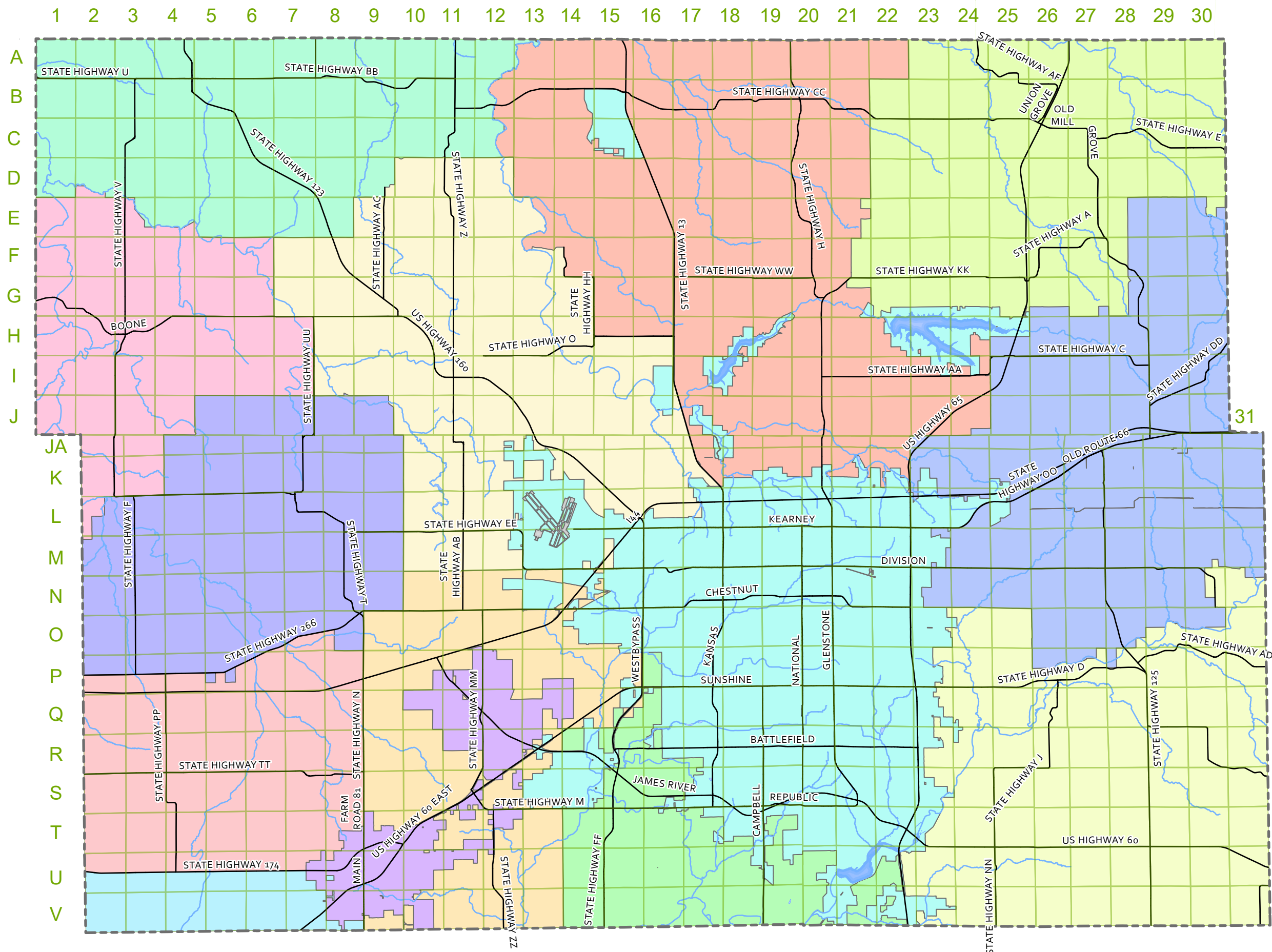
0 0.280.55 1.1 1.65 2.2
Miles

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Updated: 8/19/2019-rhant
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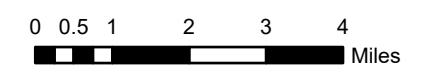


Hazard Mitigation Plan: Greene Co Fire Protection



- Greene
- Map Grid
- FIREDIST**
- ASH GROVE
- BATTLEFIELD
- BILLINGS
- BOIS D'ARC
- BROOKLINE
- EBENEZER
- FAIR GROVE
- GREENE COUNTY
- LOGAN-ROGERSVILLE
- MORRISVILLE
- REPUBLIC
- SPRINGFIELD
- STRAFFORD
- WALNUT GROVE
- WEST REPUBLIC
- WILLARD

Data Source:
City of Springfield GIS



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Hazard Mitigation Plan: Springfield Fire Protection



Greene County	SF05
Map Grid	SF06
FNAME	SF07
SF01	SF08
SF02	SF09
SF03	SF10
SF04	SF11
	SF12

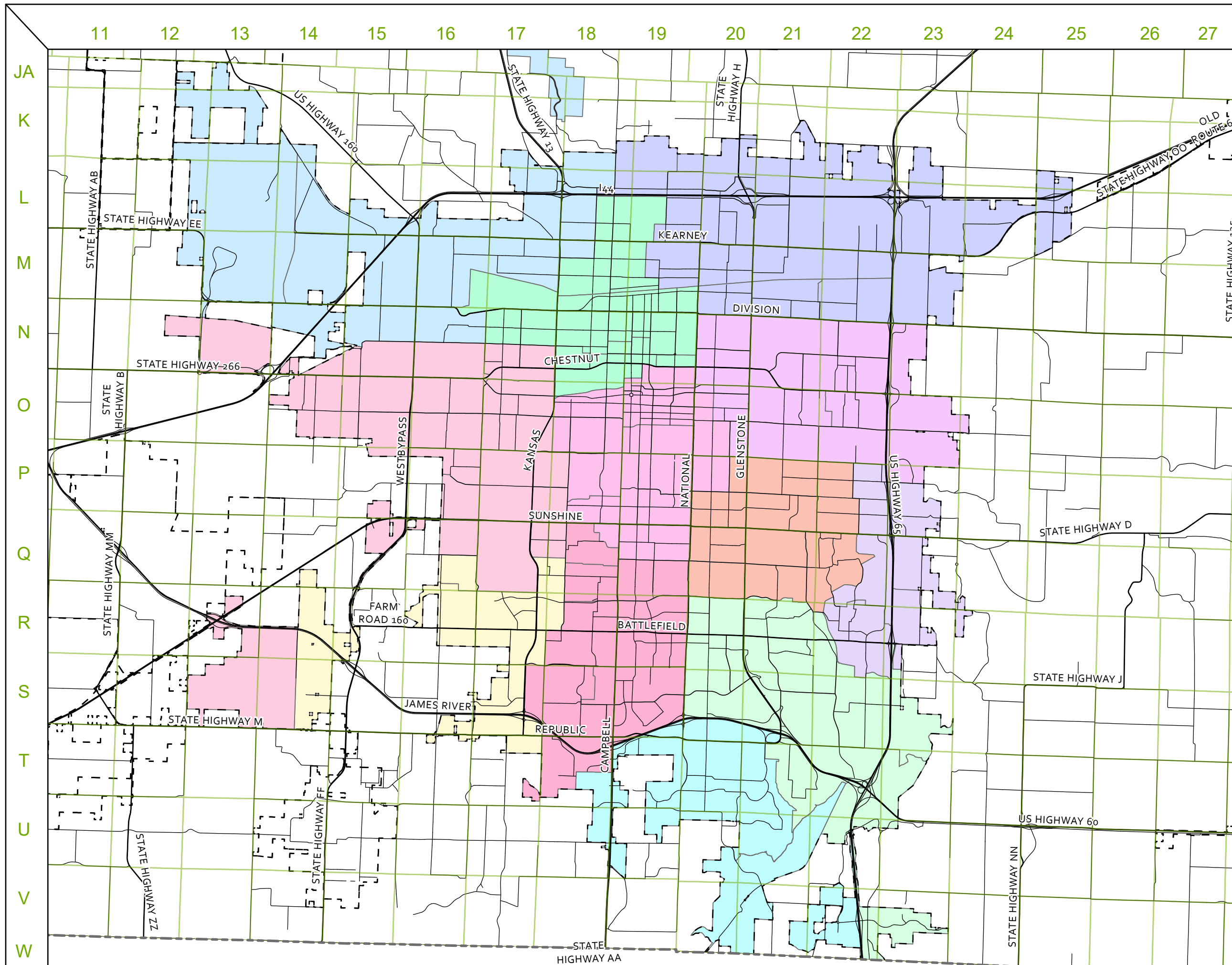
Data Source:
City of Springfield GIS



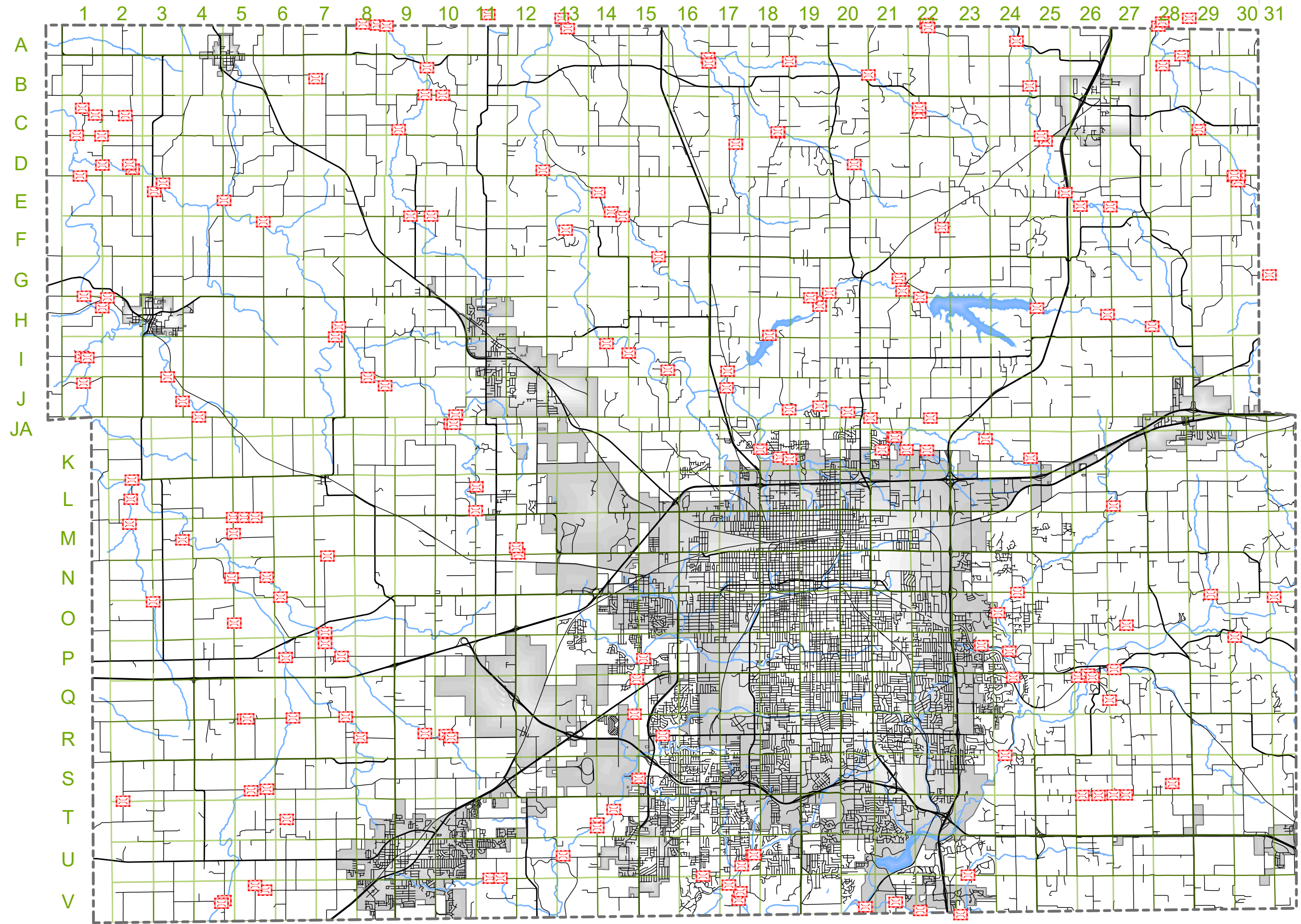
0 0.280.55 1.1 1.65 2.2
Miles

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Updated: 8/19/2019-rhant
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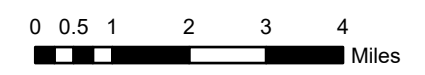


Hazard Mitigation Plan: Bridges



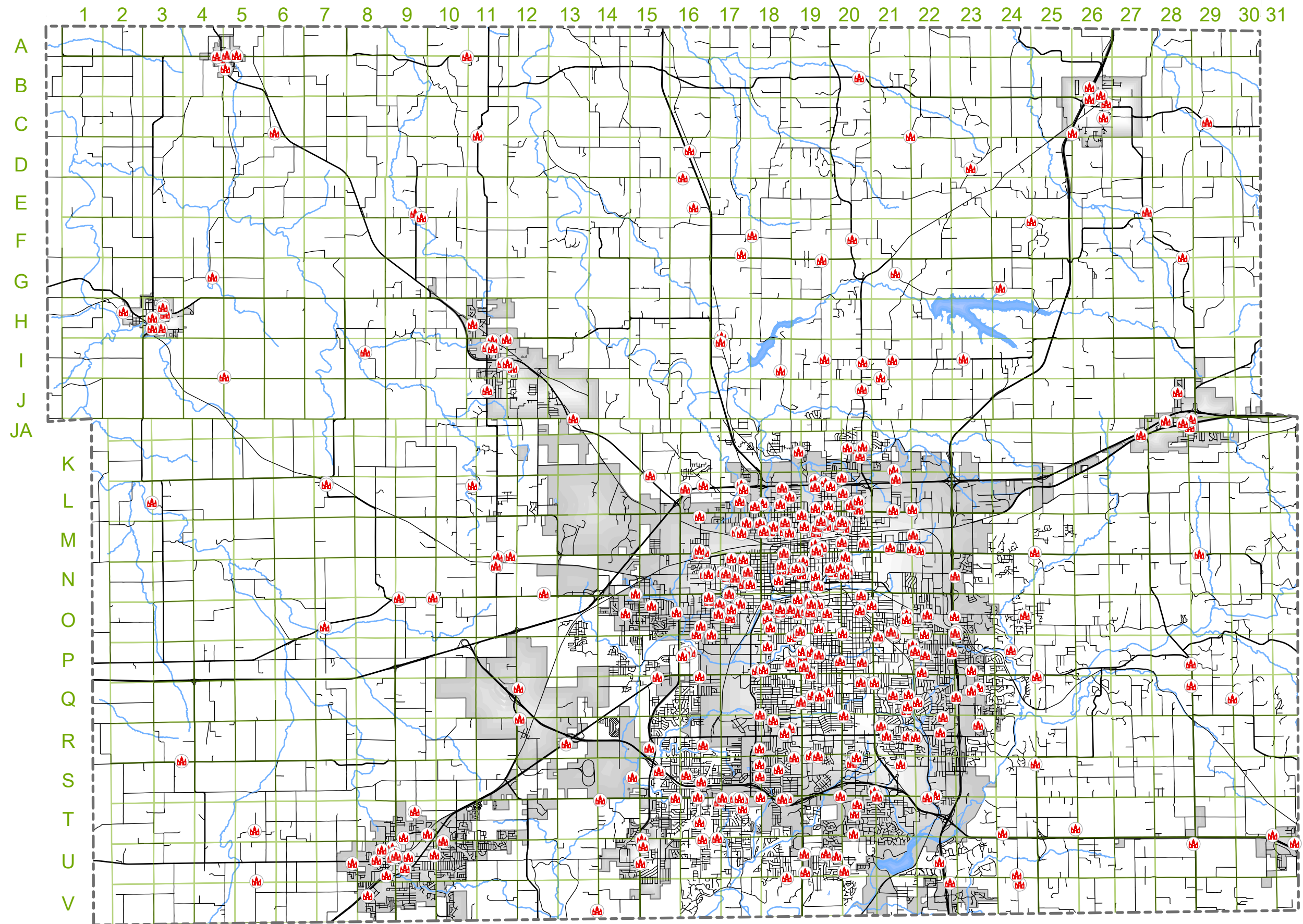
-  Greene County
-  City Limits
-  Map Grid
-  Bridge

Data Source:
Greene Co GIS



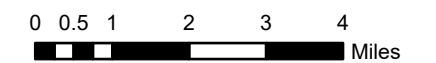
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Hazard Mitigation Plan: Places of Worship



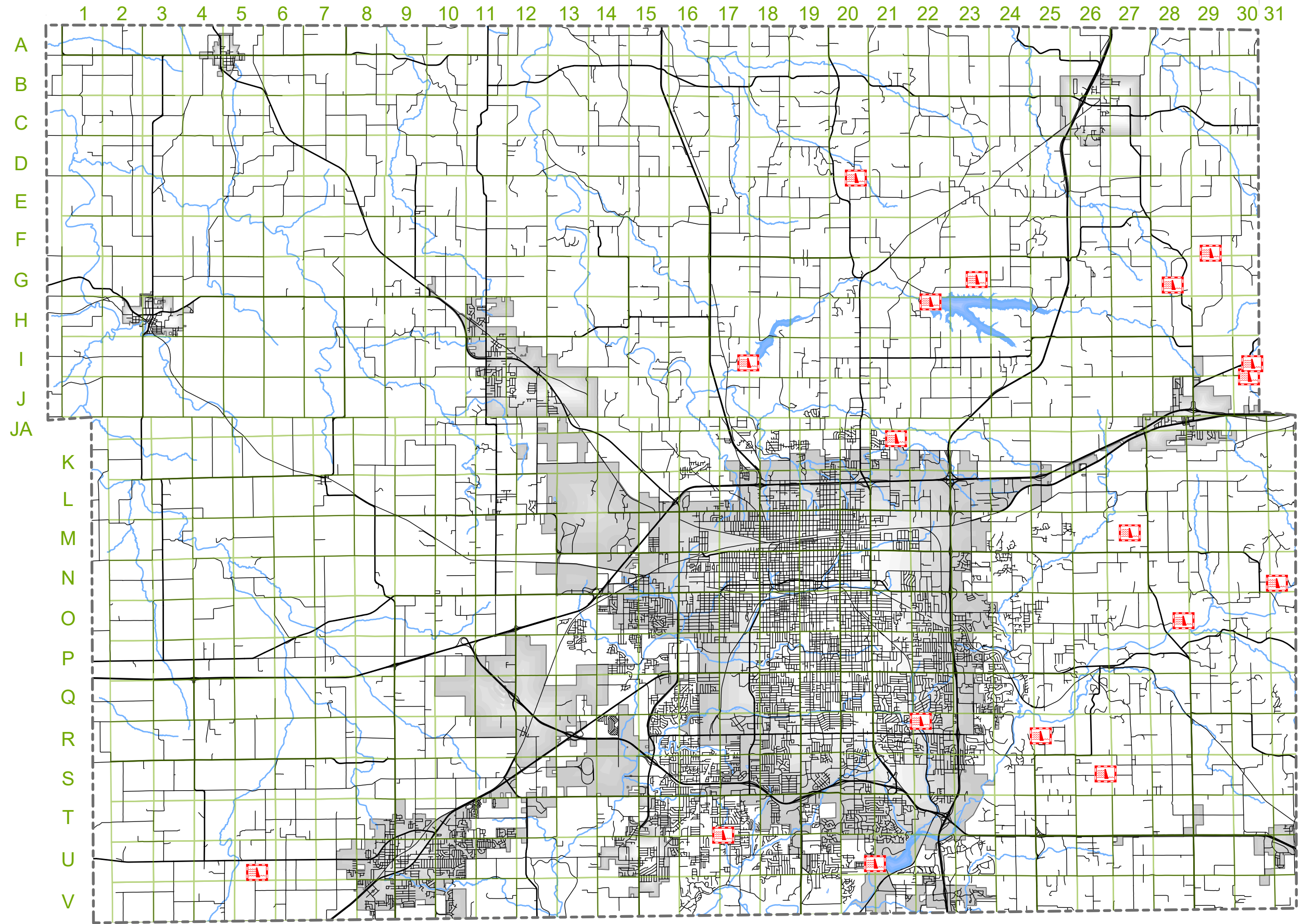
- Greene County
- City Limits
- Map Grid
- Place of Worship

Data Source:
Greene CO GIS



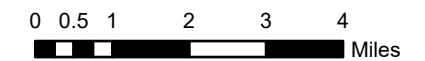
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Hazard Mitigation Plan: Dams



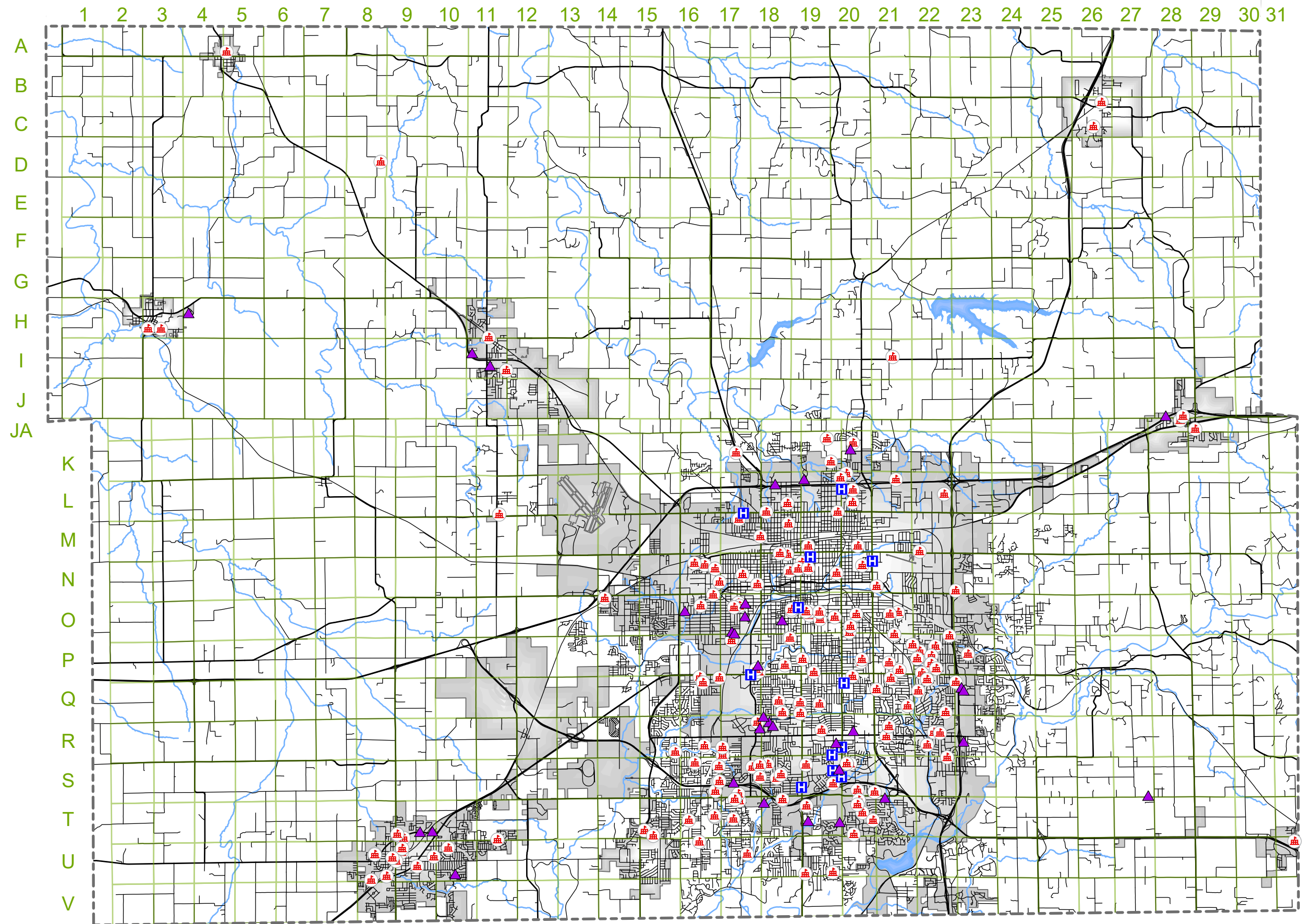
- Greene County
- City Limits
- Map Grid
- Dam

Data Source:
Missouri Spatial Data Information Service.
<https://data-msdis.opendata.arcgis.com/datasets/mo-2019-dams>



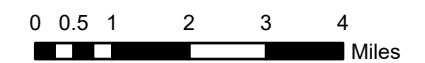
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Hazard Mitigation Plan: Essential Facilities



- Greene County
- City Limits
- Map Grid
- Hospitals - Urgent Care
- Assisted Living
- Daycares

Data Source:
Greene Co GIS



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Hazard Mitigation Plan: Government Facilities



- Airports
- Bus Transportation
- City Government
- County Government
- Federal Government
- Fire Stations
- Police Departments
- State Government
- Greene County
- Map Grid
- City Limits

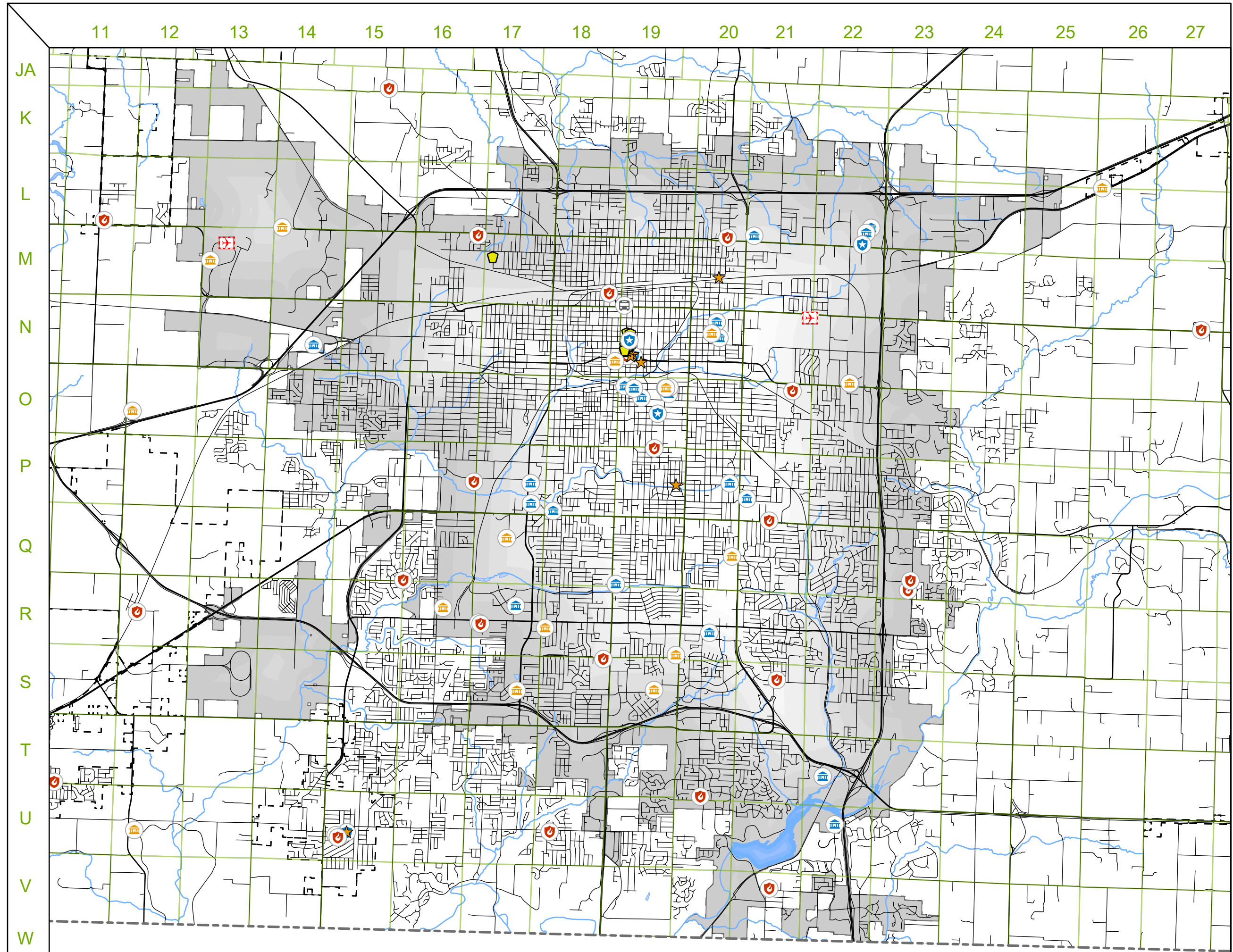
Data Source:
Greene Co GIS



0 0.280.55 1.1 1.65 2.2
Miles

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Updated: 8/7/2019-rhant
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Hazard Mitigation Plan: Major Business



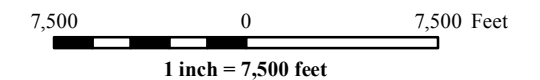
Legend

- Hotels - Motels
- Multi-Tenant Office/WH
- Large Manufacturing
- Industrial Parks

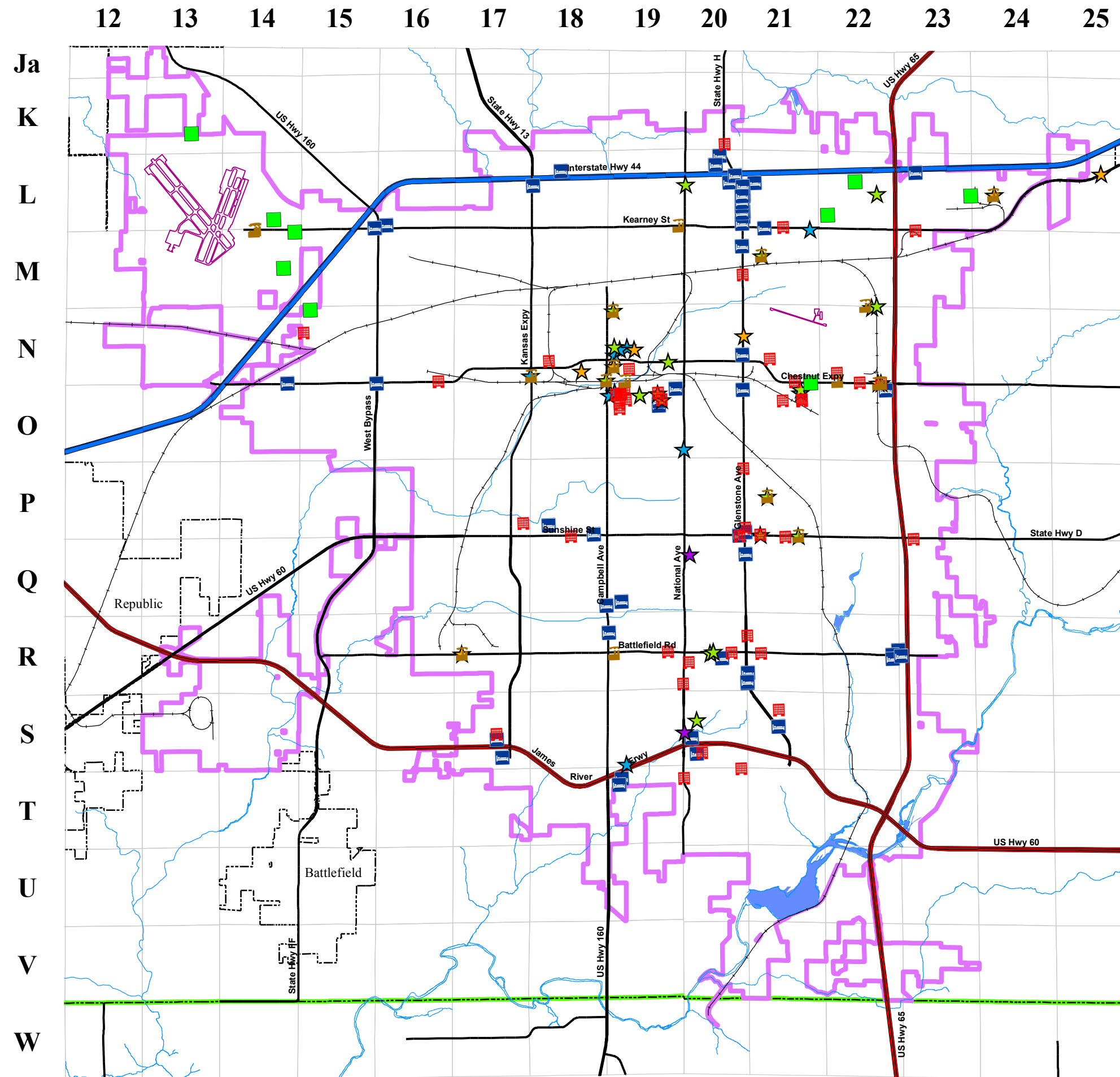
Top Employers Employees

- Less than 500
- 500 - 999
- 1000 - 4999
- 5000 - 10000

- Springfield City Limits
- City Limits
- Greene County

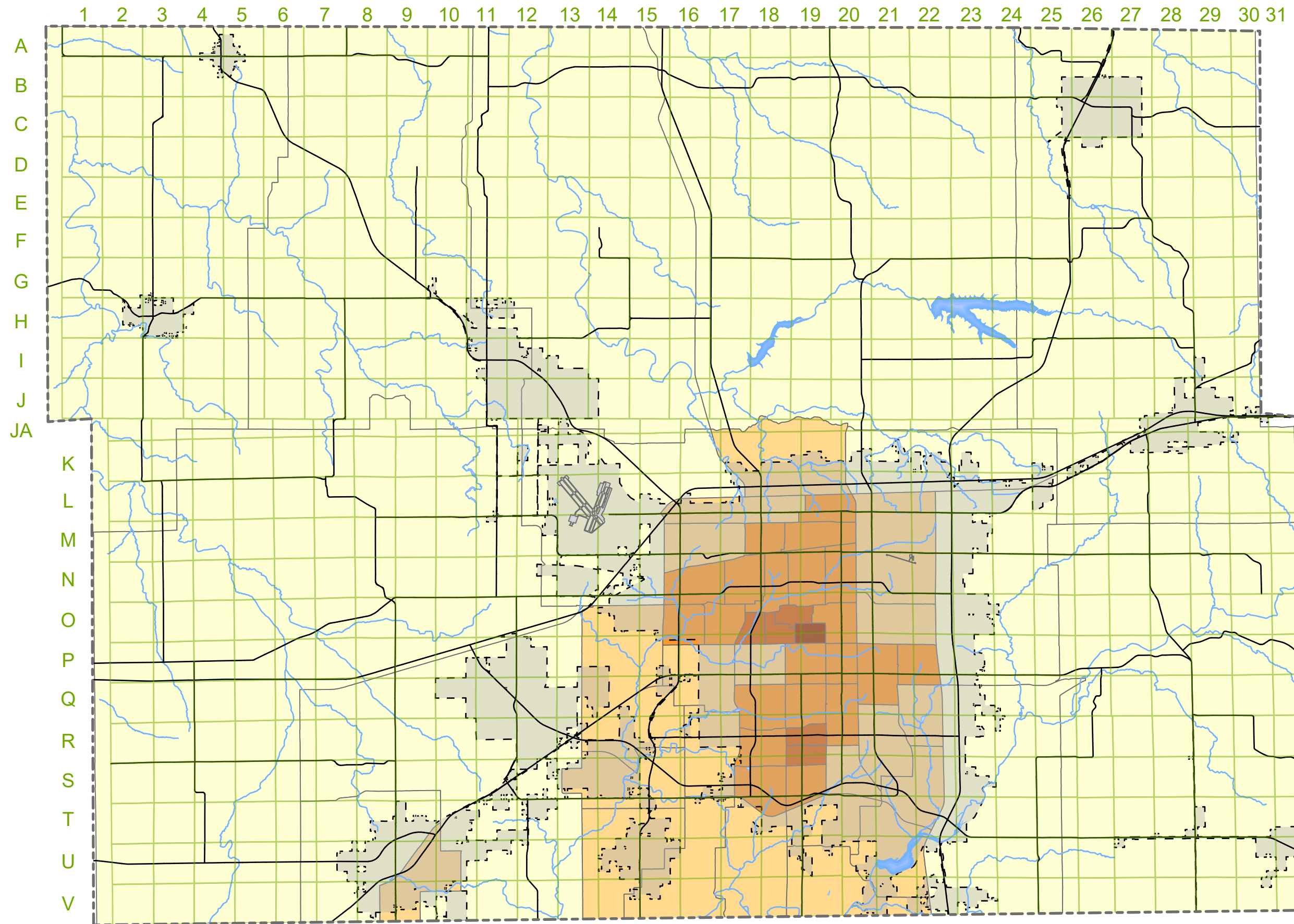


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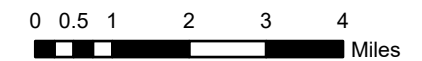
Hazard Mitigation Plan:

Greene County Population Density



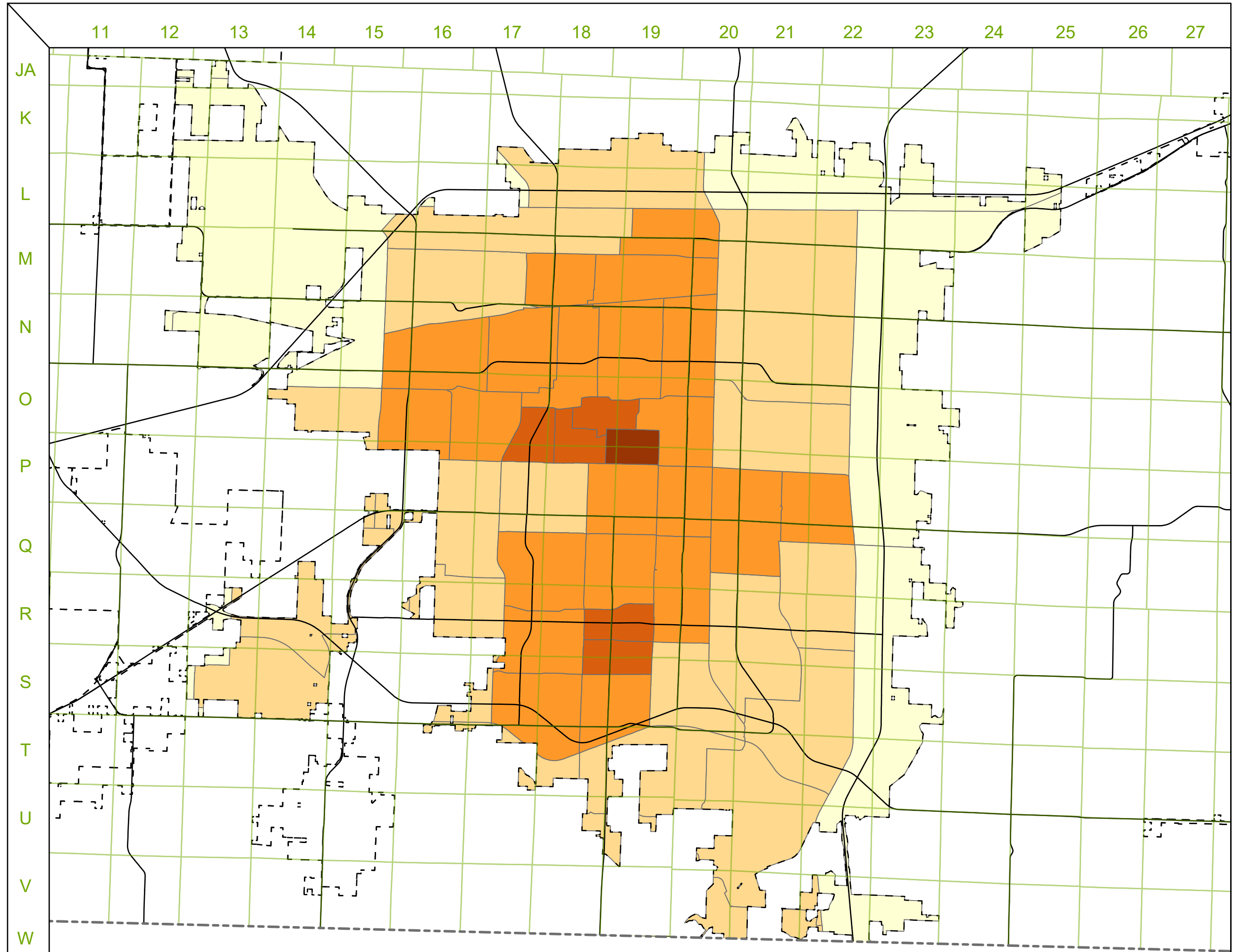
- Greene County
- Map Grid
- City Limits
- Population/Sq. Mi.**
- ≤42.9
- ≤176.6
- ≤401.8
- ≤642.0
- ≤1467.2

Data Source:
US Census Bureau & American Fact Finder



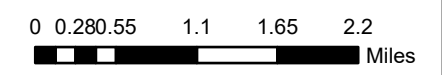
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Hazard Mitigation Plan: Springfield Population Density



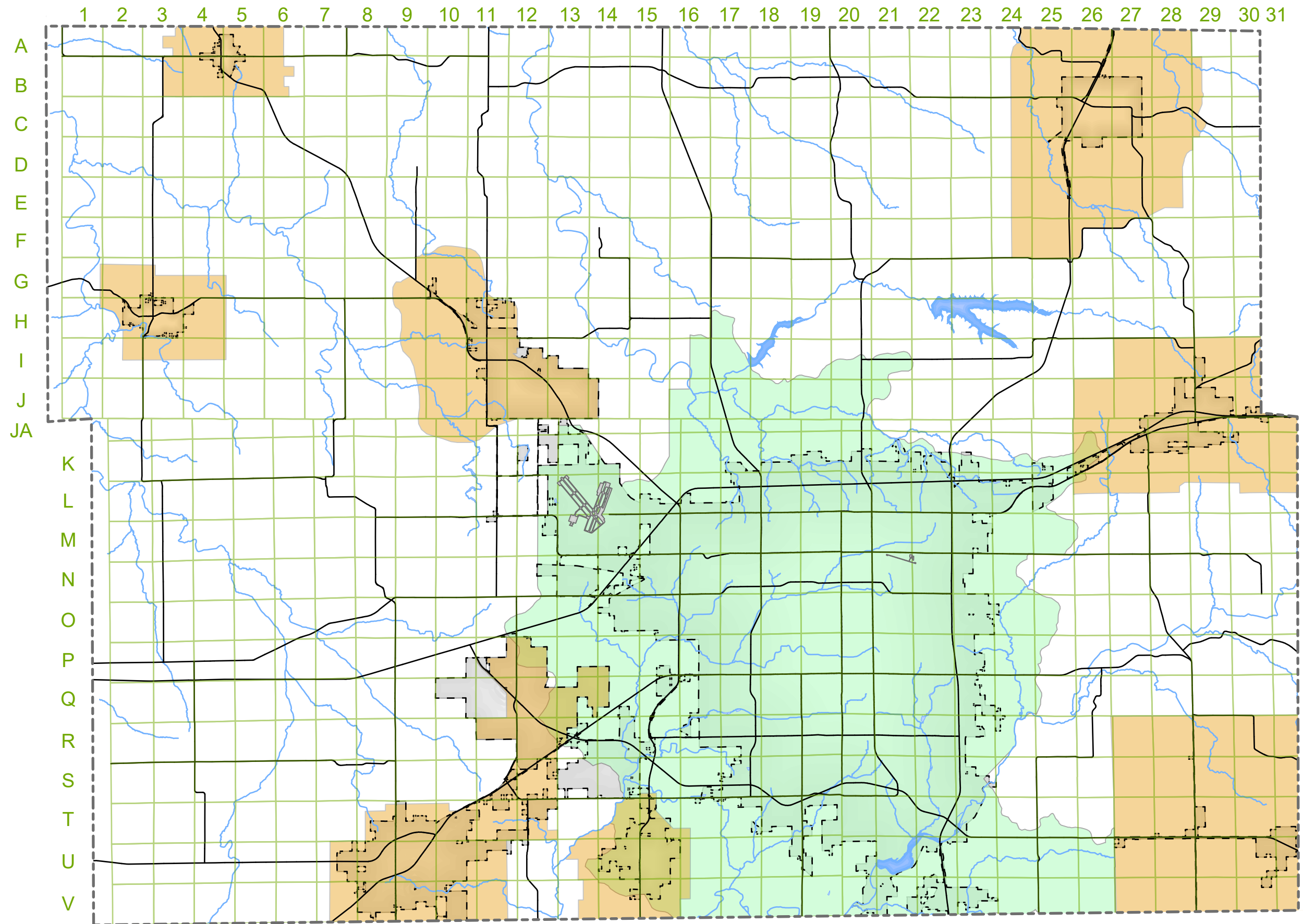
- Greene County
- Map Grid
- Population/Sq. Mi.**
- ≤30.2
- ≤176.6
- ≤401.8
- ≤642.0
- ≤1467.2

Data Source:
US Census Bureau & American Fact
Finder



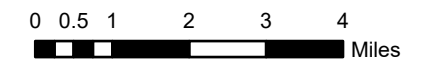
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Hazard Mitigation Plan: Urban Service Area



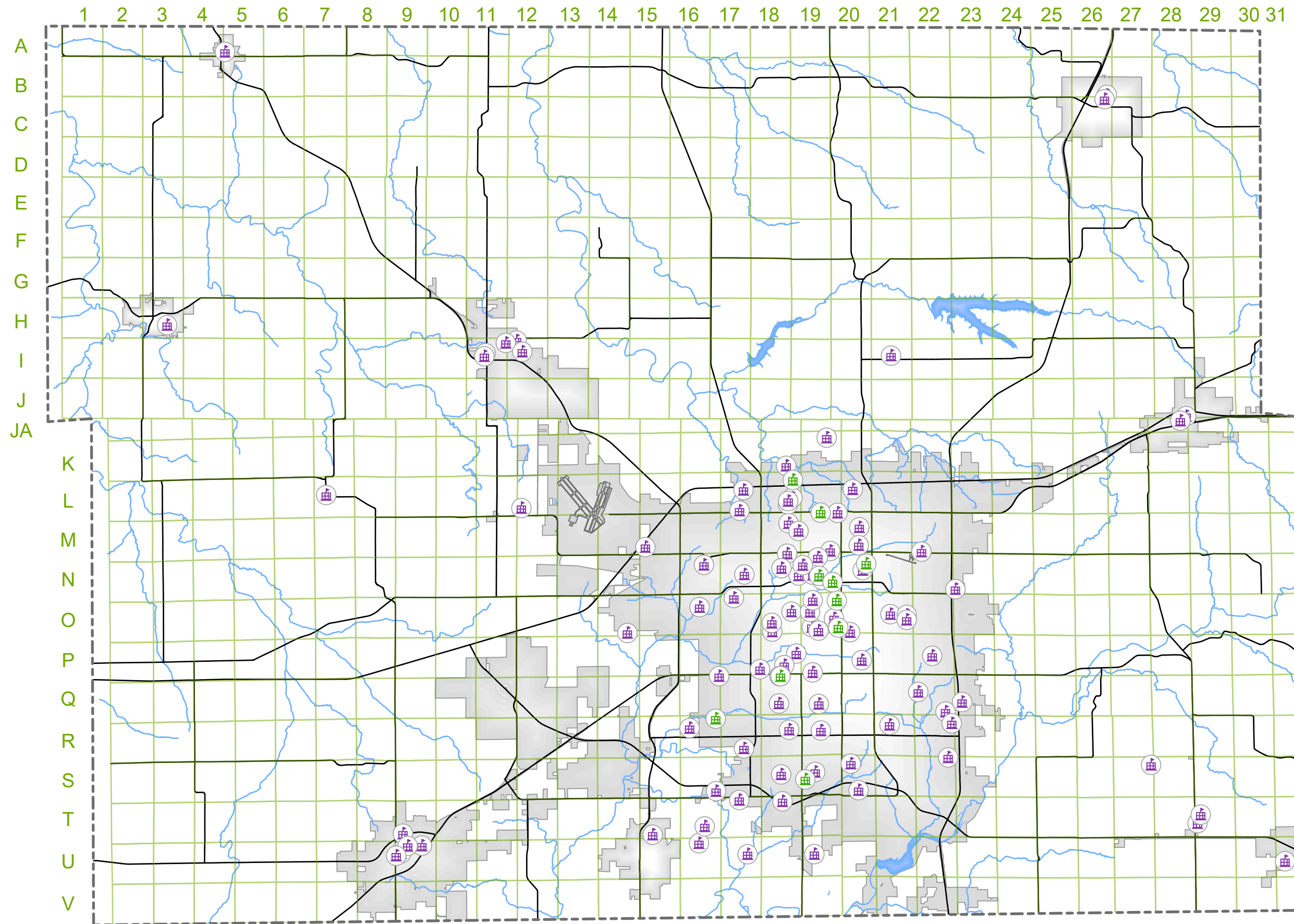
- Greene County
- City Limits
- Map Grid
- Springfield Urban Serv. Area
- Other Urban Serv. Area

Data Source:
Greene Co GIS



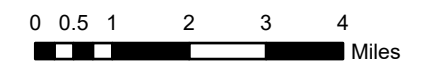
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Hazard Mitigation Plan: Schools



- Greene County
- City Limits
- Map Grid
- R12 & Rural Schools
- Colleges - Universities

Data Source:
Greene Co GIS
City of Springfield GIS



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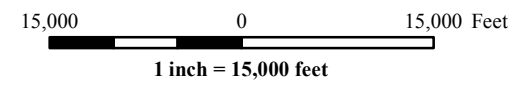
Hazard Mitigation Plan:

Solid Waste/Recycling

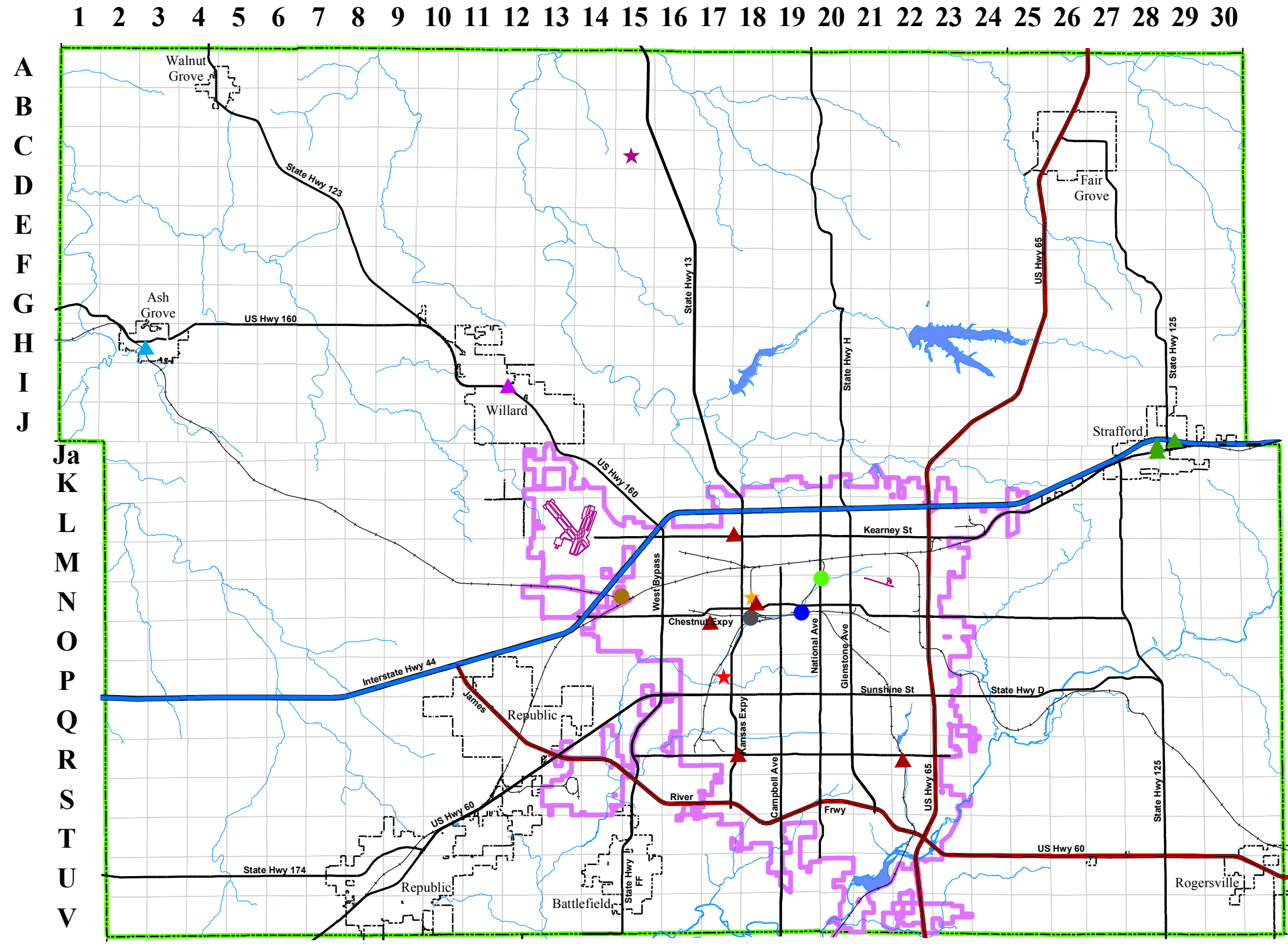


Legend

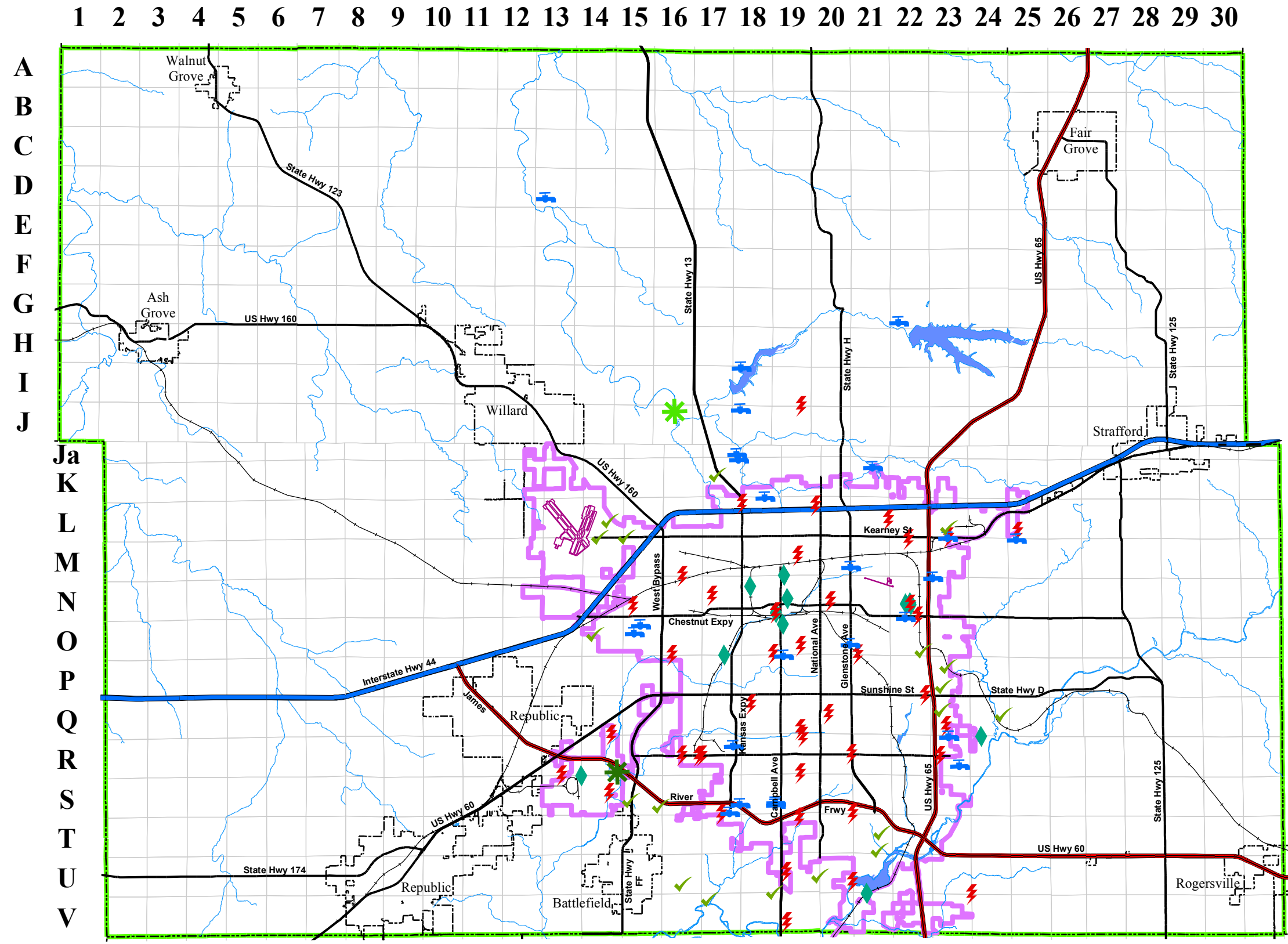
- Facility
- ★ Springfield Sanitary Landfill
 - ★ Household Chemical Collection Center
 - ★ American Disposal Services
 - ★ Waste Corp of America
 - Computer Recycling Center
 - Midwest Fibre Sales Corp
 - Commercial Metals
 - McCoy's Iron and Metal
 - ▲ Ash Grove Recycling Center
 - ▲ Springfield Recycling Center
 - ▲ Strafford Recycling Center
 - ▲ Willard Recycling Center
 - ▭ Springfield City Limits
 - - - City Limits
 - ▭ Greene County



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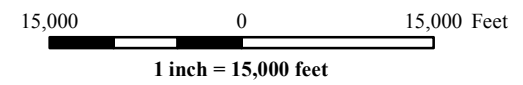


Hazard Mitigation Plan: Utilities



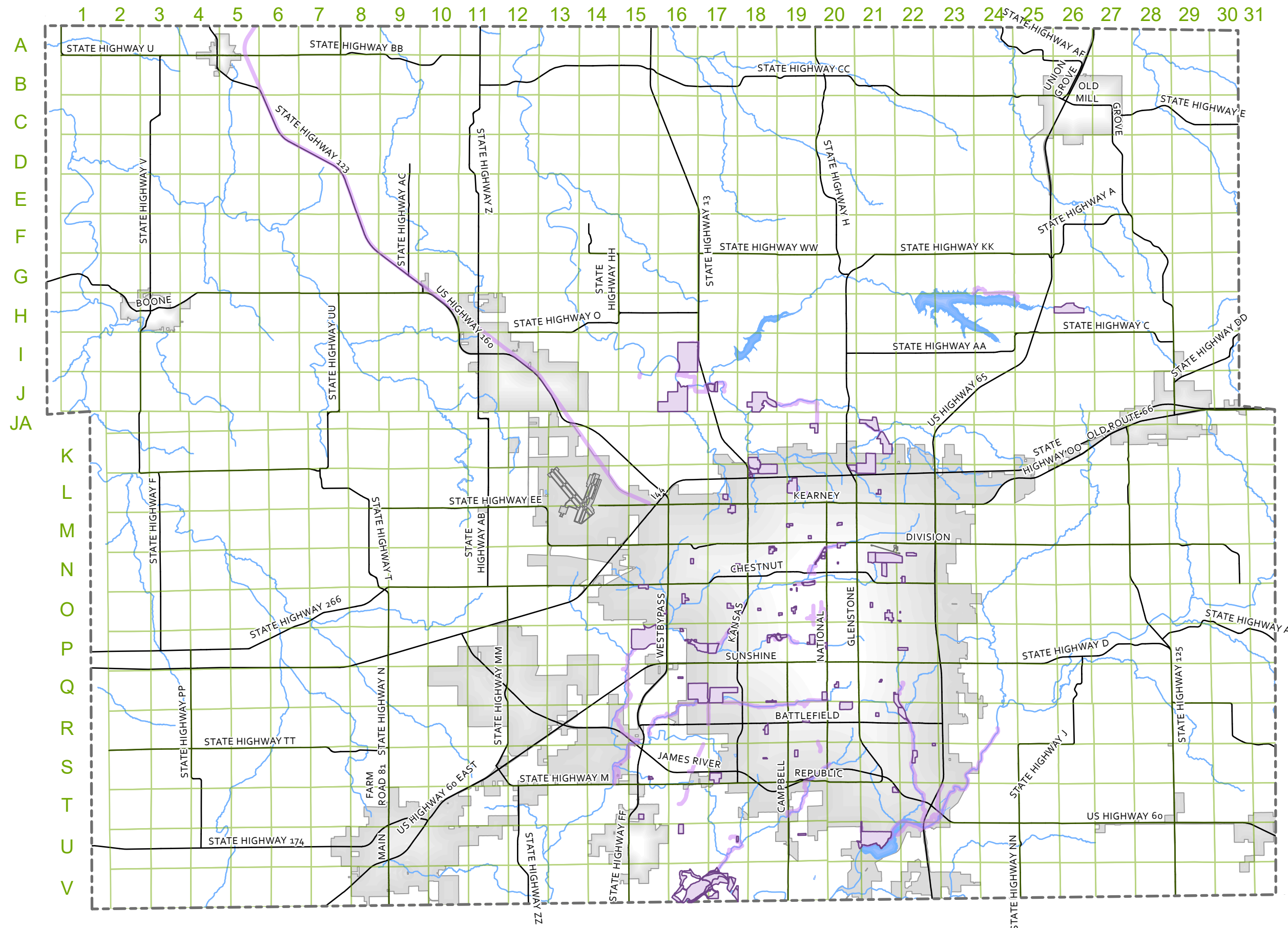
Legend

- ◆ City Utilities
- ⚡ CU Substations
- ⚓ CU Water Facilities
- ✓ Lift Stations
- ★ Northwest Wastewater Treatment Plant
- ★ Southwest Wastewater Treatment Plant
- Springfield City Limits
- City Limits
- Greene County

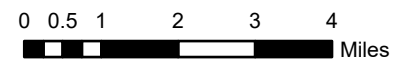


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Hazard Mitigation Plan: Parks

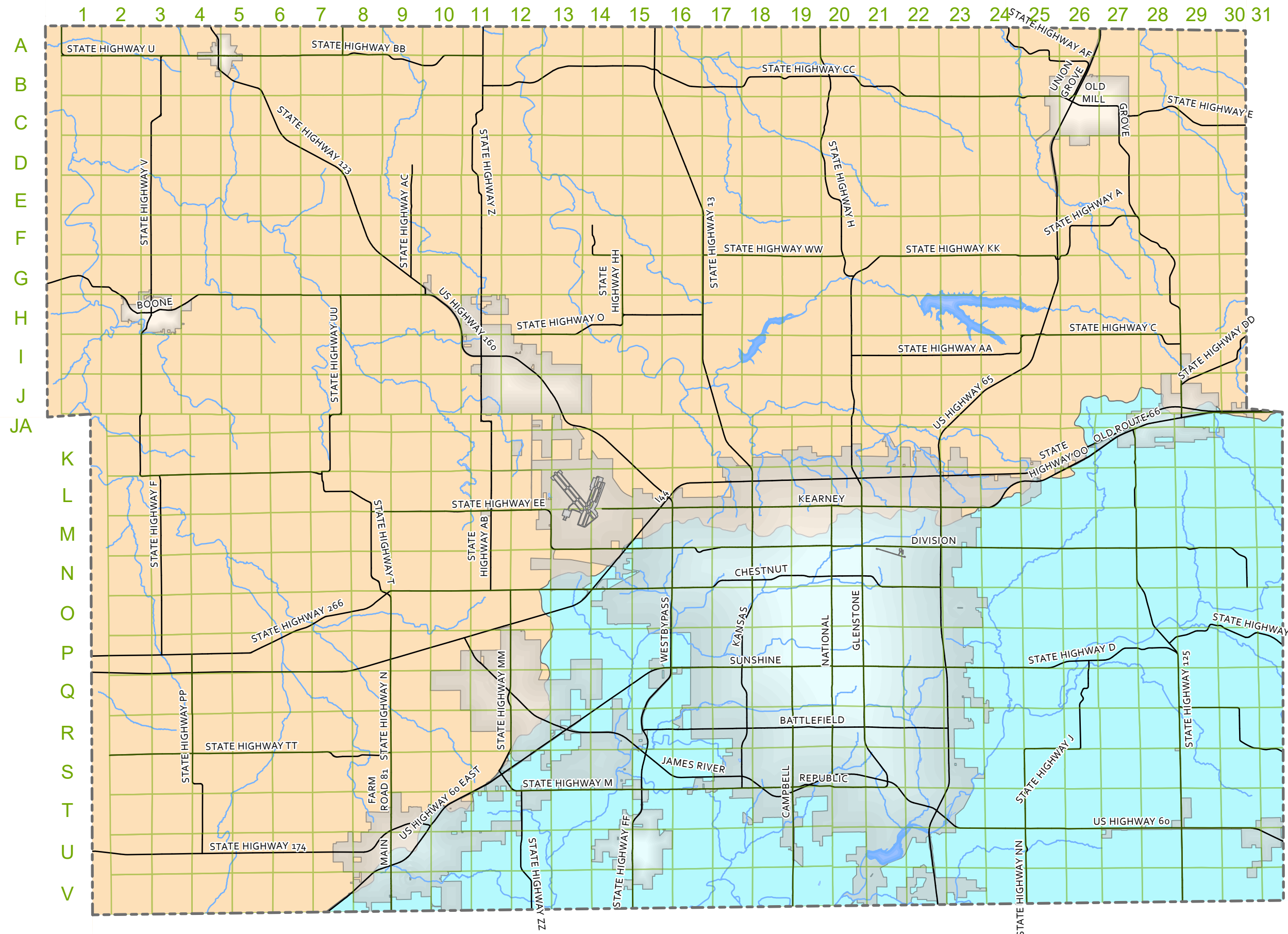


- Greene County
 - City Limits
 - Map Grid
 - Parks
 - Completed Trails
- Data Source:
City of Springfield GIS



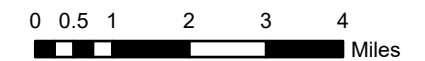
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Hazard Mitigation Plan: Watersheds



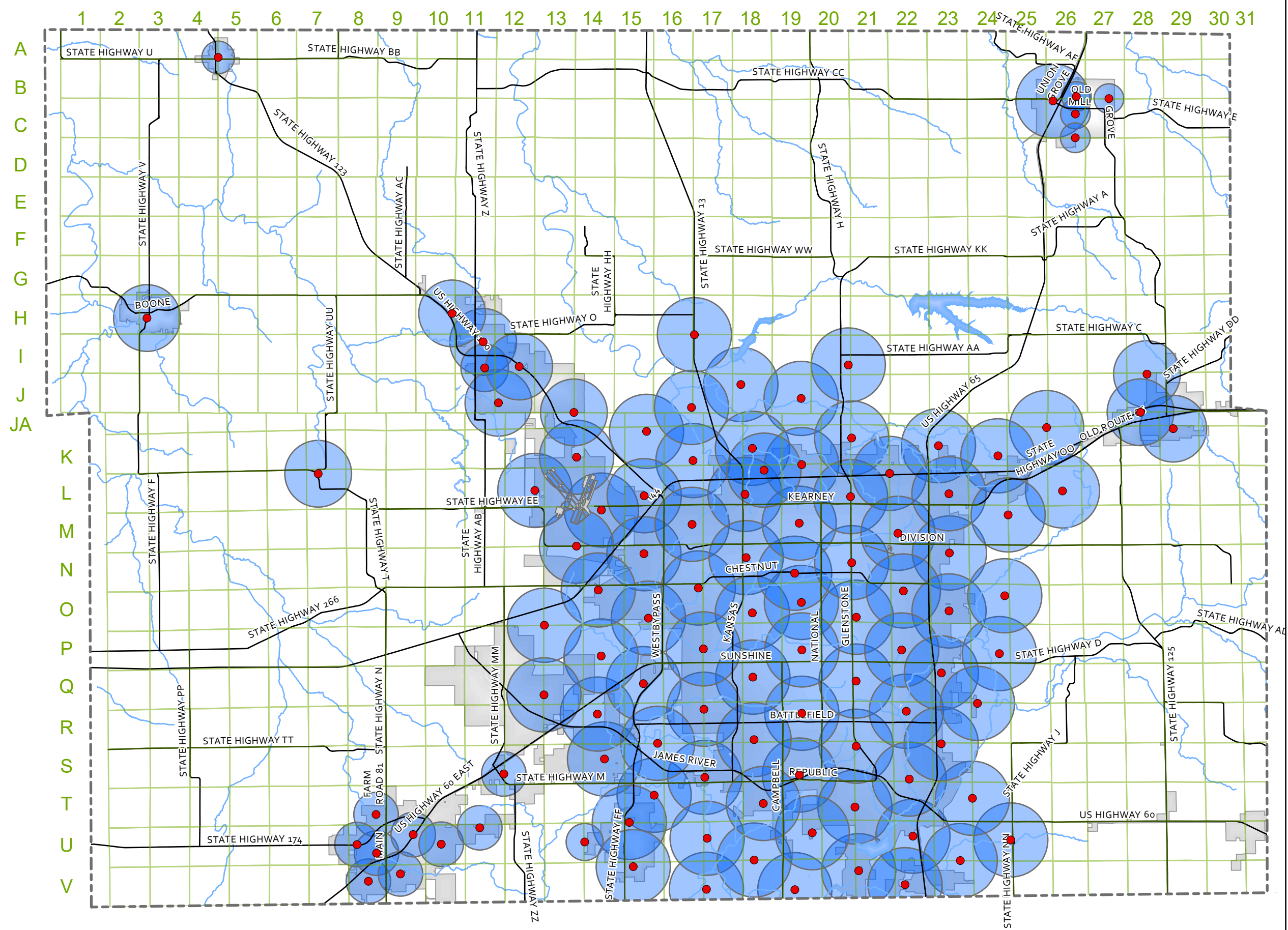
- Greene County
- City Limits
- Map Grid
- Osage
- Upper White

Data Source:
City of Springfield GIS



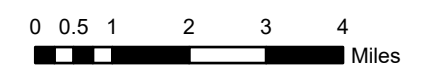
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Hazard Mitigation Plan: Storm Sirens



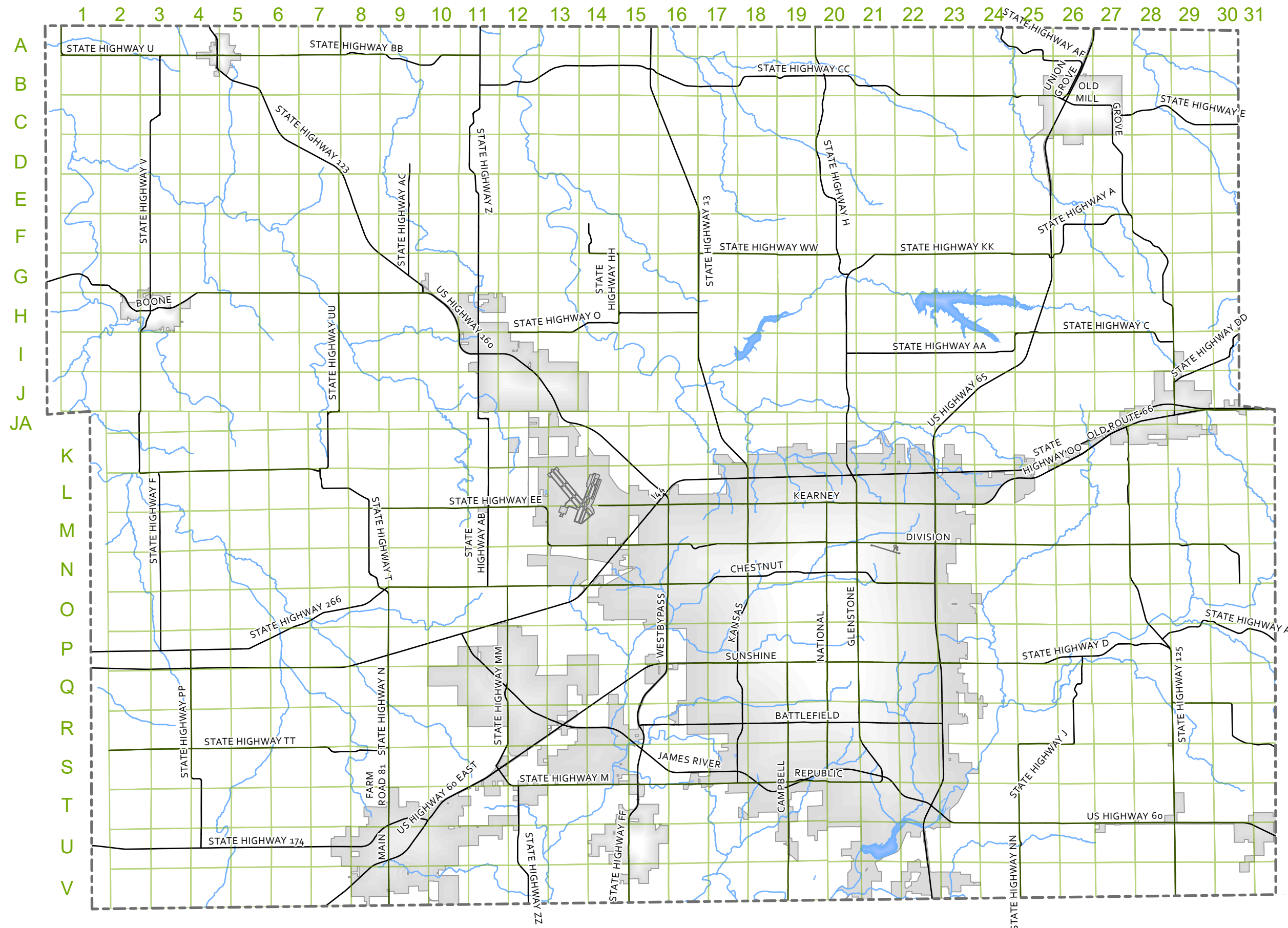
- Greene County
- City Limits
- Map Grid
- Storm Sirens
- Siren Buffers

Data Source:
City of Springfield GIS



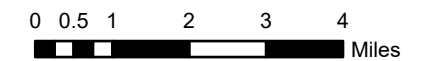
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Hazard Mitigation Plan: Waterways



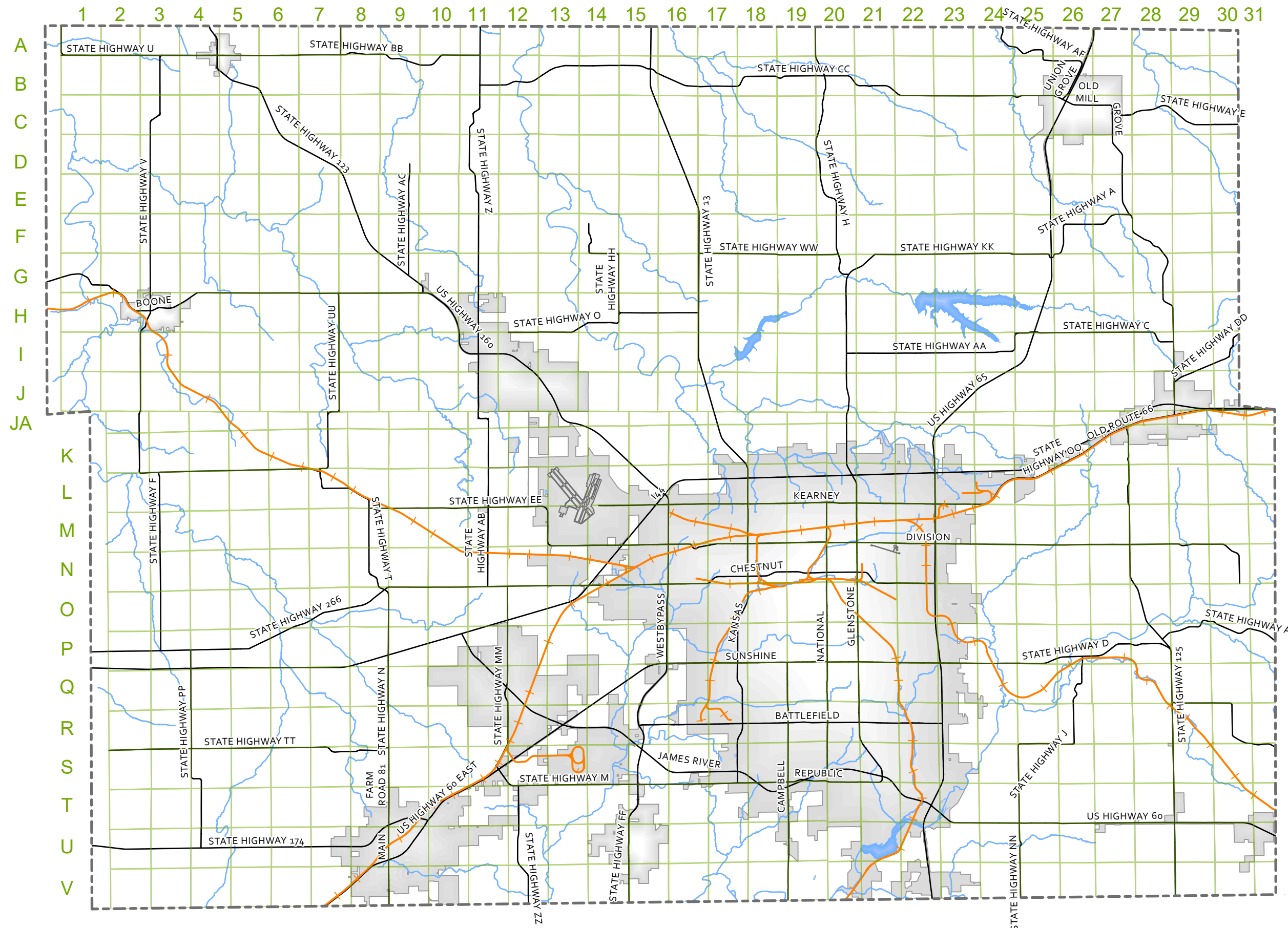
- Greene County
- City Limits
- Map Grid
- Stream
- Lake

Data Source:
City of Springfield GIS



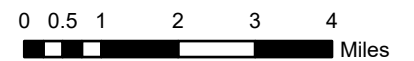
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Hazard Mitigation Plan: Railroads



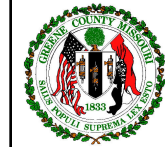
- Greene County
- City Limits
- Map Grid
- Railroad

Data Source:
City of Springfield GIS



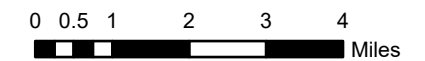
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Hazard Mitigation Plan: Greene Co Location

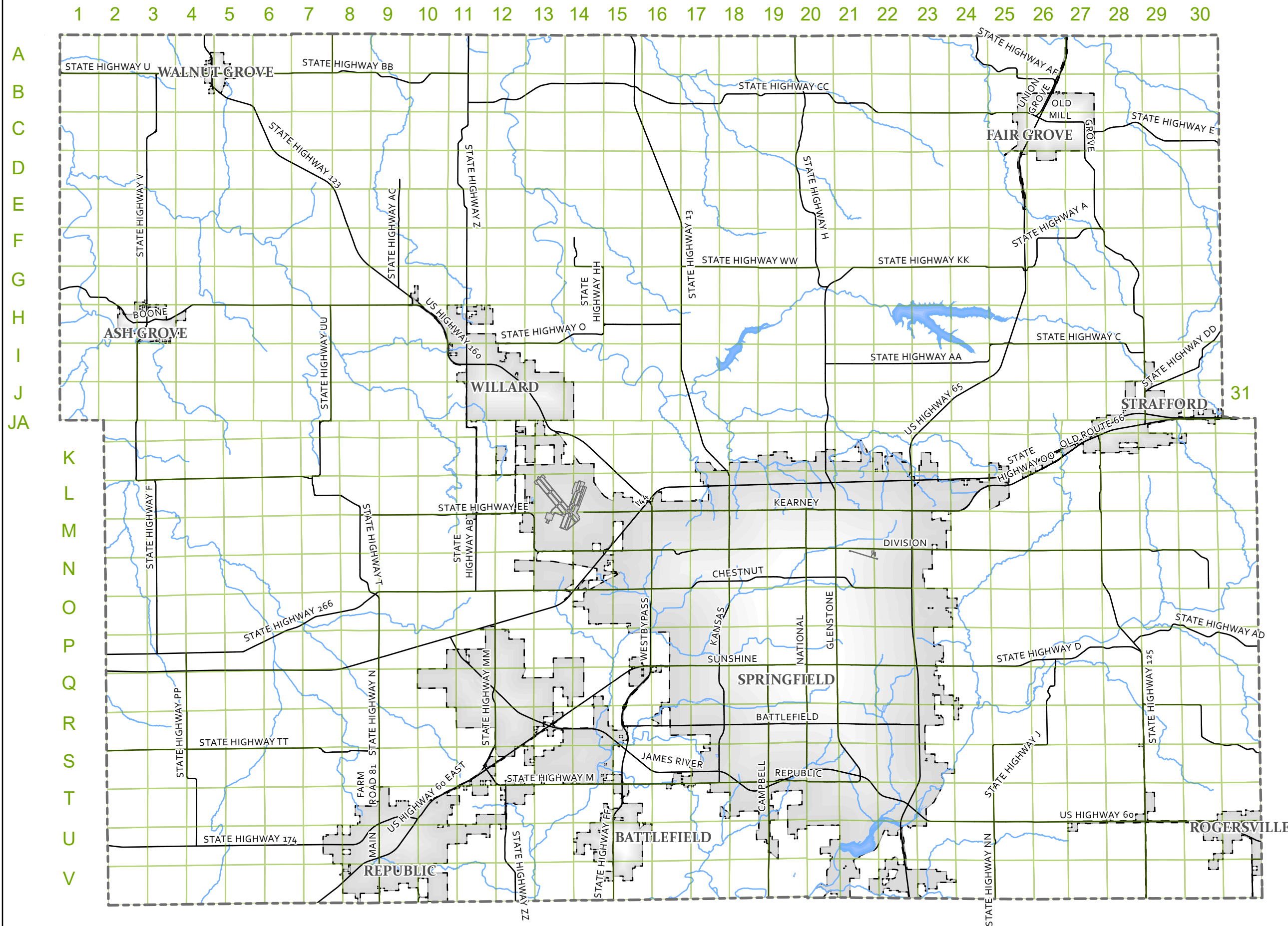


- Greene
- Map Grid
- City Limits

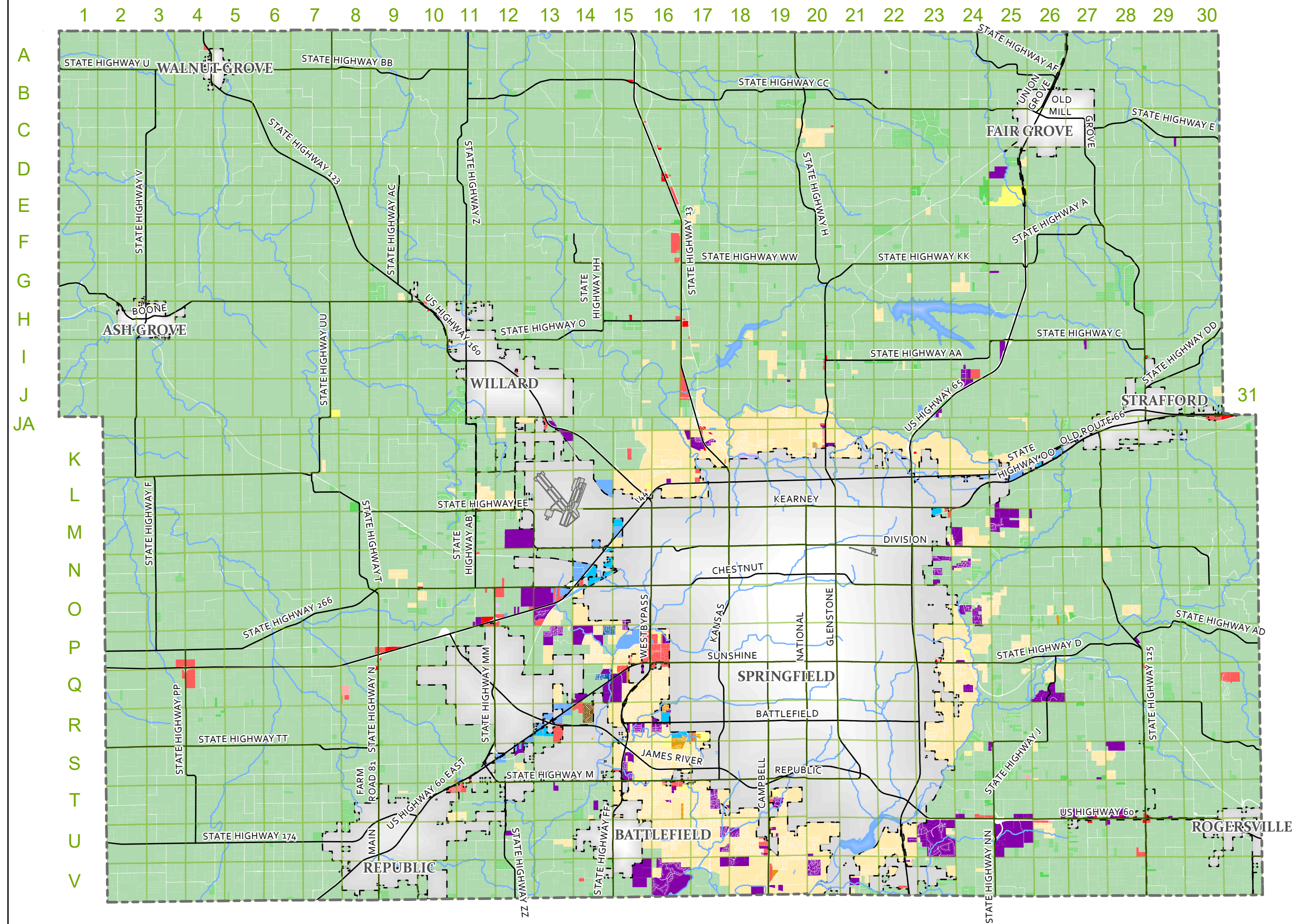
Data Source:
City of Springfield GIS



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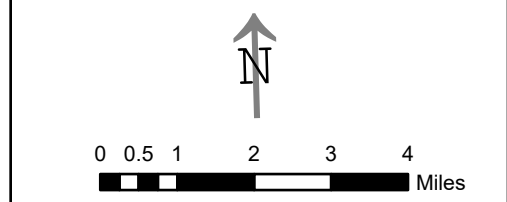


Hazard Mitigation Plan: County Zoning Districts



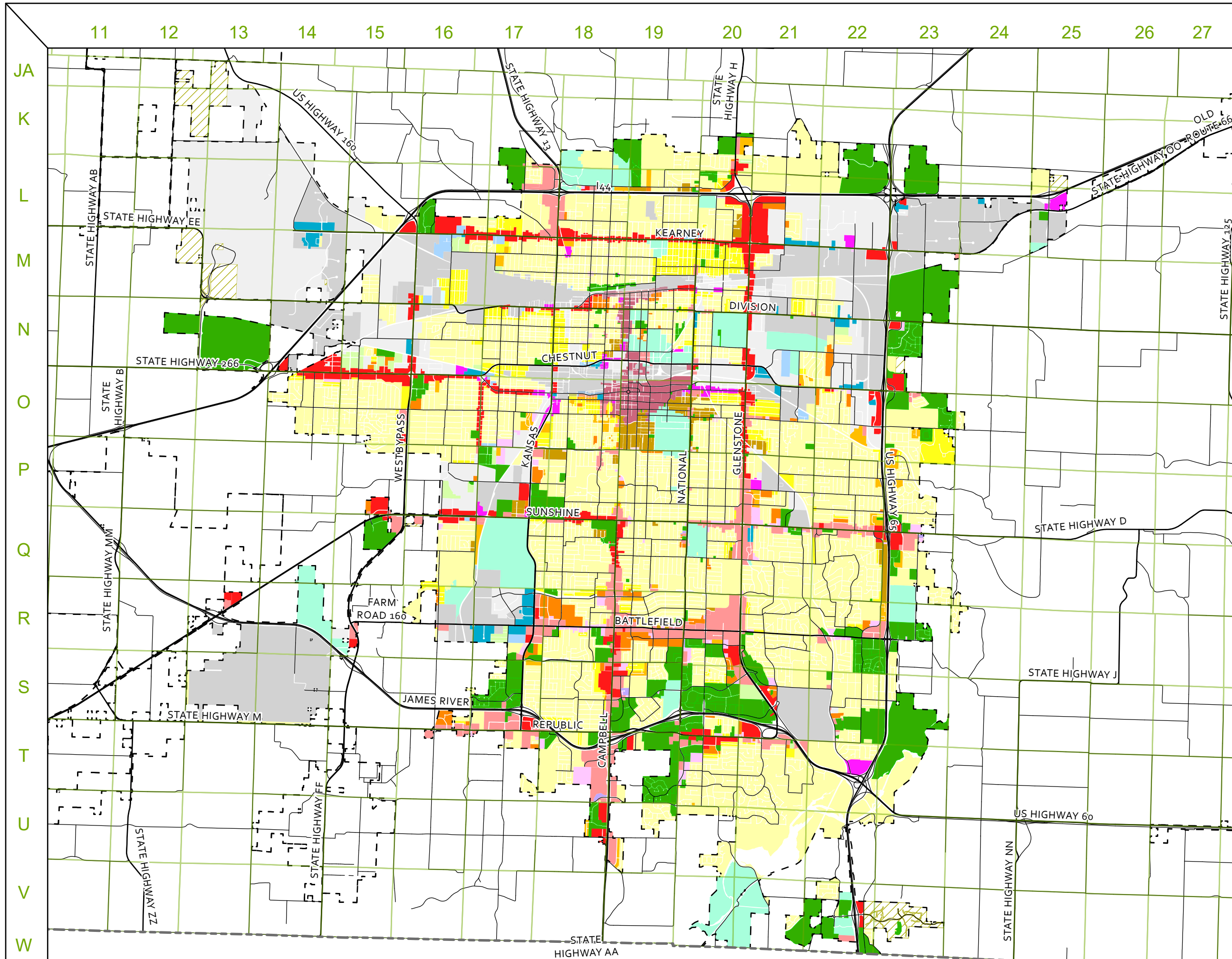
- Greene
- City Limits
- Map Grid
- City Limits
- A-1
- A-R
- C-1
- C-2
- C-3
- M-1
- M-2
- MH-1
- O-1
- O-2
- PAD
- R-1
- R-2
- R-3
- R-4
- RR-1
- UR-1

Data Source:
City of Springfield GIS



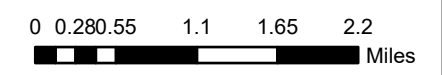
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Hazard Mitigation Plan: Springfield Zoning Dist.



- Greene County
- Map Grid
- COSGIS.zoning**
- R-SF
- R-TH
- R-LD
- R-MD
- R-HD
- R-MHC
- O-1
- O-2
- GI
- PD
- LB
- GR
- HC
- CS
- CC
- COM-1
- COM-2
- RI
- LI
- GM
- HM
- IC
- WC-1
- WC-2
- WC-3
- County District

Data Source:
City of Springfield GIS



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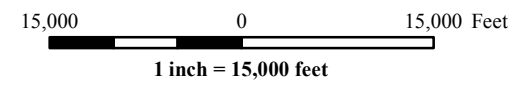
Hazard Mitigation Plan:

Greene County Historic Locations

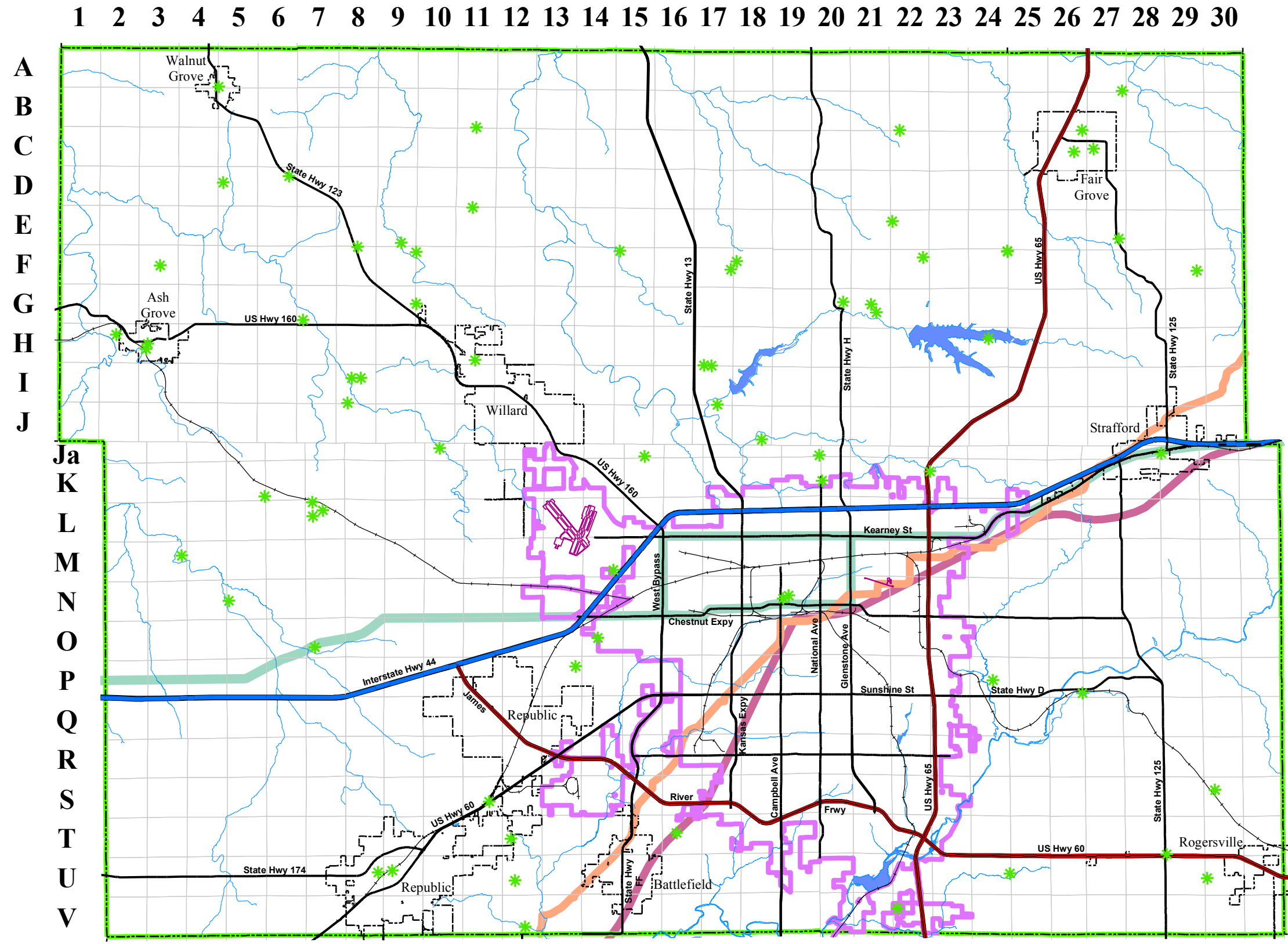


Legend

- County Historic Trails
 - Route 66
 - Trail of Tears
 - New Trail Of Tears
- * County Historic Sites
- Springfield City Limits
- City Limits
- Greene County



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Hazard Mitigation Plan: Springfield Historic Sites & Districts



- Greene County
- Map Grid
- City Limits
- Historic Sites
- Historic Districts**
- Local
- National

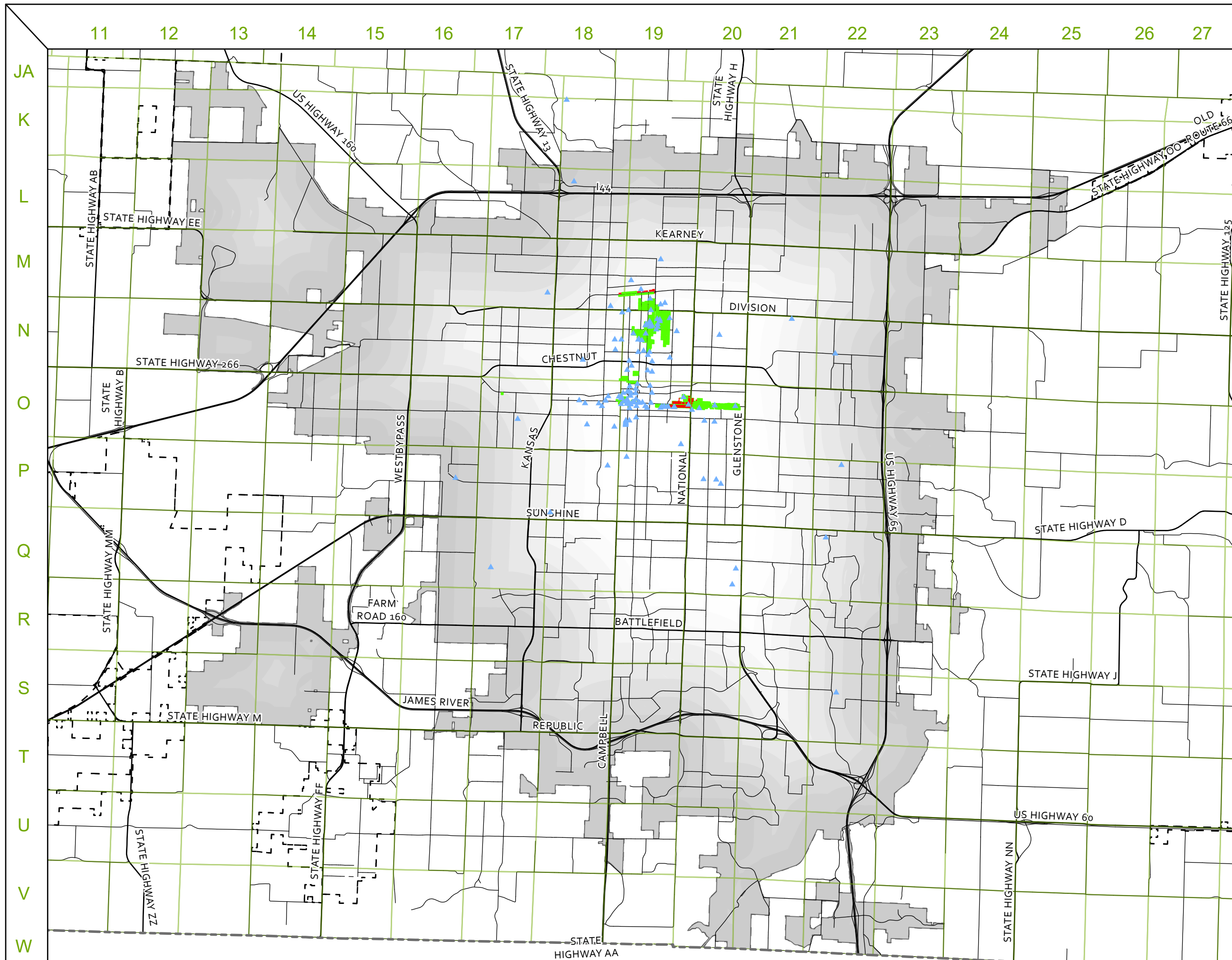
Data Source:
City of Springfield GIS



0 0.280.55 1.1 1.65 2.2
Miles

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Updated: 8/21/2019-rhant
N:\share\GIS\MXD\Egml\MitigationPlan\D_Zoning.aprx



Hazard Mitigation Plan: Springfield Historic Sites & Districts



- Greene County
- Map Grid
- Land Use**
- Land_Use**
- Agricultural
- Commercial
- Industrial
- Residential
- Tax Exempt
- Unclassified

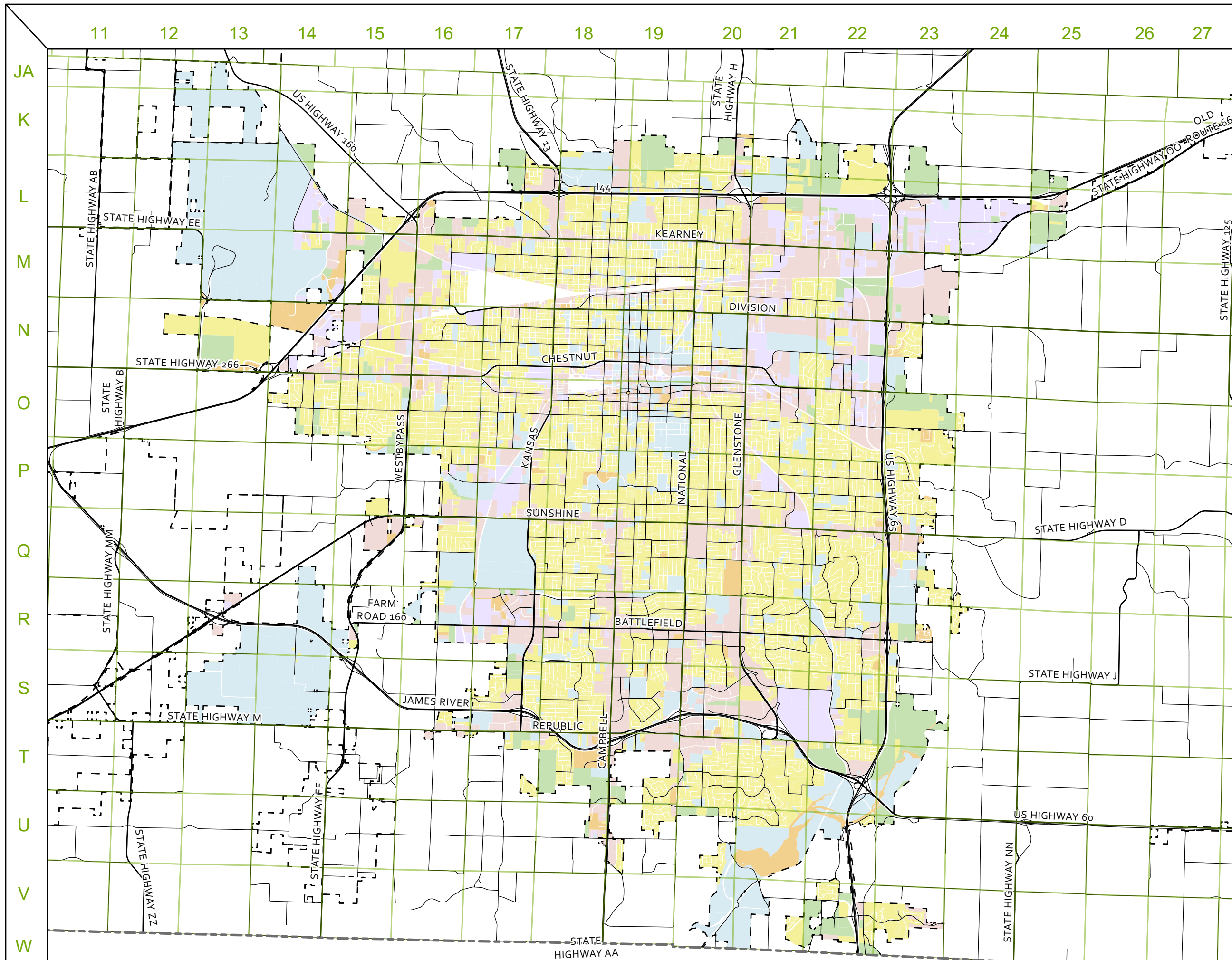
Data Source:
Greene Co GIS



0 0.280.55 1.1 1.65 2.2
Miles

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Updated: 8/30/2019-rhant
N:\share\GIS\MXD\Egri\MitigationPlan\D_Zoning.aprx



**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 3/4/19	CODE: MITIGATION
Event Name: Mitigation kick off meeting		Op Time:
info		

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James		GCOEM	—	<i>Hannah James</i>	1330	1430
2	Samantha Foster		GCOEM	—	<i>Samantha Foster</i>	1330	1430
3	Wendy Melville		GCOEM	—	<i>Wendy Melville</i>	1330	1430
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

DO NOT WRITE IN THIS SPACE!

DO NOT WRITE IN THIS SPACE!

DO NOT WRITE IN THIS SPACE!

**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Intern Staff Room	Date: 3/18/19	CODE: MITIGATION
Event Name:		Op Time:
Operational Period:		

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James		GCOEM		<i>[Signature]</i>	1030	1200
2	Kindly Meinde		GCUEM		<i>[Signature]</i>	1030	1200
3							
4							
5							
6							
7							
8							
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12							
13							
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 3/27/19	CODE: MITIGATION
Event Name: kick-off meeting run for	Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Foster Samantha	—	OEM	—	[Signature]	1430	1530
2	Winget MEDICINE		OEM		[Signature]	1430	1530
3	Wright Leah		OEM		[Signature]	1430	1530
4	Tyler Floyd		OEM		[Signature]	1430	1530
5	Hannah James		OEM		[Signature]	1430	1530
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Training	Date: 4/1/2019	CODE: First Floor	
Event Name: Mitigation Workshop	Operational Period: 3	Op Time: 1pm	

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Derrick Hubbell	15	Willard School	417-742-2554	<i>Derrick Hubbell</i>	2:00	2:56
2	David Hart	16	MSU	836-8444	<i>David Hart</i>	2:00	3:00
3	Damon Neal	17	Logan-Rogersville	417-753-2891	<i>Damon Neal</i>	2:00	3:00
4	JD Landan	18	OTR	417-447-6888	<i>JD Landan</i>	13:54	13:50
5	STEFANIE SHELL	19	WFPD	417-685-3114	<i>Stefanie Shell</i>	2:03	2:57
6	Krista	20	WFPD	417-844-7996	<i>Krista</i>	2:04	2:57
7	Brian Moberg	21	SFD	417-874-2300	<i>Brian Moberg</i>	2:04	3:00
8	Sarah Bodin	22	Smarray	417-736-2154	<i>Sarah Bodin</i>	2:00	2:40
9	Karen McKinis	23	SCHHA	—	<i>Karen McKinis</i>	2:00	2:50
10	TRANS FISHER	24	SGC-119	—	<i>TRANS FISHER</i>	2:06	2:51
11	Paul Lawrence	25	SPD	839-8500	<i>Paul Lawrence</i>	2:06	2:40
12	Paul Langhila	26	RPD	417-830-6499	<i>Paul Langhila</i>	2:06	2:50
13	Heath Baker	27	Chemex	417-209-3913	<i>Heath Baker</i>	2:45	2:58
14	Lindsey Melville	—	OEM	60040	<i>Lindsey Melville</i>	2:00	3:00
15	Hannah Jones	—	OEM	60040	<i>Hannah Jones</i>	2:00	3:00

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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Training	Date: 4/1/2019	CODE: First Floor
Event Name: Mitigation Workshop		Operational Period: 3
		Op Time: 1pm

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Jennifer Rowe	01	Willard	417-413-8772	Jennifer Rowe	1:40	2:56
2	Jacob Marler	02	Ash Grove	417-693-0811	Jacob Marler	1:41	3:00
3	Arnon Galt	03	Ash Grove	417-496-085	Arnon Galt	1:43	3:00
4	Sim Norgren	04	Greene County Hwy	417 829 6518	Sim Norgren	1:50	2:52
5	Lynne Howard	05	RDEM	417-234-4450	Lynne Howard	1:51	3:00
6	Tim Carlson	06	LRFPD	417-844-5855	Tim Carlson	1:51	3:00
7	Jeff Cumley	07	Parkus	774-2947	Jeff Cumley	1:52	3:01
8	Eve Sutton	08	City of W. Ludlow	599-7696	Eve Sutton	1:52	2:47
9	Garen McElroy	09	GCHD	829-6514	Garen McElroy	1:54	2:52
10	Scott Moore	10	Bethfield	393-4504	Scott Moore	1:54	3:00
11	Vanessa Brando		Greene City	868-4147	Vanessa Brando	1:57	2:41
12	Tom Revel	11	EVANLEL	575-8911	Tom Revel	1:52	3:00
13	CHRIS DUNNWAY	12	CITY OF SPRINGFIELD	864-1876	Chris Dunnway	1:58	2:41
14	Colby Rozell	13	GCHD	829-6513	Colby Rozell	1:59	2:51
15	Jim Finney	14	Parks	964-1345	Jim Finney	1:59	3:00

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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Training	Date: 4/11/2019	CODE: First Floor	
Event Name: Mitigation Workshop		Operational Period: 3	Op Time: 1pm

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Ty Floyd		GCDEM	6040	X	2:00	3:00
2	Sean		GCDEM	6040	X	2:00	3:00
3	Sam Foster		GCDEM	6040	X	2:00	3:00
4	Larry Nicks		GCDEM	6040	X	2:00	3:00
5	Brandon Smykel		GCDEM	6040	X	2:00	3:00
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 4/1/19	CODE: MITIGATION
Event Name: kick off meeting update		Op Time:
Operational Period:		

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James		GCOEM		<i>[Signature]</i>	0900	0930
2	Samantha Foster		GCOEM		<i>[Signature]</i>	0900	0930
3	WINDSEY MERKLE		GCOEM		<i>[Signature]</i>	0900	0930
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 4/8	CODE: MITIGATION
Event Name: SEMA QUESTIONS		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	945	1030
2	Samantha Foster	—	GCOEM	—	<i>[Signature]</i>	945	1030
3	Vanly Melville	—	GCOEM	—	<i>[Signature]</i>	945	1030
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Intern Room	Date: March 4/18	CODE: MITIGATION
Event Name: Municipalities Review		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	300	400
2	Tyrel Floyd	—	GCOEM	—	<i>Tyrel Floyd</i>	1500	1600
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 4/22	CODE: MITIGATION
Event Name: Capability Meeting		Operational Period:
		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GOEM	—	<i>[Signature]</i>	1000	1045
2	Larry Wash	—	GOEM	—	<i>[Signature]</i>	1000	1045
3	Windy Meivole	—	GOEM	—	<i>[Signature]</i>	1000	1045
4	Samantha Foster	—	GOEM	—	<i>[Signature]</i>	1000	1045
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 5/6/19	CODE: MITIGATION
Event Name: meetings/updates	Operational Period:	Op Time: 10:00-11:00AM

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	10:00	11:00
2	VINDSEY MERRILL	—	GCOEM	—	<i>V. Merrill</i>	10:00	11:00
3	Samantha Foster	—	GCOEM	—	<i>Samantha Foster</i>	10:00	11:00
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Stafford Central Office	Date: 5/7/19	CODE: MITIGATION
Event Name: Mitigation Meeting - Stafford Schools	Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	1400	1445
2	Samatha Foster	—	GCOEM	—	<i>Samatha Foster</i>	1400	1445
3	MINDY MERRIVÉ	—	GCOEM	—	<i>Mindy Merrivé</i>	1400	1445
4	Brett Soden	—	Stafford RVI	(417) 830-7014	<i>Brett Soden</i>	1400	1445
5	Justina Webster	—	Stafford RVI	417-266-5901	<i>Justina Webster</i>	1400	1445
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: <u>Police Room</u>	Date: <u>05-13-19</u>	CODE: MITIGATION
Event Name: <u>Vict Assessment</u>		Operational Period:
		Op Time: <u>0900</u>

Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1 <u>KINDSEY MERRILL</u>	<u>—</u>	<u>GOEM</u>	<u>417-869-6040</u>	<u>[Signature]</u>	<u>0900</u>	<u>1000</u>
2 <u>Hannah James</u>	<u>—</u>	<u>GOEM</u>	<u>—</u>	<u>[Signature]</u>	<u>0900</u>	<u>1000</u>
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Willard Date: 5/13/19 CODE: MITIGATION
 Event Name: Mitigation Info Operational Period: Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	13:30	14:30
2	VINSEY MERVIE	—	GCOEM	—	<i>[Signature]</i>	13:30	14:30
3	Ken Scott	—	WFPO	—	<i>[Signature]</i>	13:30	14:30
4	Derrick Hutsell	—	Willard School District	—	<i>[Signature]</i>	13:30	14:30
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 5/13/2019	CODE: First Floor
Event Name: Bois D 'Arc Mitigation Meeting		Operational Period: 1
		Op Time: 5pm

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	5:15	1800
2	Jamie Kilburn	—	Bois D'Arc Fire	417-343-4183	<i>[Signature]</i>	5:15	1800
3	VINDEY MERRIVE	—	GCOEM	—	<i>[Signature]</i>	1715	1800
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Springfield-Greene County Office of Emergency Management 911-Emergency Communications Center

Room: Policy	Date: 5/14/2019
CODE: First Floor	
Event Name: Fair Grove Mitigation Meeting	Operational Period: 1
	Op Time: 9am

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Greg Porter	—	Fair Grove	417 209-8937	<i>Greg Porter</i>	0920	1000
2	Hannah Same	—	GCOEM	—	<i>Hannah Same</i>	0920	1000
3	Vincky Meville	—	GCOEM	—	<i>Vincky Meville</i>	0920	1000
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 5/20/19	CODE: MITIGATION
Event Name: Springfield-Greene County Office of Emergency Management Plan Review	Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah Jones	—	GCOEM	—	<i>[Signature]</i>	0830	0930
2	Gematha Foster	—	GCOEM	—	<i>[Signature]</i>	0830	0930
3	Kindly Melville	—	GCOEM	—	<i>[Signature]</i>	0830	0930
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 5/27/19	CODE: MITIGATION
Event Name: GCOEM Mitigation Planning Meeting	Operational Period:	Op Time:

Risk Assessment Overview

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah Jones	-	GCOEM	-	<i>[Signature]</i>	0900	1030
2	Wendy Melville	-	GCOEM	-	<i>[Signature]</i>	0900	1030
3	Branden Surquier	-	GCOEM	-	<i>[Signature]</i>	0930	1010
4	Larry Webb	-	GCOEM	-	<i>[Signature]</i>	0930	1030
5	Samantha Foster	-	GCOEM	-	<i>[Signature]</i>	0900	1030
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: City Willard City Hall	Date: 6/10/19	CODE: MITIGATION
Event Name: City of Willard Mitigation Planning Meeting	Operational Period:	Op Time:

Mitigation Review

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCSEM	—	<i>Hannah James</i>	1400	1430
2	Jennifer Rowe	—	City of Willard	—	<i>Jennifer Rowe</i>	1400	1430
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: <u>Drury</u>	Date: <u>6/2/19</u>	CODE: MITIGATION
Event Name: Initial OEM Mitigation Planning Meeting		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	1350	1425
2	Jason Goodman	—	Drury	—		1350	1425
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: 911 Battlefield	Date: 6/13/19	CODE: MITIGATION
Event Name: Initial OEM Mitigation Planning Meeting		Operational Period:
		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	10:00	10:45
2	Frank Schoneboom		City of Battlefield		<i>F. Schoneboom</i>	10:00	10:45
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 6/20/19	CODE: MITIGATION
Event Name: MSU mitigation Update	Operational Period:	Op Time: 1030-1130

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	1030	1130
2	Karen McKinis		MSU		KAREN MCKINIS	1030	1130
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: <u>Library</u>	Date: <u>6/26/19</u>	CODE: MITIGATION
Event Name: <u>Springfield/GC meeting Agenda</u>		Operational Period: <u>Op Time: 915-1015</u>

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	<u>Hannah James</u>	<u>-</u>	<u>GC OEM</u>	<u>-</u>	<u>[Signature]</u>	<u>915</u>	<u>1015</u>
2	<u>Larry Weedy</u>		<u>GC OEM</u>	<u>-</u>	<u>[Signature]</u>	<u>915</u>	<u>1015</u>
3	<u>Samuel Foster</u>		<u>GC OEM</u>	<u>-</u>	<u>[Signature]</u>	<u>915</u>	<u>1015</u>
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 7/3/19	CODE: MITIGATION	
Event Name: Mitigation Review		Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	1230	1330
2	Vivian Melville		GCOEM		<i>[Signature]</i>	1230	1330
3	Samantha Foster		GCOEM		<i>[Signature]</i>	1230	1330
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Training Room	Date: 7/8/19
CODE: MITIGATION	
Event Name: Springfield Mitigation	Operational Period: Op Time: 1400 - 1500

	Print Name	PSC Badge #	Agency	Email	Signature	Time In	Time Out
1	CLAY GORDARD	—	HEALTH	csgordard@springfieldmo.gov	<i>Clay Gordard</i>	1:46	1500
2	Ryan Hunt	—	GIS	rhunt@springfieldmo.gov	<i>Ryan Hunt</i>	1:50	
3	Travis Fisher	—	Health	tfisher@springfieldmo.gov	<i>Travis Fisher</i>	1:50	
4	Colleen Parley	—	City Mays, etc	cparley@springfieldmo.gov	<i>Colleen Parley</i>	1:55	
5	CHRIS DUNNWAY	—	CITY OF SPRINGFIELD	cdunnway@springfieldmo.gov	<i>Chris Dunaway</i>	1:55	
6	Jeff Cumley	—	Parks	jeffcumley@springfieldmo.gov	<i>Jeff Cumley</i>	1:57	
7	Chuck Collins	—	ECD 911	ccollins@springfieldmo.gov	<i>Chuck Collins</i>	2:00	
8	Wendy Meule	—	GLDEM	—	<i>Wendy Meule</i>	1400	
9	Hannah James	—	GCOEM	—	<i>Hannah James</i>	1400	
10	Zim Schwartz	—	Springfield-Greene 911	zschwartz@springfieldmo.gov	<i>Zim Schwartz</i>	1412	
11	Larry Woch	—	GC OEm	lw@springfieldmo.gov	<i>Larry Woch</i>	1400	✓
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Training Room	Date: 7/9/19	CODE: MITIGATION	
Event Name:	Operational Period:	Op Time:	

	Print Name	Department	Email	Signature	Time In	Time Out
1	Vanessa Brandon	Resource Mgt.	vbrandon@greene-county.mo.gov	<i>Vanessa Brandon</i>	1:50	
2	Franz Williams	Building Operations	frwilliams@greene-county.mo.gov	<i>Franz Williams</i>	1:50	
3	Tyler Goodwyn	Resource Mgmt.	tgoodwyn@greene-county.mo.gov	<i>Tyler Goodwyn</i>	1:56	
4	Ken Shaw	Sheriff's Office	kshaw@greene-county.mo.gov	<i>Ken Shaw</i>	1:50	
5	David Johnson	CCSO	D.Johnson@greene-county.mo.gov	<i>David Johnson</i>	1:30	
6	Tina Phillips	CCBO	tphillips@greene-county.mo.gov	<i>Tina Phillips</i>	1:56	
7	Michael Aulen	I.S.	MAULEN@greene-county.mo.gov	<i>Michael Aulen</i>	1:57	
8	Vincky Meville	ALBEM	-	<i>Vincky Meville</i>	1400	
9	Samantha Foster	CCOEM	-	<i>Samantha Foster</i>	1400	
10	Rob Ryzdon	Resource Mgmt.	r.ryzdon@greene-county.mo.gov	<i>Rob Ryzdon</i>	14:00	
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: OTC Office	Code: MITIGATION
Date: 7/10/19	Op Time:
Event Name:	
Operational Period:	

#	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	0900	1000
2	Scott Leven		OTC	417-447-6985	<i>[Signature]</i>	0900	↓
3	J.D. Landon		OTC	417-447-6988	<i>[Signature]</i>	0900	↓
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Sam's Office	Date: 7/10/19	CODE: MITIGATION
Event Name: Mitigation Ideas - Springfield		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	1500	1600
2	Lindsey Meride	—	GCOEM	—	<i>Lindsey Meride</i>	1500	1600
3	Larry Woods	—	GCOEM	—	<i>Larry Woods</i>	1500	1600
4	Sam Foster	—	GCOEM	—	<i>Sam Foster</i>	1500	1600
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Republic Schools	Date: 7/11/19	CODE: MITIGATION
Event Name: School, City & Fire Mitigation		Operational Period: Op Time: 12:00

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	Hannah James	12:00	13:00
2	Chance Gibson		Republic Schools	—	Chance Gibson	12:00	
3	Lynne Hollenbeck		ROEM		Lynne Hollenbeck	12:00	
4	Scott Umberger		Republic Schools		Scott Umberger	12:00	
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Ty's Office	Date: 7/2/19	CODE: MITIGATION
Event Name: Multi Mitigation		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	-	GCOEM	-	Hannah James	0900	1000
2	Tyrel Floyd	-	GCOEM	-	Tyrel Floyd	0900	1000
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: <u>Battlefield</u>	Date: <u>7/12</u>	CODE: MITIGATION	
Event Name: <u>Battlefield Mitigation Update</u>	Operational Period:	Op Time: <u>13-1400</u>	

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	<u>Hannah James</u>	<u>—</u>	<u>GCOEM</u>	<u>—</u>	<u>Hannah</u>	<u>1300</u>	<u>1400</u>
2	<u>Scott Moore</u>	<u>—</u>	<u>Battlefield Fire</u>	<u>—</u>	<u>Scott Moore</u>	<u>1300</u>	<u>1400</u>
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 7/17/19	CODE: MITIGATION	
Event Name: Walnut Grove Mitigation		Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	Hannah James	1000	
2	Eric Sutto	—	City of WG	417 788 2596	Eric Sutto	1000	
3	Tyrel Floyd	—	GCOEM	—	Tyrel Floyd	1000	
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 7/17/19
CODE: MITIGATION	
Event Name: SEMA Questions	Operational Period:
	Op Time:

Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1 Hannah James	-	GCOEM	-	<i>[Signature]</i>	1130	1200
2 WINDSET MERRILL	-	GCOEM	-	<i>[Signature]</i>	1130	1200
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Logan-Rogersville St. 4	Date: 7/17/19	CODE: MITIGATION
Event Name: Fire Mitigation Planning		Operational Period:
		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	---	GCOEM	---	<i>Hannah James</i>	1400	1500
2	Tim Clarkson		LRFPD		<i>Tim Clarkson</i>	1400	1500
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: NIMS	Date: 7/18/19	CODE: First Floor
Event Name: Ebenezer Fire District		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	1000	1030
2	Heath Taylor	—	Ebenezer Fire		<i>Heath Taylor</i>	1000	1030
3	Ashlee Parker	—	Ebenezer Fire		<i>Ashlee Parker</i>	1000	1030
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 7/22/19	CODE: MITIGATION
Event Name: NOT discussion		Operational Period:
		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	0850	0930
2	Samantha Foster	—	GCOEM	—	<i>Samantha Foster</i>	0850	0930
3	Tyrel Floyd	—	GCOEM	—	<i>Tyrel Floyd</i>	0850	0930
4	VINDEY MEMBLE	—	GCOEM	—	<i>V. Memble</i>	0850	0930
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Walnut Grove Fire	Date: 8/5/19	CODE: MITIGATION
Event Name: Walnut Grove Fire Mitigation		Op Time:
Operational Period:		

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	1100	1200
2	DARREL KYR	—	WGFD	—	<i>Darrel Kerr</i>	1100	1200
3	Dwayne Bourke	—	WGFD	—	<i>Dwayne Bourke</i>	1100	1200
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 8/6/19	CODE: MITIGATION
Event Name: Greene County 30th Mitigation	Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	0900	1000
2	David Johnson	—	GC50	—	<i>[Signature]</i>	0900	1000
3	Jennifer Dodson	—	GC50	—	<i>[Signature]</i>	0900	1000
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 8/6/19	CODE: MITIGATION
Event Name: City of Springfield Stormwater	Operational Period:	Op Time:

Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1 Hannah James	—	GCOEM	—	<i>Hannah James</i>	1330	1400
2 CHRIS DUNNWAY	—	CITY OF SPRINGFIELD PUBLIC WORKS	417-864-1876	<i>Chris Dunaway</i>	1330	1400
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 8/6/19	CODE: MITIGATION
Event Name: City of Springfield (Health Dept)		Operational Period: Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOFM	—	<i>Hannah James</i>	1500	1600
2	Travis Fisher	—	S6FD	—	<i>Travis Fisher</i>	1500	1600
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 8/7/19	CODE: MITIGATION
Event Name: Ash Grove City + School Mitigation		Operational Period: Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	-	GCOEM	-	<i>[Signature]</i>	1330	1430
2	Tyrel Floyd	-	GCOEM	-	<i>[Signature]</i>	1330	1430
3	Jacob Marler	-	AGCOEM	-	<i>[Signature]</i>	1330	1430
4	Arnon GenLA	-	ASH Grove School District	-	<i>[Signature]</i>	1330	1430
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: <u>Policy</u>	Date: <u>8/13/19</u>	CODE: MITIGATION
Event Name: <u>Springfield-Greene County Parks</u>		Operational Period: _____ Op Time: _____

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GOEM	—	<i>Hannah James</i>	1000	1100
2	JEFF CRAWLEY		Parks		<i>Jeff Crawley</i>	1000	1100
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Ozark Empire Fair	Date: 8/14/19	CODE: MITIGATION
Event Name: Fairgrounds Mitigation		Operational Period: Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannan James	—	GCOEM	—	<i>Hannan James</i>	2:30	3:30
2	Casey Owen	—	DEF	—	<i>Casey Owen</i>	2:30	3:30
3	Aaron Owen		DEF		<i>Aaron Owen</i>	2:30	3:30
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 8/15/19	CODE: MITIGATION
Event Name: City of Springfield - Water Quality Mitigation	Operational Period:	Op Time: 1

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	-	GCOEM	-	Hannah James	2:00	
2	Carrie Lamb	-		-	Carrie Lamb	2:00	
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 8/19/19	CODE: MITIGATION
Event Name: Mitigation Update	Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	Hannah James	845	945
2	Samantha Foster	—	GCOEM	—	Samantha Foster	845	945
3	WINDLEY MERIBBE	—	GCOEM	—	W.M.	1145	945
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 8/22/19	CODE: MITIGATION
Event Name: Public Works Mitigation		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	1000	1100
2	Don Smith	—	SGF Public Works	—	<i>[Signature]</i>	1000	1100
3	Martin Gugel	—	SGF Public Works	—	<i>[Signature]</i>	1000	1100
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 8/20/19	CODE: MITIGATION
Event Name: Mitigation Update		Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>Hannah James</i>	0830	
2	Sam Foster	—	GCOEM	—	<i>Sam Foster</i>	0830	
3	Lindsey Mericle	—	GCOEM	—	<i>Lindsey Mericle</i>	0830	
4	Larry Woods	—	GCOEM	—	<i>Larry Woods</i>	0830	
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Greene County Mayors' Association

Representing the Communities of Ash Grove, Battlefield, Fair Grove, Republic, Rogersville, Springfield, Strafford, Walnut Grove and Willard

August 29, 2019

Name	City/County & Position	Email Address	Sign In
Les Gardner	ASH GROVE - Mayor	Les.Gardner@ashgrovemo.gov	<input type="checkbox"/>
Melissa Mau	ASH GROVE - City Clerk	Melissa.mau@ashgrovemo.gov	<input type="checkbox"/>
Debra Hickey	BATTLEFIELD - Mayor	mayor@battlefieldmo.gov	<input type="checkbox"/>
Frank Schoneboom	BATTLEFIELD - City Administrator	cityadmin@battlefieldmo.gov	<input checked="" type="checkbox"/>
Chris McPhail	BATTLEFIELD - Police Chief	policedept@battlefieldmo.gov	<input type="checkbox"/>
Anthony Miller	FAIR GROVE - Mayor	anthony.miller@fairgrove.org	<input type="checkbox"/>
Dana Louderbaugh	FAIR GROVE - City Clerk	clerk@fairgrove.org	<input type="checkbox"/>
Jeff Ussery	REPUBLIC - Mayor	jussery@republicmo.com	<input type="checkbox"/>
David Cameron	REPUBLIC - City Administrator	dcameron@republicmo.com	<input type="checkbox"/>
Jared Keeling	REPUBLIC - Assist. City Admin.	jkeeling@republicmo.com	<input type="checkbox"/>
Laura Burbridge	REPUBLIC - City Clerk	LBurbridge@republicmo.com	<input type="checkbox"/>
Scott Ison	REPUBLIC - City Attorney	sison@republicmo.com	<input checked="" type="checkbox"/>

August 29, 2012

John Hill	ROGERSVILLE - Mayor	jhill@rogersvillemo.org	<input checked="" type="checkbox"/>
Chad Bybee	ROGERSVILLE - City Administrator	lsutton@rogersvillemo.org Cbybee@rogersvillemo.org	<input checked="" type="checkbox"/>
Glenda Stegner	ROGERSVILLE - City Clerk	gstegner@rogersvillemo.org	<input type="checkbox"/>
Ken McClure	SPRINGFIELD - Mayor	kmccclure@springfieldmo.gov	<input type="checkbox"/>
Jason Gage	SPRINGFIELD - City Manager	jgage@gage@springfieldmo.gov	<input type="checkbox"/>
Anita Cotter	SPRINGFIELD - City Clerk	acotter@springfieldmo.gov	<input type="checkbox"/>
Ashley French	STRAFFORD - Mayor	mayor@straffordmo.net	<input checked="" type="checkbox"/>
Martha Smart	STRAFFORD - City Administrator	ca@straffordmo.net	<input checked="" type="checkbox"/>
Terri Taylor	STRAFFORD - City Clerk	clerk@straffordmo.net	<input type="checkbox"/>
Eldon Locke	WALNUT GROVE - Mayor	No email	<input checked="" type="checkbox"/>
Eric Sutton	WALNUT GROVE - City Clerk	clerk@walnutgrovemmo.org	<input checked="" type="checkbox"/>
Corey Hendrickson	WILLARD - Mayor	chendrickson@cityofwillard.org	<input checked="" type="checkbox"/>
Brad Gray	WILLARD - City Administrator	ca@cityofwillard.org	<input type="checkbox"/>
Jennifer Rowe	WILLARD - City Clerk	clerk@cityofwillard.org	<input type="checkbox"/>
Hannah James	Greene County OFM	h.james@greencountymo.gov	<input checked="" type="checkbox"/>

August 29, 2019

Bob Dixon	GREENE COUNTY - Presiding Commissioner	bdixon@greencountymo.gov	<input checked="" type="checkbox"/>
Harold Bengsch <i>Harold Bengsch</i>	GREENE COUNTY - Western Commissioner	hbengsch@greencountymo.gov	<input checked="" type="checkbox"/>
John Russell	GREENE COUNTY - Eastern Commissioner	jrussell@greencountymo.gov	<input checked="" type="checkbox"/>
Chris Coulter <i>CCC</i>	GREENE COUNTY - County Administrator	ccoulter@greencountymo.gov	<input checked="" type="checkbox"/>
Jim Arnott	GREENE COUNTY - Office Coordinator	@greencountymo.gov	<input type="checkbox"/>
	GREENE COUNTY - Sheriff	jarnott@greencountymo.gov	<input type="checkbox"/>
Zim Schwartz	SPRINGFIELD-GREENE COUNTY 911 Director	zschwartz@springfieldmo.gov	<input checked="" type="checkbox"/>
Jeff Scott	Greene County Budget Officer	jscott@greencountymo.gov	<input checked="" type="checkbox"/>
Tyrel Floyd	EMA Specialist for Area Municipalities	tfloyd@greencountymo.gov	<input checked="" type="checkbox"/>
David Burton	MU Extension	burtond@missouriredu	<input checked="" type="checkbox"/>
<i>John Webb</i>	<i>5-66911</i>	<i>ja webb @springfieldmo.gov</i>	<input checked="" type="checkbox"/>
<i>Cora Scott - Sr. Mayor</i>	<i>Springfield - Director of Public Engagement</i>	<i>cscott@springfieldmo.gov</i>	<input checked="" type="checkbox"/>
<i>Rick Kessinger</i>	<i>Assessor</i>	<i>rkessinger@greencountymo.gov</i>	<input checked="" type="checkbox"/>
<i>Donna Burton</i>	<i>Greene Co. PIO</i>	<i>dlburton@greencountymo.gov</i>	<input type="checkbox"/>

Cindy Stein & Angie Crews Greene Co. Auditor's Office

Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: 200	Date: 8/30/19	CODE: MITIGATION
Event Name: Parks Dept. Mitigation		Operational Period: Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	-	GOEM	-	[Signature]	1000	1100
2	Mike Crocker	-	ZOO	-	Richard B. Crocker	1000	1100
3	Jeff Cumley	-	Parks	-		1000	1100
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 8/30/19	CODE: MITIGATION
Event Name: CD Mitigation		Operational Period: Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	-	GCOEM	-	<i>[Signature]</i>	1400	1500
2	Sandy Myers	-	City Utilities	-	<i>[Signature]</i>	1400	1500
3	Heath Strey		City Utilities	417-831-8646	<i>[Signature]</i>	1400	1500
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 9/3/19	CODE: MITIGATION
Event Name: Mitigation Updates - GIS info	Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	-	GCOEM	-	[Signature]	900	1000
2	Lindsey Mericle	-	GCOEM	-	[Signature]	0900	1000
3	Sam Foster	-	GCOEM	-	[Signature]		
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Springfield-Greene County Office of Emergency Management
 911-Emergency Communications Center

Room: Policy	Date: 9/4	CODE: MITIGATION
Event Name: GEM Mitigation Projects	Operational Period:	Op Time:

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	-	GCOEM	-	<i>Hannah James</i>	0900	1000
2	Larry Woods	-	GCOEM	-	<i>Larry Woods</i>	0900	1000
3	WINDY NERDIE	-	GCOEM	-	<i>Windy Nerdie</i>	0900	1000
4	Abbey Hardy	-	GCOEM	-	<i>Abbey Hardy</i>	9:00am	1000
5	Tyler Floyd	-	GCOEM	-	<i>Tyler Floyd</i>	9:00	1000
6	Robin Sawyer	-	GCOEM	-	<i>Robin Sawyer</i>	9:00	1000
7	COURTNEY WINTER	-	GCOEM	-	<i>Courtney Winter</i>	9:00	1000
8	Samantha Foster	-	GCOEM	-	<i>Samantha Foster</i>	9:00	1000
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**Springfield-Greene County Office of Emergency Management
911-Emergency Communications Center**

Room: Policy	Date: 9/5/2019	CODE: MITIGATION	
Event Name: Mitigation Meeting		Operational Period: 1	Op Time: 1:00

	Print Name	PSC Badge #	Agency	Phone	Signature	Time In	Time Out
1	Hannah James	—	GCOEM	—	<i>[Signature]</i>	1300	1400
2	CHRISTOPHER JONES	—	Drury	—	<i>[Signature]</i>	1300	1400
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